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AN INTERPRETATION OF DISCUSSION AT A WORKSHOP ON:

The human factors affecting forestry/fuelwood projects: an agenda for research and development (11, 12, 13 February, 1984, Washington, D.C.)

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With short essays by Harry Blair, Louise Fortmann, George Lovelace, Gary Machlis, Joe Miller, Eva Muller, Jeff Romm and James Thomson.

Preface

Any workshop of two or more persons is too rich and too complex to have its full utility transcribed mechanically. This is especially so when we attempt to combine biological and social science specialists around problem areas of exceptional complexity such as forestry for rural development. Consequently, I have attempted to interpret what went on rather than simply to record all the details.

This interpretation is greatly informed by the scholars listed on the title page. I was further helped by the interpretation of my forester/social ecology consultants -- Dave Gibson, Don Masterson, Eva Muller, Chun Lai, and Carol Stoney — and the many participants who took the time to respond to our review draft.

Of particular value in this effort, has been the support and informed criticism of my USAID colleagues — Eric Chetwynd, Carl Gallegos, Max McFadden, Kathy Parker and Ruth Zagorin. To all these and the workshop participants thanks much, I'll take the blame if you will take the credit.

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I. Background and Basic Issues for Workshop

Forest ecosystems and trees have long had their lives intertwined with the lives of human social systems. Forests are the source of materials for human shelter, transportation, and energy. They are crucial elements in curbing soil erosion, moderating climate and sustaining water quality and quantity. Trees have the capacity for restoring soil nutrients and fixing nitrogen. They provide forage and shelter for domestic and wild animals. They provide spices, fruits, nuts and other foods. They are sources of resins and other marine supplies. They are places for religious and recreational refuge and foci for tourist serving industries.

Trees and forests are the last safety net for the rural poor. The landless are forced into them to find a base for survival and tribal peoples must retreat further into forests to retain their cultural identity. While wealthier segments of national and world society can chose more "noble" fuels, the poor are forced to exploit the twigs, sticks, leaves and other residues of woodlands.

The central value of fuelwood for the rural poor is provided by two recent studies. An entire issue of Cultural Survival (1982) examined the human costs of deforestation. It reported:

> Eighty percent of all wood harvested in the tropics is used for firewood and charcoal. For some 2 billion people in developing countries (80 percent of all households), it costs nearly as much to heat their cooking bowls as to fill them.

A detailed empirical study by John Briscoe (1979) clearly demonstrates the "safety net" function of forest ecosystems. He reports:

> Poor families in Bangladesh typically spend about 90 percent of their incomes on food. If they had to purchase the fuel that they presently collect for nothing, with their incomes unchanged they would have to reduce their caloric intakes to below 1200 kilocalories daily.

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The poorer countries have all the traditional demands placed upon forest ecosystems along with rising pressures for new industrial uses such as sawtimber, pulpwood, railroad ties, boxing materials and so forth. Consequently, both national development goals and local community survival and development goals press upon an ever shrinking forest resource base. As the Office of Technology Assessment (1984) notes:

> Each year approximately 11.3 million hectares of the Earth's remaining tropical forests-an area roughly the size of Pennsylvania-are cleared and converted to other uses. Where cleared land is developed for sustainable agriculture, deforestation can be beneficial. But most land being cleared cannot sustain farming or grazing with available technologies, so it is abandoned after a few years. Often, commercially valuable trees do not grow back quickly because of highly weathered soils, harsh climates, and recurring fires. Thus, highly productive but underused forest resources are giving way to low productivity grasslands and deserts.
>
> Alternative techniques exist that could be substituted for these destructive practices. However, sustainable forestry and agriculture practices generally are not being developed and applied. The underlying causes of this failure lie in political, economic, and social forces (e.g. undefined property rights) that cause people to use forests in ways that are inappropriate to ecological conditions. Deterioration of the forest resources seems likely to continue until combinations of improved technologies and enforced resource development policies make sustaining the forests more profitable than destroying them.

The importance of forests and the need for new kinds of forestry practices have only recently been major concerns of donor agencies and host government officials. While the awareness of the social and cultural dimensions are only gradually shifting from the negative view that people are a "forest problem" to an interest in how to include people, "the aim of forestry for community development is include those populations that tend to be by-passed during commerical forestry development." (Eckholm, 1979:8). The challenge then is for a social science that can contribute to the new attitudes and practices of a forestry for rural development.

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The challenge and promise has been well stated by Nyle Brady:

> While technological innovations are developed through some AID projects, the ultimate area of concern is the socioeconomic needs of the populations we are striving to assist. Scientific and technological innovations will not be widely accepted if they are in conflict with existing social and cultural customs and beliefs. By not being committed to a particular biological field, social scientists have the ability to examine a system as a complete entity and often can see points of harmony and disharmony that are not apparent to physical scientists (1984:272).

However, there are many constraints upon useful collaboration between forest technologists and social scientists. Brady (1984:273-4) outlines some of these potential constraints.

> Historically, a number of constraints exist to such collaboration. First, there is, on the part of technologists and social scientists alike, a lack of experience with such cooperative efforts. Hence, there is little previous knowledge from which suppositions can be drawn. In addition, there are traditional beliefs and myths about the incompatibility of physical and social scientists that must be put aside. To facilitate collaboration, social scientists who are chosen to work with international rural development projects must have or acquire in-depth knowledge concerning the technical focus of the effort; physical scientists must become familiar with the underlying methodology of social science. Second, the expertise of social scientists is frequently enlisted to ameliorate existing problems late in the technological project process. This pattern has caused them to be cast as undiplomatic critics. Quite to the contrary, when involved early, these disciplines are the potential source of development solutions that can expedite the programmatic process. Third, collaboration between these scientific disciplines has been a problem on campuses as well as in the field. Such cooperation has been rare and poorly documented. Hence, programs planned around such joint efforts frequently reinvent the wheel at great cost of precious time and scarce financial resources. Social-science input is increasing, but in an ad hoc, intuitive fashion. These applications must be systematized and generalized so that social-scientific expertise can be integrated into all foreign assistance efforts.

These three trends -- increasing awareness of extreme pressures upon tropical forests, the growing recognition that forestry practices must be more socially responsive to non-commercial needs and a new sensitivity about the constraints upon social science collaboration with biological scientists were both reason and guide for a workshop on the human factors affecting forestry/fuelwood projects. The short term goal was advice on what and how to

include the social science dimension in a major USAID funded forestry/fuelwood research project. The long term goal was more effective use of existing and future social science knowledge in rural development forestry projects.

A small group, of around 40 experts from within and outside of USAID gathered to identify the crucial socio-economic research issues related to forestry/fuelwood projects. Discussion considered the relevant social opportunities and constraints, social science theories and models, existing and potential methods of data collecting, ways of interrelating biophysical and socioeconomic factors, the development and use of database systems, and the institutions for implementing the research and for disseminating the findings of research.

Specifically, there were four teams -- social opportunities and constraints, interrelation, institutions and methods —who dealt with specific tasks and then reported their findings to the entire group for evaluation and refinement. The revised findings were presented to an independent group of USAID professionals for further evaluation, refinement and revision. Finally a review draft was sent to all participants for further revision. The result is this document.

II. A Framework for Considering the Diversity of Forestry Strategies and the Application of Relevant Social Research

The participants were provided with an essay by Parker and Burch that attempted some classification of the various forestry strategies being applied to rural development efforts (see Table 1). The classification was derived from detailed examination of the development literature, historical documents on the changes and trends in world forestry practices, specific development project papers, field trips and observations. The aim of the essay is to remain problem/project oriented and to seek ways in which the respective contributions of social and biophysical sciences might have a certain balance.

Our primary intention is to transcend the notion that some kinds of forestry are social while others are not. All forestry is directed by human values, norms and institutions and has certain predictable social consequences (Burch and DeLuca, 1984). Once we recognize that all forestry is social, yet, that not all forestry strategies are alike, we may being to match the diverse forestry strategies with the correct social theories and measures.

Although the five strategies should be seen as heuristic rather than absolute, they seem useful starting points for grouping social and biophysical research needs. Like all life sciences we are unlikely to have categories that are perfect in being both exhaustive and mutually exclusive. That is, there are things we overlook and there is considerable spillover between the classes. Our interest is in major tendencies and those characteristics that appear most frequently rather than some absolutely pure class. That is, many industrial forestry activities may be at a small scale, but relative to other community forest activities, they are at a large scale. Similarly, there are many projects, such as the World Bank project in Gujarat, India, that are called "social forestry" projects but whose primary outcome is to provide wood fiber for large scale industrial operations.

Even the most casual observer will note that many rural communities exhibit most of the five forestry strategies. There may be a plantation or state forest, some communal land (with or without trees), some trees of varying uses around the farmstead, and so forth. These different ownerships, functions and potentials are what integrated rural development projects seek to enhance and to make more productive. Therefore, we need some idea of the nature and types of such projects and the ways in which social and biophysical factors might be combined to ensure project success.

Further, none of the strategies are fixed, but are part of the dynamic human ecosystem. What may be a commerical plantation today may become a series of small agroforestry sites or tourist serving nature preserves tomorrow. And those plots that are small agroforestry sites today may be grouped into plantations or become part of a national park or world biosphere tomorrow.

Table 1 describes these five generic categories of forestry practice: commercial/industrial, protection, community, farm, and subsistence. The first column outlines the forestry practices and lists examples of the goods and services produced by each practice. Remaining columns characterize each practice, using market locale, exchange media, level of organization, scale of investment, and nature of property rights to serve as the operational definition of each. For example, industrial forestry may produce sawtimber and bioenergy for an international market to obtain foreign exchange for a country. It requires large-scale investments to support the intensive management of a few species on private or state-owned land. It should be noted that all 5 of the strategies have industrial or economic dimensions in the selling of fruits, nuts, charcoal and so forth. We are simply reserving the term for traditional commerical forestry whose primary emphasis is upon and sawtimber production.

Farm forestry may produce multipurpose trees for local or household consumption in a barter economy with some products such as charcoal entering a cash economy. Production is generally organized at the household level where there is a small-scale financial investment and high labor cost in planting and maintaining individual trees or scattered woodlots. The individual or household may privately own the land, or it may be owned by a clan or other local authority.

Because "protection forestry" may be the least familiar as a forestry development strategy. I asked Dr. Gary Machlis to provide a note on its possibilities. Machlis has an understanding of the range of development issues. He teaches in a forestry college, has worked in China on the development of their national parks and has recently completed a worldwide study on national parks.

These operational definitions help differentiate the various forest practices, some of which are lumped together under the name of "social forestry". The framework illustrates how each forestry practice can contribute to rural development because it measures the various social, economic, and institutional factors that act as constraints on or as opportunities for the success of each practice.

TABLE I

SOCIAL CHARACTERISTICS OF FORESTRY STRATEGIES

OPERATIONAL DEFINITION

Forestry Practices (Goods and Services Produced)	Market Locale	Exchange Media	Organizing Level	Scale of Investment	Formal Property Rights In Resource
Commercial/Industrial Forestry Raw timber	National/ International	Cash/Foreign Exchange	Corporation/ State	Large scale investment to support large, contiguous tract of land with intensive management of a new species	Corporate or State owned
Protection Forestry National Parks Biosphere Reserves Forest Reserves Wildlife Reserves International Tourism Watershed management Dune stabilization Shelterbelts	International/ National	Knowledge/foreign exchange/opportunity savings	State	Small scale investment high maintenance costs on relatively large contiguous tract of land with management in most cases of great natural diversity	State Agency Managed/regulated
Community Forestry Silvipasturage Fuelwood Recreation Orchards Strip planting	Local/National	Barter/cash	Village	Moderate Scale investment on small isolated contiguous tract or margins along fields and roads rapid growing species	Commons locally held
Farm Forestry Integrated Farm system Specialty Products Multipurpose trees Agroforestry	Regional/Local/ household	Barter/cash/ reciprocity	Individual/ household	Small scale financial investment/high labor costs in planting and maintaining individual trees or scattered woodlots	Private/clan, household, individually held/owned
Subsistence Forestry Food for Hunter-Gatherers Land For Rural Landless and Unscheduled Castes	Household/ tribe	Directly consumed	Household/ tribe	Small Scale in marginal lands	Unowned/ unclaimed wildland territory or traditional

Table 2 provides a list of some of the operational goals of each of the above strategies, a list of some of the technologies (biophysical and social) needed for each, and some social and biophysical indicators for evaluating each. This information suggests measures to assess potential impacts of a certain practice on the natural environment or on populations involved in exploiting that environment through forestry. It also provides a means to monitor impacts, whether of decreasing volumes of water production or increasing incomes from the sale of surplus fuelwood.

It should be obvious that any one of these indicators could, and perhaps should be applied to most of the strategies. The intent here is not to have the absolutely correct indicator, but to illustrate that there are presently available measures that might be adapted to the needs of social and technical monitoring and evaluation. Obviously, other approaches can and should be developed. Fortmann, for example has suggested grouping social and biophysical indicators in terms of positive and negative effects.

Each of these forestry strategies for rural development would require different levels of social science involvement and different kinds of specific knowledge. For example, <u>industrial/commercial forestry</u> strategies could involve a large absolute amount of socio-economic input to conduct labor force and marketing analyses, but require proportionately less time compared to the biological skills to study soil and site conditions, to determine an appropriate species, and to maintain high quality plantations. On the other hand, <u>subsistence forestry</u> practices might require small absolute amounts of time to study equipment needs and site preparation activities, but have a significant proportion of the total effort investigating ethnobotanical uses, migration rates, and traditional farming practices.

Similarly, different kinds of socio-economic knowledge are required for different strategies. Industrial/commercial forestry might draw upon and encourage the expansion of knowledge on labor force structure, organization, and motivation. Protection forestry might draw upon ways to interpret the value of forest reserves and national parks and the means for managing tourists. Community forestry projects might draw upon and encourage studies on the relation between the levels and nature of local participation and project effectiveness. Farm forestry could expand knowledge from experiments on relative effectiveness of different economic incentive systems for different sizes and levels of farms. Subsistence forestry might expand knowledge on the nature of cultural values in the management of tropical ecosystems.

TABLE 2

Examples of

TECHNICAL DIMENSIONS OF FORESTRY STRATEGIES: EVALUATIVE INDICATORS

erational Goals	Biophysical and Social Technology	Social Indicators	Biophysical Indicators
dustrial/Commercial Forestry			
rofit rd currency roduction	-Plantation monoculture -Heavy duty harvesters -Social impact assessment -Marketing analysis, labor force analysis	-Employment rate -Accident rates -Per capita income trends	-Growth rates of commercial species -Soil stabilization/loss rates -Biomass production volumes
otection Forestry			
reserve biota rotect endangered species urism revenue ational pride	-Fire, disease & pest control -Ecosystem monitoring -Tourism/socio-economic monitoring -Social profiles of adjacent communities and of tourists	-Visitation trends and sources -Transfer of payments measures -"Downstream" benefits -Cost/benefit analyses	-Water production volumes -Species survival rates -Soil stabilization measures -Wildlife species census
mmunity Forestry			
eforestation rotection of land base ustained production of tree products	-Genetic -Nursery development -Soil analyses -Social survey -Demographic analyses	-Trends in preferences -Participation rates -Flow in distribution of resources	-Vegetation cover rates -Forest planting rates -Growth rates of fuelwood species -Charcoal production
rm Forestry			
nergy ropping orage hade upplemental income irect consumption	-Kinship analyses -Property right analyses -Systematic interviews -Trace measures -Soil survey	-Time budgets -Nutrient budgets -Energy budgets -Money budgets	-Deforestation rates -Plantings, DBH, basal area -Survival rates of key species
bsistence Forestry			
urvival--food, fuel shelter nproved levels of living	-Historical analyses -Systematic observation -Horticulture trials	-Migration rates -Health rates -Intertribal marriage rates	-Forest recovery rates -Soil erosion rates -Species extinctions, niche expansion

Our classification and suggested measures and indicators of forestry projects remains a start on developing a means for linking social and biophysical factors. It helped to group and to order some observations at the workshop and it stimulated a fair bit of discussion and suggestions for improvement.

The remaining sections of this report will give details and interpretations on the team discussions. A summary of key observations starts this effort.

III. A Summary of Key Observations from the Four Teams

A. Social Opportunities and Constraints

1. There are 5 key social science research issues: a) how are costs and benefits distributed; b) what are the interrelations between various development strategies; c) what is the influence of property rights; d) what are the nature and types of participation systems; e) what are the changing meanings and functions in gender roles associated with forest practices.

2. There are a range of specific social science who, what, when and how questions that can guide forestry/fuelwood projects.

3. There are different levels of information need — action (diagnostic), planning (comparison), policy (experimental/evaluative) -- which require specialized social science information.

4. The most important contribution of social science may be in helping forestry agencies develop a "learning core" from past actions.

B. Interrelations

1. There is the need for a common perspective that will allow biologists and social scientists to focus upon "systemic" interactions between humans and their environments.

2. The systems perspective permits disciplinary divisions to become simply a matter of different methods that can complement one another.

3. Many specific research problems, particularly ones that are parts of broader questions, can be most effectively handled along disciplinary lines.

4. Social researchers need to develop a better understanding of forestry and the problems it faces if they are to make significant contributions.

C. Institutions

1. There is the need to both tie together research work by various institutions (AID/W, USAID missions, host country institutions, etc.) <u>and</u> the social and biophysical sciences.

2. Both abstract and applied research knowledge should be encouraged.

3. There should be a structured means for tapping the vast store of indigenous technology that forest dwellers and farmers have accumulated.

4. Users of the knowledge should be made participants in the research process.

5. Other rural development experiences should be captured and re-worked for forestry development projects.

D. Methods

1. Research methods should be adapted to the appropriate levels of information need (diagnosis, planning, policy) and application (nation, region, community, household).

2. New methodologies are not necessary rather existing ones need to be applied more effectively.

3. There is the need to make social science research more useful to missions.

4. There is a need for social scientists to learn how to provide relevant research.

5. There are a variety of forestry problems for which specific social science methods can be directed.

6. There are at least, four methods that have specialized application — in-depth interviewing, participant observation, surveys and trouble cases.

7. Ideally, research questions should flow from appropriate social science theories, rather than simply emerge because a research method is available.

The remaining sections will expand upon these summary points. We begin with social opportunities and constraints.

IV. Social Opportunities/Constraints

Existing social science theory, knowledge and field experience permits us to identify a range of socio-economic studies relevant to forestry/fuelwood projects. There are five key social science research issues that cut across all types of forestry strategies for rural development. These key research issues

are: 1) How are the various costs and benefits of projects distributed among affected strata, groups, regions and so forth of the affected populations? 2) What are the interrelations between various development strategies such as food for peace, rural industrialization, irrigation and water management systems and farm forestry? 3) What are the direct and indirect influences of various property rights and inheritance systems upon forestry/fuelwood projects (that is who has rights of access to one or more benefits of trees and forests and who has responsibility for sustaining the resource)? 4) What are the nature and types of existing and potential systems of participation by affected populations at all stages of the project cycle? 5) What are the existing, potential and changing gender role meanings and functions as they affect forestry/fuelwood projects? (e.g., when tree and forest products are outside cash markets are they the rights/responsibilities of only one gender, but when they move to a cash market do they become assigned to the other gender?

Forestry projects have a limited range of social issues and solutions. As Eva Muller, a consulting forester with experience in West Africa, argues many seemingly different issues have a similar root cause. "The people who are most directly concerned with problems associated with tree planting are the foresters who implement projects in the field. Any attempt to design better projects in the future should therefore start at this level, i.e. identify the problems encountered by the foresters in the field and look for their origins. Equipped with this information problem solutions then will be sought. This process should lead to the recognition of what we know and what we need to know (i.e., research needs). The identified problems may be of technical nature, but most often they have to do with the people, particularly in community forestry and farm or subsistence forestry."

"Here we might consider three questions. What are the most common problems? Why do they occur? and How can they be solved? The problems will probably be

similar for the other types of forestry, although the reasons may differ. Taking a closer look, however, they often boil down to the same major issues. For example, if people in a community do not plant trees because the Forest Service may claim the right to the land when the trees are mature, or if a farmer does not plant trees on his land because he has no way of protecting them against his neighbors who cut them down for firewood because trees are traditionally common property, then the reason for not planting is basically the same in both cases: insecure land and tree tenure. I think that the approach to the problem-solution is important because it starts at the source, and that it is equally applicable to the va ious forestry strategies."

In this vein, the social opportunities and constraints team determined that social science research can make its best contributions to forestry strategies at the community, farm and subsistence levels. However, interrelation and distribution research issues are crucial for all fire strategies; while participation, gender and property rights issues were most crucial for community, farm and subsistence forestry practices.

In addition to these five broad research issues the team, also, identified a range of specific research questions that give a flavor as to how social science research might be applied in the design; implementation and evaluation of fuelwood/forestry projects. These took the form of who, what, when and how questions. Again these questions should be seen as illustrative rather than complete and absolute.

A. Who questions

1. Who uses what forest related resources with what frequency, amounts and applications?

2. Which sector of the local population actually uses the resource?

3. Who needs access to these resources?

4. Who controls access to these resources (e.g., property rights, power, etc.)?

5. Who are the growers, tolerators and users of trees and what are their interrelations?

B. <u>What questions</u>

1. What, if any, is the local resource management system, its effectiveness and its impact?

2. What local institutions, if any, (including the management system) could be best adapted to making local participation effective?

3. What outside forces beyond the control of local folk would interfere with the effectiveness of the resource management system?

4. What are cheap and easy methods for growing trees? (e.g., regularities of animal movements and seed distribution)?

C. <u>When questions</u>

1. When are the resource development, management and use patterns affected by circular (seasonal) and linear (metric) time factors?

D. <u>How questions</u>

1. How can we more successfully develop and communicate strategies for those who control access to the resource?

2. How do we measure the effectiveness of the management system?

3. How do we identify the mechanisms for re-directing those outside forces that impinge on local forest resources?

4. How do we identify the range of appropriate incentives for forest project implementation?

5. How do we encourage the use of those incentives/motives?

6. How do we determine who is being served by rural development forestry projects?

7. How do we capitalize/encourage changes in national legal codes to sustain/create tree planting, maintenance, etc.?

8. How do we ensure the implementation of the necessary codes?

9. How do we more effectively and efficiently make use of existing techniques for rapid reconnaissance, etc.?

There was fairly wide agreement that we need to avoid defining the research problem in technical terms, i.e., forest degradation could be defined as a problem of poverty-equity-political development rather than forest management.

As Jeff Romm notes "Often the problem is viewed as social adaptation-technical adoption, implying that the "right" technology can be found: we need only then find how to convince people that they should modify their lives and accept it. This is an incorrect perspective. Technology and social behavior are both variable within a common system that, through the project, is to achieve its highest possible well being. Within the system, the very distinction between "technical" and "social" is fallacious. We have trees, roads, fences and people, all of which can be defined either way. The need is to define and analyze them in ways that best serve our explanation of how and why a particular system is functioning as it is. A systems approach that is problem directed rather than discipline directed is" likely to provide the most effective knowledge base for forestry programs.

Another consideration is to be certain that the right kind of research information is being directed to the appropriate level of social organization. Different levels of social organization have different information needs and comparative advantages for the generation of information. At the action or ground level, case and diagnostic studies are important for those who are attempting to resolve specific operational problems. At a planning level, comparative analysis is important, to extract the apparent causes of success and failure and to translate them into guidelines for both planning and diagnosis. At a policy level, an understanding of specific cause--effect relations is required, i.e., an access to experimental or quasi-experimental results that establish a basis for prediction and for selection of variables to be assessed in cooperative studies at lower levels. We need different kinds of research at different levels to ensure effective use of research information. (See Table 3 for some possibilities for developing research methods and outputs that might be most appropriate for each level.)

FORESTRY/FUELWOOD PROJECTS: Information Levels, Socio economic Research Issues, Methods and Outputs

for-tion vel	Socio-Econ. Res. Issues	Kinds of Research	Socio-Economic Research Issues	Socio-Economic Methodologies	Outputs
ACTION LEVEL		Diagnostic	Who, what, when, how questions -- e.g. who uses what forest related resources with what frequencies, amounts and application? What local institutions can be adopted? When are the activities carried out? How do we measure effectiveness?	1) Rapid appraisal 2) Household budget time, energy, etc. 3) Participation — observation 4) Listening surveys 5) In-depth interviews	1) Training manuals on nature, types, and uses of methodologies 2) Training manuals on identification of key socio-economic issues 3) Short course(s) on identifying and responding to group processes
ANNING LEVEL		Comparative	1) Participation questions 2) Property rights questions (e.g. inheritance, type ownership, control over resources, formal vs effective rights, etc. Gender role questions (eg. domestic and commercial wood uses)	1) Case studies 2) Institutional analyses 3) Cost/benefit analyses 4) Archives such as Human Relations Area Files	1) SOAP based upon analysis of range of case studies 2) SOAP based upon nature, types, and uses of participation 3) Training manual on the identification and use of land and tree tenure systems 4) Training manual on C/B techniques applied to forestry/fuelwood research
OLICY LEVEL		Experimental/ Evaluative	1) The interrelationship between development strategies — e.g. industrial, agricultural and variety of forestry activities 2) The distribution of various costs and benefits	1) Census 2) Survey -- interview/mail-back questionnaire 3) Experimental design 4) Bureaucratic Re-orientation	1) Development of model of human resource systems 2) Training manual on use of human resource model in research problem identification 3) SOAP on institutional mechanisms for research implementation and dissemination of findings 4) Training manual on survey designs for forestry/ fuelwood research 5) SOAP on literature and case studies dealing with distribution mechanisms and effects

The value of Table 3 is that it differentiates the range of social science applications. We require different approaches and methods, and produce different outputs as we move from the action level to the policy level. Any human organization, whether a household or a multi-national corporation, will have these different levels of information need and will require distinct approaches to the collection, analysis and dissemination of information.

Undoubtably, one of the best uses of social science theory and method will be in making project learning systematic. That is we have a reasonable array of completed and on-going forestry projects which serve as empirical case studies whose successes and failures may fit a general pattern to guide the policy and planning for future projects. Here the social scientist serves as facilitator and interpreter between field level and policy level professionals and between technical professionals and affected beneficiary groups.

Jeff Romm, provides further details and understanding of the role social science can play in forestry projects. His emphasis is upon action and the systematic learning from those actions.

"We tend to protest too much the role of social scientists in the <u>field design phase</u>. This concerns me, for the most significant thing that can happen in forestry is <u>for something to happen</u>. Anything that discourages a happening is discouraging. The critical need is to get people past the immense barriers that discourage them from acting upon new ideas. If we argue that actions should wait until the social scientist finishes her bit and/or stamps his approval, we build the barrier to action rather than reduce it. The first step in learning is to act and to have the confidence to take the consequences. To act is much more important than to know all the answers, which is impossible in any case. I would prefer to have a forester, or a forestry department, try something foolish than to try nothing at all. If an action is taken, we can at

least learn why it is successful or not and how it might be improved. If no action is taken, all the rest is toothpaste."

"Point one: Social scientists should not discourage people who are ready to act, whatever their views of the quality of the action."

"Once actions are taken, the potential for learning begins to develop. It is here that the social scientist should gain an important role. How can a forester or department learn most efficiently from the experience of the action he/it has taken? How do we reduce the time lag between when something happens and when its lessons are developed and applied? Here is the key question. Social scientists can help to answer it at three levels."

"Project level: What does a field person or researcher look for in order to explain the social and economic causes, if any, of outcomes? What are the variables she/he can best observe? How can she/he use them to interpret relationships? How can she/he transmit and/or act upon the knowledge of these relationships in an effective manner?"

"Point two: Social scientists should be able to offer useful methods, ideas about key variables, and alternative models for their interpretation, so that learning from field experience occurs as rapidly and effectively as possible."

"Agency level: How does an agency organize the flow of information so that the chain process of 1) interpretation of experience, 2) analysis of, and generalization from experience, 3) incorporation of generalizations into planning and staff education, and 4) application of refined approaches, occurs as rapidly and effectively as possible? Here, we are concerned with how organizations learn, how learning is affected by organizational structure and process, and how it can produce improved actions in the shortest period of time."

"Point three: Social scientists should be able to offer creditable assistance in the organization of the "learning core" of an agency or program. Here is his/her key design function. Let actions go willy-nilly, but be sure that an organization/program is able to interpret, analyze and generalize the results and apply them in improved plans, educational programs, and actions."

"Policy level: How does an agency respond to its political constituencies and competitors? By what means does it stablize and influence its political environment? By what means does it open itself to others' influences in order to remain responsive and to retain the integrity of its activities? Here, we are concerned with the mechanisms of political action and response."

"Point four: Social scientists should be able to interpret the structural and functional requirements of a political context, and to use/develop analytical skills to form and present alternative strategies of policy response."

"My four points have a sequence to them. The first and third enter the design process. The first says that social scientists should find ways to reduce barriers to action in project design and execution; the social scientist typically assumes the devil's advocate role in this situation, thereby failing his/her mission. The third says that the key initial role of the social scientist is not in field design but in the design of the "learning core" of the organization that is ultimately responsible for successful actions. The second point, developing guides to field interpretation, can occur a year or two later. The fourth can develop a year or two after than. Of all these points, the third is by far the most important. If an organization is capable of learning, its initial actions can be almost anything at all. If it is capable of learning, it can modify its approaches and modify itself as experience suggests. If it is capable of learning, it will find and develop its own people to provide the social science information required for effective action. If it is not capable

of learning, all the rest is mouthwash."

One important means for providing a "learning core" for forestry/energy agencies will be use of computer capability. There are at least two needs for such database management -- one is capturing the large body of research literature relevant to such projects and the second is capturing and cummulating actual experience from on-going projects. Appendix Two outlines some of the possibilities for such database systems.

V. Interrelations

The contribution of social science research to forestry/fuelwood projects will seldom be done independent of biophysical/technical efforts. Indeed, a primary value of social research may be its role in collaborative efforts. As Brady (1984:273) notes:

> As the physical and biological sciences become more sophisticated and less comprehensible to the nonscientist, collaboration between biological and social scientists becomes more valuable and necessary. Traditionally, most social-science research has been carried out in isolation from the physical and biological sciences. While collaboration between the social and natural sciences could always have enhanced assistance efforts, rapid advances in technology frequently make cooperation mandatory. Technological changes that can vastly improve the quality of life may be incompatible with traditional patterns. Innovations work only if they are used. Scientific collaboration can create an environment within which technology and traditions can be modified to allow for real and lasting change.

The means for making this collaboration possible was explored by the interrelations team. As George Lovelace reports, the team emphasized the need for a systems approach to identify linkages and co-variation between the social system and the ecosystem. A systems approach permits better understanding and anticipation of consequences from certain resource decisions and actions. At the same time such an approach reduces distinctions between disciplines. The rigor and focus of the individual disciplines are retained but a resource

systems approach permits points of complementarity between them. Lovelace supplies the details.

"The primary activities of the Interrelations group involved the consideration of a basic framework for examining interrelations and interactions between the biophysical and socio-economic realms and discussion of certain implications of these relations for research implementation and dissemination."

"Central to the tasks of interrelating and of better integrating research efforts on the socio-economic and biophysical aspects of forestry and fuelwood projects is a common perspective that will allow us to focus upon the systemic interactions between humans and their environments. We are basically concerned with the relationships and interactions between two realms, the biophysical realm on the one hand and the socio-economic realm on the other. The socio-economic realm is composed of such things as social organization, technology, politics, knowledge, etc.; the biophysical of flora and fauna, geology, climate, resources, etc. At one level, each realm can be considered as a somewhat separate entity possessing intrinsic systemic properties. There is a natural ecosystem and a social-economic system. At another level of analysis, however, these two systemic entities are tied together into a larger, total resource system by flows of materials, energy, and information. The socio-economic and biophysical portions of this system are thus related to the extent that changes in the nature of inputs from one subsystem (e.g., the biophysical realm) can alter the patterning in the other subsystem, and vice versa."

"A modification of the biophysical realm such as deforestation, for example, can have a tremendous impact not only on the overall natural environment, but also on the people who depend upon that environment. Although most of us are willing to at least entertain the idea of "systemic consequences," forestry and fuelwood research projects that are concerned with interrelating socio-economic and biophysical research must take seriously the notion that they are dealing

with systems, complex patterns of interaction in which actions and modifications have consequences, direct and indirect consequences, long and short term consequences. When a commercial forestry enterprise opens up a new area for logging, there are likely to be many different kinds of consequences beyond the simple removal of trees. Deforestation often increases and intensifies the natural pattern of soil erorion and downslope deposition. The building of new roads into the area can lead to a later influx of settlers. The presence of the commercial enterprise itself will often encourage the growth of a variety of nearby support services."

"This kind of perspective is useful in that it focuses our attention upon interactions within a "total resource system", of which forests and trees are one component. It is probably fair to say that most rural peoples do <u>not</u> relate to forests separately; trees and forests are not a distinct and special category. It is more likely that forests are perceived as one of a number of interrelated factors, including such things as population, climate, fauna, social institutions, etc., that come into play and must be negotiated in everyday life. The world in which we live only tends to become substantially segmented into discrete parts in the context of academic training and research. For applied research on rural development questions, this academic segmentation is extremely unfortunate because planners and policy makers sorely need integrated information and the ability to identify, assess, and weigh the varied consequences that may result from particular actions and decisions. By adopting a systems perspective of the larger resource system, however, we are in a better position to identify, understand, explain, and ultimately anticipate the complex nature of change."

"Another advantage of this perspective is that individual researchers and organizations can begin to perceive of themselves and their work as parts of a larger research effort and to see how their research can contribute to, and can

usefully gain contributions from, the work of other specialists. In a related manner, the systems perspective can help to reduce rigid distinctions between disciplines as disciplinary divisions become less a matter of separate inquiries and topics and more a matter of different methods that are complementary and ultimately enhance our overall understanding of larger and more important scientific problems (Romm 1978)."

"In employing this systemic perspective in the context of the total resource system, it becomes clear that the forest, as one of a number of different, yet related and interacting, components of the larger system, can be examined from a variety of different relational standpoints. Forest (and trees) can be considered not just in terms of physical characteristics such as growth rates but also in terms of their relationships to other aspects of the natural ecosystems (e.g., the examination of forest--water relationships in the context of watershed management) or in terms of their relationships to elements of the socio-economic realm (e.g., tree and land tenure relationships, or the social and aesthetic value of forests)."

"In focusing on the total resource system, on the interactions between the socio-economic and biophysical realms, and on the consequences of change, the research implementation process tends to demand an integrated, multidisciplinary team approach that is organized around a common goal or problem. This is <u>not</u> to say, however, that all problems/questions must be examined by a multidisciplinary team. Many specific problems, particularly ones that are parts of broader questions, can be most effectively handled along disciplinary lines. Yet continued awareness of the broader questions and their relationship to the particular problem is essential. Mechanisms are also needed to insure that individuals working on very different problems, e.g., demographers and plant breeders, can and do discuss their common concerns."

"In addition, input from other disciplines is often extremely valuable in that it can present problems in an entirely different light. Forestry research has tended to emphasis technical approaches to problem solving. Consider a purely technical activity such as setting rotation lengths for the cultivation of a particular species. These can be set to achieve some maximal goal in terms of productivity, but what about the potential impacts on marketing, employment, and processing? If, however, we reorient the problem by starting with an examination of the socio-economic conditions and needs and then proceed to develop a technology that is suitable, given certain biophysical conditions, then we may often come up with a rather different technology."

"From the foregoing, it should be apparent that integrating and interrelating the socio-economic and biophysical aspects of forestry and fuelwood research projects require that social science not be something that is tacked on to the large effort. Social scientists need to be treated as more than "junior partners." We should recognize, however, that many social scientists have not been exposed to the kinds of questions and considerations that are often raised in connection with forestry efforts. If these researchers are to make significant contributions then they need to develop a better understanding of forestry and the problems it faces. At the same time, specialists in the biophysical realm need to have greater exposure to rural situations and to the conditions under which rural villagers must operate. Such exposure may not only benefit the natural scientist, but the rural people who can then directly benefit from scientific expertise."

"The process of research implementation and dissemination are obviously related. What a researcher or planner or decision maker wishes to do with the information dictates the kinds of information he or she wants and needs. Networks, channels of dissemination, and sets of data need to be 'user-oriented'."

"It should be noted that the proposed USAID Forestry and Fuelwood project is structured as a hierarchy: high-level policy makers at the top, villagers and extension agents at the base, with various types of planners, researchers, administrators, and agencies occupying intermediate levels. Different levels of the hierarchy will have different informational needs. At the base, there is a need for case studies and diagnostic information, such as what are the factors that contribute to a particular problem. As one moves up the hierarchy needs change. Planners and policy makers, for example, require the results of comparative analyses and an ability to generalize for the purposes of community, regional, and global planning and decision making. The vertical movement of information, upward to allow generalization and downward to allow the testing of generalized propositions, is thus of critical importance. The horizontal movement of information is also important. Individuals working on the same or similar problems in different areas need to be rapidly informed as new developments and problems arise and new solutions are found. In such cases, considerable details of the information may have to be horizontally transmitted to allow for adequate assessment. In other cases, horizontal movement of information in a more generalized form may be necessary for research entities that are working on separate, but related problems." (See Table 3 page 24? for other details).

"The varied informational needs that are inherent in a forestry and fuelwood project of this nature and size thus suggest a need for different kinds of information networks, rather than a single, all-purpose network. In addition, the availability and accessibility of information are critical. Individuals and groups of individuals, be they extension agents, planners, private volunteer organizations, or even rural villagers, need to be able to get at specific information and expertise in a timely fashion and an inexpensive manner."

VI. Institutions

The institutions team identified some mechanisms for implementing and disseminating social research findings and techniques between the various information levels. They provide a general and fairly universal approach to guide the applied issues identified by McFadden and Parker (1984:3), who note:

> Institutional development and the capacity for local, national and regional institutions to conduct quality forestry/fuelwood and associated socio-economic research vary considerably between regions and especially within countries. It will be necessary therefore, to develop criteria to: (1) identify the institutions involved in forestry research within each country where this project will be implemented; (2) determine the status of their forest resources both from a biophysical and socio-economic viewpoint,; (3) attempt to identify priority research topics that address these problems; and determine, establish, and strengthen linkages between research institutions and policy-makers so that findings can be used to guide forestry development within the context of natural resource use and related economic policies.

The institutions team considered a variety of more general questions such as:

A. What are the most effective existing organizational systems for the production and dissemination of forestry research?

B. What research institutions roles and rules affect success and failure of existing systems for technology transfer and technical backstopping? For instance, what incentives exist for technical experts to go into and stay in the forestry research field?

C. What are the advantages and disadvantages of existing relevant models of practices such as networking, twinning, short courses, formal training, modules? What guidelines are necessary to enhance these practices through this project?

D. How do we translate the research done in forestry planning and management?

E. How do we institutionalize an interdisciplinary learning process in rural development forestry?

Harry Blair summarizes some of the findings of the institutions team. "The team suggested that the "ribbon" concept be expanded to encompass not one but two ribbons: one tying together the different types of institutions involved

(AID/W, USAID missions in the field, and the other tying the social and biophysical sciences together. Each aspect and component of the project should consciously incorporate both ribbons."

"The team also suggested refinements of the project purpose along the following lines:

1. Focus should be not only on the fostering of research in the abstract but also in the sense of developing approaches and methods to apply the knowledge that the project generates. This concept is implicit with the PP as it stands, but should be made more explicit.

2. The phrase "appropriate knowledge" should be employed as verb + noun as well as in its more customary form as adjective + noun. The project should encourage capacities both within LDCs and regionally to appropriate knowledge by tapping the vast store of indigenous technology that forest dwellers and farmers have accumulated, but which has not heretofore received strong attention from professional foresters in most (not all) LDCs. Further, that tapping process should be not just included but structured into the project, such that for instance LDC institutions develop an ongoing capacity for acquiring knowledge about how non-foresters practice forestry.

3. Along similar lines, the team thought the project should develop ways to incorporate users into the research process as participants. The building of appropriate knowledge tends to be a top-down process in the rural development field generally; forestry is no exception here. But one of the lessons learned in recent years is that significant benefits to the generation of usable knowledge will accrue where users are included in the process.

4. Our sister social sciences in the rural development field have put together a rich experience over the past decade or so, particularly in connection with many of the projects sponsored by S&T/RD and its predecessors (S&T/MD,S&T/RAD, etc.). This knowledge and the institutional networks that were put together in creating it should be incorporated into this project, a task facilitated greatly by the fact that most of these other projects have generated a huge literature, much of which (e.g., in farming systems, participation, agricultural extension, etc.) should be directly applicable to the present effort."

"The two tables that follow illustrate some possible ways for developing institutional networks. Table 4 represents a taxonomy of institutional types that could be fruitfully drawn on in the projects. It should be emphasized that the listing is not inclusive, but only illustrative. Likewise Table 5 offers a couple of tentative examples of how a network of institutions might be put together for putting project activities into action in West Africa and South Asia. For other areas, of course, the array would be different."

TABLE 4
LOCUS OF CONTROL AND MANAGEMENT OF FORESTRY/FUELWOOD RESEARCH

SECTOR	United States	International	Within LDCA
PUBLIC	Public research agencies *Lead universities 2nd level universities Schools of business administration and management Institutes of public Horticultural institutes National integrated development projects Bureaucracy implementing new project	*International forest research institutes *Regional forest research institutes Indigenously managed regional consortia International forest clearing-house Multilateral donor agencies International institutions by a single government	National Forestry Ministry research agencies *Lead universities *Subnational forestry department research agencies National forest experiment stations *Local organizations *Technical secondary schools *Provincial universities National integrated development projects Bureaucracy implementing new programs National parastatal agencies *Public research agencies agencies Provincial government agencies Schools of business administration and management Institutes of public administration Horticultural institutes
PRIVATE	*Lead universities Private-for-profit research institutes Schools of business administration and management Research divisions of corporations	Multi-disciplinary research center *Broad-based international PVO's Professional international forest research organizations	*Local organizations *Professional forest research organizations Private nonprofit research institutes

*Institutions especially suited to realize project goals and purposes

TABLE 5

F/FRED
TWO EXAMPLES OF REGIONAL INSTITUTIONAL ARRAYS

	United States	International	Within LDC
WEST AFRICA	-Universities -Twinning -Private research institutes	-Regional coordinating agencies -International forest research institutes -Regional clearinghouses	-National parastatal agencies -Technical secondary schools -Universities at national level -Institutes of public administration -National forestry ministries
SOUTH ASIA	-Universities -National integrated development projects (e.g. TVA)	-Regional clearinghouses -International institutions supported by a single government	-National forestry ministries, including forestry research centers -Ministries of planning -Schools of management -Private research institutes -Cooperative institutions -Subnational forestry departments, especially those implementing new projects -National integrated development projects -Local organizations

VII. Methods

Social science theory can identify the social factors affecting forestry/fuelwood projects, provide a conceptual base for collaboration, and help to design appropriate institutional mechanisms for organizing and disseminating research findings. Yet, it is the methods for collecting data and testing theory that offer much potential for directly including human factors in forestry practices.

The Methods team examined the existing and potential social science techniques for assessing, monitoring and evaluating forestry/fuelwood projects. The team stressed the need for a theory and model of the human resource system to define the research problems and relevant questions and to guide the analysis of results. They stressed the need to fit the research technique to the relevant level of social organization. Table 6 suggests how some techniques could be most useful at certain levels of information and application. It must be stressed that the table merely illustrates where a technique may be <u>particularly</u> appropriate. Obviously most of the techniques could be used at most levels.

TABLE 6

Representative Social Science Methods, Levels of Information and Levels of Application

ods	Level of Information			Level of Application			
	Diagnostic	Planning	Policy	Nation-State	Regional	Community	Household
hoto Analysis	X		X	X	X	X	
ening Surveys	X		X			X	X
icipatory ion Research	X	X				X	
d Rural Reconn	X		X			X	
Informant Inter	X		X	X	X	X	
y Indicator dies	X		X	X	X	X	X
ctural Indicator dies	X		X	X	X	X	X
ew of Available erature and umentation	X			X	X	X	
p Interviews	X		X			X	
eo	X				X	X	
Sallah	X	X		X			
ie Surveys	X		X	X	X	X	X
overs	X		X		X	X	
ncial/Economic sures			X	X	X	X	X
Term Ongoing itoring			X		X	X	
ial Analysis		X		X	X		
tion/Diffusion dies			X	X	X	X	X
cy Research Studies			X	X	X		
nizational avior Studies	X		X	X	X	X	
ing Locally ed Monitoring			X			X	

Louise Fortman and James Thomson kindly provided other insights and opinions regarding the use of social science methods in forestry/fuelwood projects. We begin with Fortmann's ideas.

"It was the consensus of the group that new methodologies are not necessary. Existing research methods need to be used more imaginatively and more effectively. There is a clear need to learn how to mesh the research methods of the physical, social, and agricultural ciences in a way which yields interdisciplinary research. There is much to be learned from the Cornell University Mountain Agriculture Project, and Water Points Survey in this respect. One example of such cooperation might be the use of aerial surveys and/or satellite imagery in conjunction with a social science study of the management of the resource surveyed from the air."

"There is a need for missions to learn how to use social science research.

A. Mission personnel need to sit down with social scientists and host country personnel and determine precisely what is being researched. Often disappointment stems from the vauge notion that such research will "take care of those problems", "those problems" being losely defined as people not doing what the project wants them to do.

B. The kind and amount of logistical support to be provided by the Mission should be determined in advance and the Mission should stick to its side of the bargain.

C. Someone in the Mission should read every report that comes in and discuss it with the researcher. This person should be someone who is capable of understanding the report. Problems perceived by the Mission ranging from inappropriate style or unintelligible writing to failure to answer questions or address issues should be discussed with the researchers on a face-to-face basis.

D. The intellectual integrity of the research process must be clearly understood from the beginning.

E. The Mission should make any decisions concerning the research (particularly once it is in the field in an expeditious and timely manner).

F. Whenever possible, Mission personnel should go to the field themselves for a briefing visit.

G. Missions should not use social science research as a substitute for developing their own host country contacts or for visiting the field."

"There is a need for social scientists to learn how to provide relevant research.

A. Researchers should be very clear about the questions the Mission wants answered. They should be equally clear about the questions which their physical and agricultural and forestry science colleagues want answered. In the event that answers are being sought for the wrong questions, the first order of business is to educate the eventual userr of your information (or yourself - they may be right).

B. Researchers must be sure to get their reports in on time and to write at least an executive summary (preferably the whole report) in a manner which is easily understood by laypersons.

C. Researchers should try to include in both their time and financial budgets, a period of time to be devoted to working report into the policy stream. It is the researcher who best understands how she/he got from research findings to policy recommendations. She/he often has the necessary verbal skills to do the multiple rewrites that the policy

process often requires. Further, involvement in the policy process may make the researcher more sensitive to the needs of policy-related research next time around.

D. Social science researchers need to include variables from other disciplines in their research. See, for example, Riley E. Dunlap and Kenneth E. Martin, 1983. "Bringing Environment into the Study of Agriculture: Observation and Suggestions Regarding the Sociology of Agriculture." Rural Sociology 48(2): 201-218 and Jacqueline A. Ashby. 1983. "Armchair Agriculture or the Sociology of Agriculture: A Rejoinder to Gartrell. Rural Sociology 48(4): 667-669.

E. If multidisciplinary research is being done, it is well worth the time it takes to hammer out a joint survey instrument(s). The blood shed at this point will prevent disjointed results, confusion and other indicators of ineffective research."

"Social science input in fuelwood projects is essential both to flag the factors which might lead to project failure or to unanticipated social consequences and to identify factors which may facilitate the implementation of the project. It is generally considered desirable for the social scientist to be in the field well in advance of the rest of the design team so that the design will be adapted to local social structures. However, others would argue that as long as there is a flexible, responsive bureaucracy, the social science input can be made at any time and the important thing is to start. Since responsive, flexible bureaucracies are scarce on the ground, the arguement for early if not prior involvement of social scientists has considerable merit."

"Some factors which might affect fuelwood projects and methods which could be used to identify them are listed in the following Table. This table is by no means complete. Rather it is indicative of the sort of input a social scientist

might make to a fuelwood project. For each factor a variety of methods are listed. The method actually used may depend on the time or money available, the precision of data required, and/or various factors associated with the project site. There is data required, and/or various factors associated with the project site. There is no single method which must be used to address any particular problem. Rather each method has its own advantages and drawbacks. If the funds for social science research are limited, the priority should be to look at the poorer segments of the population both to maximize the benefits they receive from the project and to minimize the negative effects on them. It should also be noted that the same technique such as key informant interviewing can be used at several levels of social organization - village, district or provincial level government, national government. It can also profitably be done among donors, missionaries, other social scientists."

Table 7
Problems, Causes and Methods

Potential Problem	Factors Leading to Problem	Research Methods
Unable to guarantee planter rights to tree	National Law	Read law Key informant interviews
	Use rights	Read enthnographies[1] Key informant interviews Observation
	Non-functional internal exclusionary rights	Key informant interviews Read ethnographies Observation Read court cases
	Inability to exclude outsiders	Key informant interviews Observation Read court cases
Trees may not be planted	Tree tenure/land tenure	Read ethnographies Key informant interviews Court cases Observation
	Cultural beliefs about tree planting	Read ethnographies Key informant Observation
Trees cannot be planted	Fragmentation of land	Aerial photographs Observation Key informant interviews Sample surveys
	Insufficient land	Aerial photographs Observation Key informant interviews Sample survey
	Insufficient labour/nature of division of labour	Observation Key informant interviews Sample surveys
	Patterns of land use	Observation Aerial photography Key informants Sample survey

[1]Ethnographies should be read with a certain grain of salt. Many of them are very dated. Look for the date of research not the publication date!

Table 7 con't.

Potential Problem	Factors Leading to Problem	Research Methods
Likelihood of trees being destroyed	Large or mobilized or desperate excluded pop. (Obviously, if this is discovered, the project needs to be redesigned).	Observation Key informant interviews Sample survey Read history, ethnographies Read court cases Various structural indicators of poverty, etc. Community meetings Listening survey Consensus data if at all valid Various structural indicators of solidarity among the excluded group
	Destruction of local resources by the project (If this possibility is discovered, redesign or move the project or negotiate with the community.)	Read ethnographies on local production and resource systems Observation Key informant interviews Sample surveys
	Hostile village factions or class divisions	Key informant interviews Observation
Poor relations between villagers and implementing personnel	Arrogance on part of either Corruption Refusal to work with target population	Key informant interviews Observation
Obstacles within the implementing agency	Corruption Awkward procedures	Observation Key informant interviews
Payoff lag time too long	Poverty	Observation Structural indicators Key informant interviews Census data Read reports Sample survey Listening survey
Facilitating Factors		**Methods**
Community solidarity		Various structural indicators Observation Key informant interviews
Functional community institutions		Observation Key informant interviews Various structural indicators

Table 7 con't.

Potential Problem	Factors Leading to Problem	Research Methods
Community ability to exclude outsiders resource abusers		Observation Key informant interviews Court cases
Community ability to control insiders		Observation Key informant interviews Court cases Listening survey REad ethnographies
Cultural beliefs		Observation Read ethnographies Key informant interviews
Land tenure/tree tenure		As above

Possible negative effects	Source of negative effects	Methods
Destroy basis of subsistence production	Destruction of local resources	See above
	Project usurpation of land	Key informant interviews Sample survey Possibly aerial photographs
Loss of tree use rights	Registration Commercialization Creation of scarcity	Read related projects Key informant interviews Think Read court cases
Loss of land use rights	Privatization Land grabbing	Read related projects Key informant interviews Read court cases Think
Project inappropriate	Wrong trees	Sample surveys Key informant interviews Listening survey Observation (crop patterns etc.) Aerial survey (possibly)
Alienation	No consultation Corruption Use of force by center Loss of local resources	Think Read related projects
Pauperization	Inappropriate technology Inappropriate financing	Key informant interviews Sample surveys Census information Observation Read related proejcts Think

James Thomson identifies four methodologies and suggests their likely uses. he also, makes a strong argument for the importance of a theoretical framework. "After reading as much of the available documentation as possible, in depth interviewing seem to me an indispensable starting point. It provides a politic and productive way to understand views of those officials concerned with woodstock management. It can do the same for comprehension of user views, although linguistic, cultural and suspicion barriers may to some degree degrade information quality. With both officials and users, in-depth interviewing may provide insights into the divergence, if any, between formal and effective resource use rules. An astute interviewer using an appropriate theoretical framework can get a lot of mileage out of this methodology. Those with less skill and less formal theoretical training will in general use the techniques much less effectively (as with computers, so with in-depth interviewing: GIGO). Structured though open-ended interview forms can to some extent reduce this problem, but there's a limit."

"Participant observation can be effective, though it's less likely to be efficient unless there are major resource use/management events which can be observed on a scheduled basis. Requires lots of time otherwise, and again formal training to see and identify significant patterns of behavior. Short-course prepping can be used, I would suppose, to improve the quality of new observers' observations. The technique would be very useful as one element in an on-going assessment, e.g., of user group activities, especially (again where those occur in a systematic fashion), e.g., tree planting, field clearing, resource harvesting when undertaken on a collective basis, etc."

"Surveys offer the advantage of generalization on a statistically valid basis, if properly executed. That power comes with a cost attached, in the sense that they require a great deal of preparation (hypothesis development, questionnaire design, pre-testing with or without translation of the master into

local languages, enumerator training and supervision, data entry and processing). Furthermore, surveys can be very tricky instruments whenever questions move into behavior patterns that are complex and/or illegal in terms of formal rules. Ditto for attitudes. Respondents may also be reluctant to provide accurate information about attitudes concerning state rules, whenever they occupy the role of subjects rather than citizens in terms of the wider society."

"Trouble cases can provide very useful information about effective versus formal rules. They can serve to some extent as verifiers of officials' statements, users' statements, and survey results. They require theoretical background, and relationship of confidence between interviewer and informants whenever case proceedings are reconstructed ex post rather than being observed as they occur, which is frequently the case."

"Incorporating/developing, shaping methodologies. Ideally, questions flow from theories. How the questions are asked is a technical matter. They can be incorporated at any stage of the assessment/monitoring/evaluation cycle. Overflights and rapid reconnaissance assessments may quickly produce insights. So might self surveys. Survey researchers may be able to identify critical, but innocuous questions, though only after a considerable period of effort in a specific milieu. The same holds for in-depth interviewing and trouble case methodologies. The hang-up is the necessity for a theoretical framework to generate the questions and make sense of the answers, however acquired. Obviously a lot could be done here in terms of specific types of resource management situations; that should be a major priority of social science research under the Forestry/Fuelwood Research and Development Project.

VIII. Conclusion

Nearly everyone has noted the crucial need for social knowledge in guiding forestry/fuelwood programs. However, there have been few attempts where foresters and social scientists worked together in both defining the crucial human factors issues and the appropriate role for social scientists. So in one sense this workshop represents the culmination of a long recognized need. In another sense it is the starting point on a long path toward genuine interdisciplinary, applied research efforts in forestry programs throughout the world.

Like all such interdisciplinary attempts, there was a need to assert the basic value of one's own discipline. However in most cases that was an essential signal that once the point was established it was time to get down to the problem solution rather than re-inventing past mistakes and dwelling upon disciplinary slights. In many ways the workshop was an important confirmation of Brady's point that, "Social scientists have the tools for assessing what will work best, for whom it will work, and why. Biological scientists have the ability to develop and adapt appropriate technologies. Working together, they can greatly enhance the success of these foreign-aid endeavors that ultimately benefit all of us (1984:277)." My hope remains that this report provides a common ground for expanding that "geography of hope". Certainly both the forester and the social scientist should have a better sense of their mutual contributions to rural development.

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IX. Appendix One

A Note on Protection Forestry

by Gary Machlis

As Parker and Burch have described, there are many strategies for utilizing forest resources—from subsistence to silvipasturage to commerical timber production. One of these strategies, "protection forestry", often receives less attention than it should. There are several reasons.

First, protection forestry (which is primarily the management of forest lands in parks and reserves) is fundamentally different from other forms of forestry. Economic exchanges are not derived from the cash value of the timber, nuts, twigs, or total biomass, but from the social characteristics of the forest ecosystem—its attractiveness, uniqueness, beauty and so forth. The sale of one million board feet to a multinational corporation is a comfortable transaction to the forester; the sale of 1,000 package tours to a national park is not. This may reflect trained incapacities rather than economic reality. Both transactions may provide economic benefits and incur social and environmental costs; both demand careful forest management.

Second, protection forestry may be much more renewable than other forms, once established. Trees for fuelwood may require 5-10 year cycles; the tourists who visit nature reserves can be "cropped" (I use the word without prejudice), in daily or seasonal cycles. The ecological benefits of preserved watersheds and protected species are likewise renewable; illegal activity such as poaching underscores the importance of protected ecosystems in local and economic systems. In some instances, managing a forest for tourism may be preferable to other strategies.

Third, protection forestry may require different forms of technical expertise. The management of forests in order to maintain ecosystems in dynamic

equilibrium, protect unique populations of flora and fauna, preserve landscapes and accommodate tourists, is difficult. For example, the role of natural fire in ecosystem stability is only partially understood, and fire management in national parks is still in its infancy.

Yet, protection forestry represents a real, viable and current strategy for using forest lands. Since WW II, the rapid expansion of national parks has put more and more hectares of forest under protection forestry forms of management; there are currently 900 national parks in 90 countries. In Kenya, nature based tourism generated the second largest source of income in 1966; by 1972 it was the leading source of income Similar examples include Thailand, Bali, many Carribean countries, and parts of the western U.S.A. For the population of many communities, tourism is a primary source of work.

Protection forestry is by no means a panacea, nor will it be appropriate in all places and all times. Not all forest lands will attract tourists, nor can all communities and regions develop the necessary infrastructures. The environmental and social costs of international tourism have increasingly been documented. Yet similar difficulties and trade-offs face other strategies such as pulpwood production, regional fuelwood projects, and so forth. Hence, research on the socio-economic issues related to forestry/fuelwood projects benefits from a scheme similar to what Parker and Burch have proposed, for a continuum of forest strategies is provided. Protection forestry is clearly one of these strategies.

Appendix Two

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Appendix Three

DATABASE MANAGEMENT SYSTEM (DBMS) FOR HUMAN FACTORS RESEARCH IN THE FORESTRY/FUELWOOD RESEARCH AND DEVELOPMENT PROJECT (F/FRED)

By Joseph A. Miller

A database management system or DBMS has been considered an important output of the proposed Forestry/Fuelwood Research and Development Project (F/FRED) from the beginning. Current thinking on the role of DBMS was presented to the Workshop by Professor Dietmar Rose of the University of Minnesota. This appendix supplements that presentation by addressing more specifically the ways in which the DBMS would affect the social science/human factors research component of the F/FRED Project.

As Dr. Rose pointed out in his report to AID, DBMS perform a critical function in the information transfer process. They assist in the transfer of technology by standardizing the storage and analysis of data; assure the continuity of research; facilitate coordination, networking, training, and technical support; reduce the cost of information retrieval by abstraction, central storage, and rapid access; protect data; identify gaps in information; encourage standardized data collection and avoidance of duplication; and contribute to integrated planning and management decision-making.

Nevertheless, to many at the Workshop, the prospect did not thrill. Everyone knows of expensive, complicated DBMS that have consumed valuable resources and yielded little if anything in the way of research support benefits. Further, DBMS have traditionally been mounted on mainframe computers, and there have been problems of access and output. Then too, creating another database may seem like an irrelevant excercise given the problems to be dealt with; that is, real-world problems are avoided or by-passed in favor of creating another database, usually a single, monolithic, all-purpose network. Finally, these DBMS seem always to be for administration, not research. Dr. Rose's

written report to AID does in fact emphasize the Management Information System aspects of the DBMS.

Any DBMS is only as useful as the purposes established to guide its development. Leaving aside for the moment the administrative and managment information functions of DBMS in this project, let us consider some features of an ideal DBMS from the researchers' point of view.

First, it is a means to an end, not an end in itself. Researchers and other end users must have as much to say about its design and operation as data processing personnel. Second, it must be conveniently accessible at all times. Third, it should be integrated; that is, contain all kinds of information, in text or numeric data, on physical, biolgical, and social subjects. Fourth, it should be relevant, providing information that will help solve immediate problems. Fifth, the chosen DBMS system should be interactive and flexible in order to serve as a creative component of the social and human factors research portions of the F/FRED Project.

Even guided by these purposes, the DBMS emerging from this research effort may not do everything that is planned. But the days of traditional, centralized, mini or mainnframe DBMS have passed. If nothing else, this brief report is written to remind researchers in the social/energy-environment fields that radically new conditions have reshaped the world of electronic data processessing. What has been a problem--how to use computer processing effectively--has become an extraordinary professional opportunity that has only begun to be appreciated.

Researchers cooperating with the F/FRED Project, seeking as it does integration between the biological and social factors affecting natural resource management, are in a unique position to use a DBMS perhaps more effectively than it has ever been used before. The DBMS in this project can become a coordinated family of databases, interrelated, containing different kinds of information depending upon the needs and levels of its users.

The DBMS concept put forth in this appendix is possible only because of the widespread availability of personal computers having the speed and capacity to handle millions of characters. The writer's understanding is that the DBMS proposed for the F/FRED Project would operate on micros, and this appendix is written on that assumption.

At the risk of boring readers with more words on the computer revolution, it is worth recalling some of the advantages that the new hardware and software present to social science researchers, in the context of this and similar projects, and to show how they relate to the overall advantages of DBMS outlined above.

Availability and Flexibility: A few years ago, use of DBMS was confined to the precincts of institutions with mainframe or minicomputers. The forms in which data could be entered, manipulated, and reported were limited and inflexible. By contrast, there are now dozens of commercially-available DBMS costing less then $700 and capable of manipulating data in ways previously impossible, even on mainframe computers. Researchers now can have hundreds of fields for their data, variable length records, free text indexing, and multiple views of records in relation to other records through "windows."

Analysis: One does not have to be a programmer to use micro-based DBMS. The newer packages are completely menu-driven, interactive, and quite powerful. Their power presents users with as yet unexplored analytical capabilities. One

no longer need tailor research to fit tightly constrained applications packages like SPSS. With existing DBMS packages, one can use interactive menus to search for patterns, to test hypotheses and relationships among the data in different fields. Given the large number of socio-economic variables affecting rural energy systems in the developing world, the luxury of having such analytical capabilities can be readily appreciated.

Information Dissemination: Traditional modes of information dissemination--journal and book publishing, technical report distribution, reprint requests--no longer provide the kind of timely access to new information required in applied, project-oriented, interdisciplinary research. DBMS can play a vital intermediary role between researchers, institutions, government agencies, administrators, and field workers. Data in DBMS can be manipulated into the most useful forms, depending upon information needs, and disseminated via paper printouts, disks, tapes, or telecommunications. Information flows can be decentralized and move vertically or horizontally among individuals and institutions, through and along different networks, as the occasion demands.

For too long, the sharing of findings and data has been more or less left to individuals in the spirit of scientific fraternity. That honorable but ancient system no longer works. Today it is common for large projects not to respond to requests for information generated by the project. Individual researchers cannot afford to extend these courtesies, because they are committed to publishing results. Ironically, many of these projects take place in developing countries; but host-country scientists and professional do not share in the knowledge gained until it is formally published, and someone remembers to request a reprint.

If we intend, as with the F/FRED Project, to strengthen research institutions in developing countries, this prevailing, unthinking information dissemination system is deficient, if not intolerable, unacceptable, or

insulting. A shared DBMS will liberate developing country institutions from having to depend upon the good will of North American or European institutions to get at the results of research. The results, in the DBMS, can be distributed quickly in many forms. If they are not, it will not be the fault of the technology.

Behind the data in the DBMS are the full-text reports, documents, publications, and so on accumulated by the project. These too must be made readily accessible to all participants through the medium of a backup library or archival facility. This has been recommended to AID by Dr. Rose in his report on DBMS, and, since the writer is a librarian, the concept is heartily endorsed in this appendix.

Institutional Memory: Every project accumulates a knowledge base that is greater than the sum of its parts. This is particularly true of a project that will continue for ten years, extend over three continents, become involved with numerous institutions, and occupy itself with several different areas of investigation. There will be much to remember--and learn from--if the data and experiences are recorded in a form that facilitates remembering and learning.

A DBMS can make that possible. Institutional memory usually suffers because projects do not have at their cores mechanisms for storing and retrieving many kinds of data, citations to literature, evaluations, chronologies, and records of individual expertise. We can see this in large, well-funded and well-publicized projects today, where there is not even an archival record of all the

articles, reports, and books that were published. Everyone's problem is no one's responsibility.

The DBMS is a built-in mechanism for recording project experience. Properly utilized, it will provide an indispensable overview of project objectives, direction, accomplishments, and resources. The base of project experience in a recoverable form will also enable researchers to rethink their objectives. They can use the DBMS to identify priority topics for research. The proposed DBMS will enhance the learning curve at every stage of the project's existence.

Interrelations and Integration: The proposed DBMS can make interdisciplinary research a reality. We hear a lot about integration of the social and biological sciences, but it rarely if ever happens. The reason is that effective interdisciplinary cooperation depends upon good will, imagination, and altruism--qualities that are always in short supply.

With the proposed DBMS, a collaborative systems approach is almost mandatory, if we truly want to identify linkages and covariations between social systems and ecosytems. The DBMS makes it possible to integrate textual and numeric data; socioeconomic surveys with biophysical data. This has been possible previously on mainframe DBMS but the limitations of those programs--their rigidity and inflexibility for the most part--more or less ruled out true mixing of data between the social and biophysical sciences.

But the capabilities of programs now are such that the DBMS can become the workhorse of the project, supporting all of its activities and objectives. Moreover, the kind of superior recordkeeping and comparisons it is capable of making force project personnel to develop standardized data formats and collection methods and to integrate findings.

From this comes an even more important integration than that of the social and biophysical disciplines—the integration of administration and research. The two could hardly be more distant on most projects. Researchers regard administrators as unwelcome intruders into their activities, while administrators often regard researchers as individuals who must be closely watched. This adversarial relation can be, if not completely changed, certainly modified by the advent of the micro-based DBMS. Suddenly one begins to see the interrelations of project data. The information project managers require turns out to be information that is also needed by project researchers. The truth is that neither researchers nor administrators exploit the kinds of information the other collects, and the result is a loss to both. Having a DBMS forces the sharing of data internally, which will have a positive influence on project evaluations, one area in which researchers and administrators have a common practical as well as methodological interest.

The advantages of a DBMS so far presented may appear convincing, but they are potential advantages. The question naturally arises as to how the proposed DBMS would actually function in practice, in the real world of administration and bureaucracy. The undertaking of a ten-year, cooperative program poses substantial administrative problems.

Dr. Dietmar Rose has suggested to AID officials an administrative plan that features a coordinating mechanism at the regional level in each of the AID regions, and a Global Advisory Group, headed by the Project Manager. The Regional Forestry Advisor, supported by specialists with networking, training, database management, and subject area technical expertise (foresters, soil conservationists, sociologists, ecologists, and so on), would carry the main load in the project. The DBMS would be created and maintained at the regional level in order to support the coordination, networking, technical backstopping, and training of the F/FRED Project. Database personnel in each region and in the

Project Manager's office would consist of a database manager and a technician assistant.

How researchers would utilize the functioning DBMS can be seen more closely if we look at three activities--database design, information storage and retrieval, and project management. The discussion assumes that the administrative organization would be similar to that proposed by Dr. Rose.

Database Design: Project researchers would have perhaps the greatest creative interaction with the DBMS at this stage. Care and thought have always been crucial in designing a database format. But the design element here is crucial in a different way. Traditionally, with a mainframe DBMS, design revolved around fitting the data into appropriate fields for analysis. You knew what you had or what you were going to c/llect; the problem was how to analyze it, how to make the computer work for you.

In this project, it is not yet known what socio-economic data are going to be most useful. Database design should be an ongoing process, during which researchers will draw ideas and make decisions about organizing, classifying, and collecting. Work on the database design will lead directly to forming guidelines for project design and management. Creative collaboration between administrators and researchers is thereby built into the project.

Dr. Rose's administrative recommendation to AID left the setting of database guidelines and formats to be done at the global or project manager level. This means that social scientists participating in the project would have to present their ideas early on. The workshop proceedings and bibliography give examples of several approaches to social forestry data collection. These can be incorporated into the initial database design, but other categories for data collection will be forthcoming--social indicators, land tenure and property rights, opinion surveys, rapid appraisals, informant interviews, social

profiles, demographic surveys, kinship analyses, participation rates, household budgets, gender roles, migration rates, modes of distribution, subsistence activities, indigenous plant and animal lore, and all the many others.

Obviously there must be standardization and overall guidelines, but not at the expense of flexibility. During this project, it will be essential to test and refine new data categories in actual fieldwork, analysis, and information retrieval so that the best combinations can gradually be identified.

Given what a micro-based DBMS can do, it follows that the regional level DBMS would not consist of a single program or piece of hardware. Instead, as indicated earlier, there would be a family of databases. It is assumed that the hardware will be IBM or IBM compatible. (That does not exclude other computer hardware, as will be explained below, but the IBM-compatible, 16-bit micro running PC DOS or MS-DOS operating systems are the closest to being an international standard, and the best existing DBMS micro software is available for them.) The database software, as noted by Dr. Rose in his report, would be relational in design (dBaseII, Rbase 4000, Knowledgeman, Dataease, for example).

Whether hardware or software, the DBMS manager on the regional staff would identify preferred systems so as to maximize the area of compatibility in networking. Where incompatibility existed, that person would build connections between dissimilar disk formats, operating systems, programs, and database designs.

This role for a DBMS professional differs radically from that of data processing personnel in the traditional mainframe computer center, and the difference cannot be overemphasized. Instead of ensuring conformity to a single, large system, he or she would be working to link disparate decentralized systems under one or more standardized formats. The object would be to encourage use of standard formats and approaches. But not all participants will meet all

standards. In the DBMS family, there would be a gradation among databases, from the complete and standardized to the incomplete and unstandardized. Yet all can have their place and make contributions to fulfilling project objectives.

At the database design stage, then, social science researchers would give their input continuously to the DBMS manager to ensure that the manager is creating the most effective, flexible instrument for research support.

Information Storage and Retrieval: Once designed, the DBMS will give the social/science human factors researcher a powerful tool for storing and retrieving data. Storage would be in accordance with designed database formats, as already explained. The researchers would interact with DBMS personnel to ensure that appropriate data are saved, stored, and made accessible in the system.

According to Dr. Rose, the project will emphasize initially the collection and storage of current field-project data; older research findings would be included as needed. Here is a classic instance where social scientists would have significant input: because a determination to concentrate on current project field data completely overlooks the value of learning from the past. One can work in libraries and archives, as well as in the field, and discover there a body of knowledge based on project experiences that can be utilized immediately in working on the problems of the F/FRED Project. The Workshop and accompanying bibliography demonstrate how extensive that experience and knowledge base really is, and Workshop participants will agree that this is the kind of data that is appropriately stored in the DBMS.

It follows that the role of libraries is itself important in this project. There is first the special backup facility needed to store and archive all project-related materials and provide documents on demand recommended in Dr.

Rose's report. But libraries generally should serve as significant sources of research material to be searched for essential data.

Information retrieval is an everyday working experience for social scientists, who are very good at it. And being accustomed to searching exhaustively for sources of information in the field and in libraries or archives, they will be in a good position to make the most out of what has been stored in the DBMS. As the DBMS grows and becomes ever more complex, the database manager will become increasingly useful for retrieving and interpreting data in the DBMS. Researchers will utilize the manager's skills and experience much as they now do those of librarians and other information professionals. It will be a new kind of collaboration. Obviously, those who continuously use the DBMS and understand it will profit most from the database manager's specialized knowledge.

The output from the DBMS can be the usual paper printouts in different categories; but it can also be on diskettes or tapes. Researchers will want—and will be able to get--custom-mad ta acquisition packages that they can further manipulate.

Project management is the third and last kind of interaction to be noted. As explained in Dr. Rose's report, database managers will provide support for all the project's activities at both regional and global levels: networking, training, technical information. They will also monitor and facilitate the flows of information to the top of the administration, particularly in order to supply decision makers with up-to-date status reports on project activities--a management information system or MIS.

Where researchers would interact in these administrative matters is in the preparing of project evaluations, both retrospective and prospective. Researchers could contribute, from their use of the DBMS, an invaluable feedback

function. They would know what kinds of information have been gathered and how useful they are. The DBMS, because it will be the project workhorse, will tend to open up project evaluation, making the process at once easier, more comprehensive, objective, and careful. This will happen because the administrators will be drawing upon the researchers' expertise much sooner. Presently, a consultant is brought in to assist with evaluations on an ad hoc basis. Judgments can be ill considered, hasty. The DBMS forces the administrators and researchers to confront issues earlier on, presumably making possible corrective action. So long as there is general access to the DBMS--which access researchers will insist upon--evaluations will involve nearly everyone. At the very least, the chances for constructive, timely input will be much greater than they are at present.

This representation of the operating DBMS during a project may appear idealized to some. The writer admits to having no first-hand experience with a bureaucratic-administrative system that could negate every single, hopeful thing described. But then this appendix is, like the Workshop Proceedings themselves, an interpretation, an imaginative exercise. At the Workshop, many participants argued once again for integration of social with biophysical research and for more input on AID projects. This appendix is a similar argument constructed around idealized interactions of researchers with a sophisticated, many faceted micro-based DBMS and the professional technical personnel responsible for its operation.

But these things can happen. There is nothing in administation or technology to prevent innovative use of DBMS in this project. If innovation does not take place, it should not be the fault of social scientists who were reluctant to try. The DBMS described above and by Dr. Rose is not a panacea. Yet it can be an effective medium through which those in the social sciences improve their research capabilities and at the same time forge close working

relationships with those in other disciplines and professions that will certainly further the achievement of our common objectives.

Appendix Four

Bibliography on Human Factors Affecting Forestry/Fuelwood Projects

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Subject index (KWIC) is available from the compiler. Write Library, Yale School of Forestry and Environmental Studies, 205 Prospect Street, New haven, CT 06511

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