WORKING PAPER 1

Forestry For Sustainable Development: Concepts and A Framework For Action

by

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March 1990

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PREFACE

This is the first in a series of working papers produced for the Forestry For Sustainable Development (FFSD) Program at the University of Minnesota that represent work in progress. The purpose of these working papers is to stimulate discussion among individuals working in the field of interest.

The major objectives of the FFSD Program are to:

1. **Improve the availability and usefulness of existing technical knowledge related to forestry for sustainable development** - translate state-of-the-art scientific and technical information into practical and easily usable management guides and training materials that can be used effectively in planning and implementing development projects that will contribute to sustainable development; and

2. **Improve the policy and organizational environment to encourage application of sustainability strategies** - identify and develop effective institutional mechanisms, both at the policy and project levels, for introducing sustainability strategies into the development planning process at an early enough stage to influence project or program design.

The focus of the Program is on social forestry and related strategies within a watershed management framework as an integrating mechanism for moving toward sustainability in land use and in natural resource-based development projects. It involves an interdisciplinary group of faculty from the University of Minnesota, and associates at the University of Arizona, Yale University, Oxford University, the InterAmerican Development Bank, and other development groups. The FFSD Program is part of the University of Minnesota's Center for Natural Resource Policy and Management in the College of Natural Resources.

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FORWARD

Some words of explanation are needed with regard to why Working Paper 1 is published long after Working papers 2 through 5 have appeared. A first draft of Working paper 1 was written and sent out to FFSD Program collaborators early in 1988. Many of our collaborators took a great deal of time and effort to comment on the paper. Significantly, though, many of the comments and criticisms received conflicted with each other. It was quite evident that different collaborators had different views on what sustainable development was all about and how to tackle issues of sustainability in a pragmatic and effective fashion.

After reviewing all the responses, and after having spent another few months reviewing available documentation on the subject of sustainable development, we decided that it would be unproductive to merely revise the original version of Working Paper 1. Instead, we decided to do a total rewrite of the paper, focusing just on issues related to introducing sustainability concepts into international and national development agencies, leaving issues related to local participation and local community action to others, including our colleagues in the other two Pew-funded sustainability programs.1 We also decided to wait to produce the rewrite until the concepts being explored in the FFSD Program were much more clearly defined and tested.

Building on comments and suggestions received from FFSD collaborators, our additional review of the literature, and discussions with numerous development professionals, we developed a more systematic framework within which to view development agency policies and actions to introduce sustainability concepts into practice. This new version of Working Paper 1 is the result.

We hasten to add that it still is a "working" paper, one that likely will need considerable revision and expansion of ideas before it will be ready for wider circulation and use. As such, we emphasize that comments and criticisms are most welcome and, indeed, are requested.

1 These programs are as follows: World Wildlife Fund/The Conservation Foundation - "Training and Management for Sustainable Development;" Center for International Development and Environment/The World Resources Institute - "From the Ground Up In Africa."
Sustainable development is defined here as development involving changes in the production and/or distribution of desired goods and services which result for a given target population, in an increase in welfare that can be sustained over time. The emphasis is on production with environmental protection in order to improve the well-being of people in a target population. Sustainability must refer not only to maintaining and/or improving environmental quality and the productive capacity of ecosystems, but also to maintaining and/or improving the well-being of people and enhancing their capacity to utilize available resources effectively and efficiently over the long run to meet the needs of present and future generations.

The FFSD Program has developed a framework for action that includes:

1) the need to change the operational focus of development practitioners to:
   a) focus on avoiding nonsustainable development as a workable, operational objective;
   b) develop indicators of potential nonsustainable development, considering the context within which these indicators will be used;
   c) build more flexibility into projects to deal with uncertainty; and
   d) focus on sustaining project benefits rather than the development project itself.

2) expanding the traditional project paradigm that is used in most development agencies by:
   a) internalizing key project externalities;
   b) providing for continuity of project benefits beyond the formal life of the project;
   c) planning for the diffusion of positive project ideas and impacts beyond the project boundaries; and
   d) considering the distribution of project costs and benefits among various groups of people over time.

Although the above general principles for dealing with sustainability issues are known among development professionals, this knowledge often is not applied in practice. Two obstacles appear to stand in the way of application:

1) Appropriate information required for specific applications is lacking; and

2) Institutional bottlenecks exist that inhibit or prevent implementation of sustainability principles.

To provide more appropriate information to development planners and managers:

- Additional research and development work is needed to improve understanding of the various physical, biological, social, and economic linkages involved in human manipulation of the environment.
- Available information intended for practitioners must be put into a more understandable and useful form, and be made readily available to them where and when they need it.
Decision makers must be provided with an expanded set of value weights for
decision making that includes more thorough consideration of noneconomic and
local, indigenous economic value dimensions, and that expresses environmental
impacts in terms of their economic and social values, as reflected in their direct and
indirect impacts on humans.

To overcome institutional bottlenecks that inhibit application of sustainability principles in
development agencies, personnel need to be provided with:

- The means to overcome the bottlenecks, through provision of education and training,
  resources, and authority or power to act; and
- Appropriate economic, social, and political incentives to overcome institutional
  bottlenecks.
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INTRODUCTION

The issues associated with sustainable development are extremely complex. Yet they have to be dealt with, given the increasing evidence of serious negative consequences of nonsustained development. Evidence from the Sahel, the Andes, the Amazon, the Himalayas and many other regions indicate the misery and suffering which can result. While in many cases intentions may have been good, results were poor.

Clearly, people can act to avoid some of the same mistakes in the future. To do so they need to understand clearly the implications of alternative development policies, strategies and activities. More informed choices can lead to more sustainable development.

Objectives of the FFSD Program

This clearer understanding of options and their implications is needed both by landusers and the development professionals involved in the design and implementation of development projects and programs. The Forestry For Sustainable Development (FFSD) Program focuses mainly on the latter group—the planners, policy makers, trainers, extensionists, managers and administrators working for national and international development agencies, both governmental and nongovernmental.

The FFSD Program has as its objective to develop management guides, training materials and training approaches (formats and modules) which address the information needs at both the project and the policy levels for this broad audience. Both levels are emphasized, recognizing that sustainability concepts and safeguards need to be introduced from the highest policy level down to the specific project action in order to achieve widespread and effective results. Projects that support overall sustainable development cannot avoid being influenced by the overall policies and actions which guide the path of development of a country. At the same time, policies which are not followed up with concrete projects or actions become hollow reminders of what could have been and not what is.

Social Forestry Focus in a Watershed Management Context

The focus of the FFSD Program is on social forestry strategies considered within a watershed management framework. Social forestry activities aim at meeting human needs on a sustainable basis, using limited resources and emphasizing improved use of the productive potential of land and tree resources at the local farm and community levels. How to introduce social forestry strategies into development efforts is of growing concern to national and international development agencies, since they realize that effective social...
forestry activities can contribute in a significant way to the sustainability of development in many regions.

The conceptual watershed management framework considered here is built on the fundamental realization that the economic and political forces that cause nonsustainable development operate within political and legal boundaries, while the forces of nature that affect land and water resources, and ultimately the sustainability of development, respect only watershed boundaries. Often, the two sets of boundaries conflict. Since most rural development programs involve the use of land and water resources, lack of consideration of watershed boundaries in rural development programs can have disastrous effects in terms of the sustainability of such programs. One major challenge that faces those involved in development work is to reconcile the watershed boundaries respected by forces operating in the natural environment with the geographical boundaries set by the political and economic forces that drive development (see FFSD Working Paper no. 3).

**Organization of the Paper**

In section 1 we discuss our interpretation of what "sustainable development" means and the concepts we need to define in operational terms in order to deal effectively with the issues at hand. Section 2 discusses in more detail social forestry strategies considered within a watershed management framework. Some of the reasons why these strategies can lead to more sustainable development are outlined. Section 3 provides a more detailed look at the elements in project design and implementation processes that need to be considered in taking sustainability issues into account. Section 4 suggests institutional changes to implement sustainable development strategies.

### I. DEFINITIONS AND CONCEPTS

*The temptation is to begin with a definition of 'sustainability'. To ask: What is it? Frankly, I don't think I can define it without unduly constraining the free flow of my thoughts. In other words, I don't know what it is. As it is something that is 'sustained', it obviously has a time dimension. But I am unclear as to what this dimension is—*is it five years? Ten years? or what?* (W. D. Hopper, Vice President, the World Bank, 1987).

Sustainable development is a broad term that is difficult to define. It is used differently by different people, depending on their backgrounds, purposes and viewpoints (Brown et al. 1987). Its breadth and vagueness make it politically appealing, but confusing as a point of reference for any concrete operational activity. However, in all cases, the term seems to embrace the concept of *production with environmental protection* rather than environmental protection alone. This is why, in contrast to many other terms and concepts used in the past by environmentalists, sustainable development has been embraced as an
important concept by the development community at large. "Production with protection" is also how we interpret the term in the FFSD Program.²

We define sustainable development as development involving changes in the production and/or distribution of desired goods and services which result, for a given target population, in an increase in welfare that can be sustained over time.

The definition focuses on those increases in "desired goods and services" that lead to increases in "welfare." What do we mean by welfare in this context? We are talking about a very complex concept which really is not specifiable in quantitative terms. Welfare relates to level and distribution of income, physical and mental health, food, education, housing, clothing, recreational opportunities, and many other factors. "Welfare" is a term used loosely by most everyone. In practical terms, it is defined by each society through its laws and cultural traditions. In the simplest form, increases in welfare generally are equated to increases in GNP per capita or increases in the consumption of goods and services.

It is important to specify adequately what "target population" means in the definition. In the ideal case, the whole world population should be the target. In this case, the welfare of at least some people would be increased on a sustainable basis without adversely affecting the welfare of any people. In the more realistic case, given political and economic realities of the world, the target population becomes a more limited group, say the national population of a country, or the population of given project region.

In the broad interpretation of sustainable development, the focus is on sustaining an increased level of welfare rather than merely sustaining (protecting) the resource base on which welfare partly depends. Resource sustainability is only one concern. Ultimately, the concern is with the welfare-sustaining capacity of a development system. Accepting this welfare-sustaining interpretation in forestry, for example, means that the focus is not on "sustained yield forest development," but rather on "forestry for sustainable development," or tree growing, management and use strategies to increase human welfare on a sustainable basis.

The physical input-output concept of natural resource sustainability has been in use for many decades, for example, in the forester's use of the principle of "sustained yield" forestry and in the management and control of some fishery resources. This is an important partial measure of sustainability and it has a practical, though limited use in planning and managing development involving use of renewable natural resources. The limitations are due to the lack of consideration in this model of the fact that technology, institutions, society's wants, and its definition of welfare are changing over time, which means that the relative importance of different resources changes over time. Sustainable increases in welfare depend on more than the stocks and yields of any specific renewable resource.

²It also is the way in which we interpret the term "conservation." Despite the fact that many people equate it with "preservation," Gifford Pinchot and those who first used the term took it to mean production or land use with protection of the resource base (Pinchot 1947). Many development organizations share this view; for example, the title of a 1983 publication by the Food and Agriculture Organization of the United Nations is, "Protect and Produce: Soil Conservation for Development."
Given the broad concept of sustaining welfare, it follows that depletion of a specific natural resource asset, i.e., nonsustainability in terms of the supply of that resource, can still be part of a broader welfare sustaining development process. It all depends on where, when, and how the depletion occurs and what replaces the depleted resource. An example would be a progressive depletion of an abundant forest resource to provide land for sustainable agriculture, or to provide the capital for other development, such as in the case of the early forest clearing in the midwest of the United States or in Sweden. In terms of our definition, this depletion of forest capital would be part of a welfare-sustaining development. In other cases (depending on location and agroclimatic conditions) clearing and burning of forests leads to creation of desert and barren lands and a reduction in welfare, i.e., the (deforestation) activity contributes to nonsustainable development.

Thus, the same type of activity—deforestation in the above case—may or may not contribute to the welfare-sustaining ability of a development system. Given resource availability, technology, institutions and desired output (the components of development activity) sustainability depends on specific surrounding conditions (location), on scale (extent, intensity, duration), and on timing of the activity in relation to other activities. Thus, we need to analyze the role of each of these dimensions before passing judgement on the contribution of a given development activity to the sustainability of a development system and resulting increases in welfare. The context of development does make a difference in assessing the contribution of an activity to sustainable development.

Changes in the demand for resources also are caused by development of new technologies. For example, the development of pulp and paper technology and then structural particleboard technology has increased drastically the demand for the aspen (Populus spp.) resource in the midwest of the United States. Aspen, which used to be considered a "weed species" and an unimportant component of the sustainable forest resource base, is now a valuable resource. With structural particleboard replacing structural plywood, and with the introduction of technology to produce veneer from small logs, the demand for larger sized peeler logs of coniferous species shifts. Such shifts in resource demands—due mainly to the development of technology and to institutional change which leads to acceptance of substitution—change our ideas concerning the size of the capital stock of given resources which should be sustained, and the value of that resource in terms of its contribution to human welfare.

In some cases, demand for a resource can disappear almost totally. This was the case with the gum from the Acras zapote tree, a main ingredient in chewing gum before artificial gums (new technologies) were introduced. There are many other examples of evolving technology changing the desirability of sustaining a given resource base from short and intermediate term economic and social (human welfare) points of view.

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3 It should be noted that the same fate affected the "Jelutong" tree (Dyera costulata) which produced gum for chewing gum in Malaysia. However, use of the tree for lumber became popular. Further, there now are indications of a renewed interest in use of the gum from the "Jelutong." (Personal communication, Harry Chea, Director of Planning and Evaluation, FRIM, Malaysia, Oct. 2, 1987).
In general, the implicit assumption underlying the resource-sustaining model is that sustaining a resource is good and depleting it is bad. This view of the world is unfortunately not always appropriate, as discussed and illustrated earlier. Thus, we need to consider other dimensions. The institutional and environmental contexts within which changes in the resource base take place also should be considered in reaching any conclusions concerning the desirability of a given physical/biological change and its contribution to development.

II. SOCIAL FORESTRY IN A WATERSHED MANAGEMENT FRAMEWORK

As mentioned, the actual and potential contribution of social forestry to sustainable development is the area of interest of the FFSD Program. This contribution will be viewed within an integrated watershed management framework, recognizing that: 1) social forestry is just one category of rural land use; 2) social forestry is closely interrelated with other land uses and activities in a watershed; 3) it is the sum total of these resource uses on a watershed that determines the sustainability of the resulting welfare changes, both for people living where the uses take place and for others downstream who are affected by them; and, 4) an integrated watershed management framework is fully compatible with our "production with protection" interpretation of sustainable development.

The term "watershed" refers to the total area of land above some point on a stream or river that drains to that point; it can be defined to be as small as a few hectares near the origin of a small stream in the high Andes, or as large as the entire Amazon River basin into which that small stream drains. The level of aggregation used depends on the objectives and purpose. A watershed management framework basically provides a systems view of the management and use of resources found on a watershed. More specifically, such a framework provides a systematic basis for guiding and organizing land and other resource use to provide needed goods and services without adversely affecting soil, water and other natural resources.

A watershed management approach incorporates "soil conservation" and "land use planning" into a logical framework by focusing on the following concepts:

1) People are impacted positively and negatively by the interaction of water with other resources; and in turn, people affect the nature and severity of such interactions by the ways in which they use resources and the quantities that they use.

2) The impacts of these interactions do not follow political boundaries—water flows downhill regardless of how people define their political boundaries. Thus, what is done in the highlands of one country can have significant effects in another country; and the ways in which farmers in one village use land and water will affect villagers downstream.

3) Since such interactions cut across political boundaries, what may be sound resource use from the point of view of one political unit (country, community, or landowner) may...
not be sound resource use from a broader, societal point of view, because of undesirable downstream effects, i.e., what economists call "externalities."

4) Given the existence of externalities, ecologically sound management becomes good economics for all concerned only if costs and benefits are appropriately distributed among the political units, communities and individuals that carry out the watershed management activities and those who benefit from them.

A number of strategies and activities fit within the watershed management framework to accomplish objectives associated with sustainable development. Such strategies and activities, for example, relate to agriculture, ranching, social forestry and production forestry, and protection activities through setting aside of reserves and parks. In short, almost any land use activity can become part of a watershed management strategy and program and fit within an integrated watershed management framework.

The term, "social forestry," is used interchangeably with "farm and community forestry," and "forestry for local community development." The terms refer to a broad range of tree- or forest-related activities undertaken by rural landowners and community groups to provide products for their own use and for generating local income. This includes farmers growing wood to sell or use for firewood. It includes various agroforestry approaches used by farmers. It also includes communities or individuals (e.g., landless persons) earning income from the gathering, processing, and sale of minor forest products such as fruits, nuts, mushrooms, herbs, basketry materials, honey, and vines. Or in some cases, landless people are given the right to grow trees on public or common lands. Finally, it may also include governments or other groups planting trees on public lands specifically to meet local village needs. In the context of sector development, social forestry overlaps with the conventional production forestry sector, the agricultural sector, and, in many countries, with the energy sector because of the importance of fuelwood in the overall energy supply picture. In fact, in some countries, one finds all three of these sectors involved in social forestry programs.

In conventional production forestry, trees also are used to meet the needs of people. In that sense, all types of forestry should contribute to social goals. However, the distinction is that, in social forestry, the primary focus is on people and on community involvement with trees.

III. A FRAMEWORK FOR ACTION

This section lays out some ideas on practical approaches that might be taken to introduce sustainability concerns into development practice in the social forestry and watershed management areas.

The FFSD Program has focused so far mainly on those factors that specifically are identified with sustainability issues at the project level. It is at the project level that the physical actions which contribute to nonsustainability of a development system can be controlled most directly. However, we recognize fully that many of the major sustainability issues facing the world will not be resolved merely by working with development projects. Fundamental policy changes also are needed to encourage people to think about sustainability issues as they go about their everyday activities quite outside a project context. Development projects and the programs into which they are organized are only a small part
of the total human activity affecting the sustainability of development. They only can
demonstrate what types of activities lead towards sustainable development. To make such
demonstration effective in terms of widespread diffusion and adoption, appropriate policy
environments have to be established.

The distinction between project and policy level considerations also relates to the need to
deal with sustainability at different scales of human and ecological activity. Thus, some
people are involved with issues related to "global sustainability" or "global change," whereas
others focus on sustainability issues associated with a village, small watershed region, or a
specific project. Sustainability is of concern at all levels, and there are strong interactions
between the different levels of concern. An aggregation of local level actions can lead to
broader and eventually global effects. Global level concerns must lead to policy changes.
Local level concerns are most often translated into concrete project level action, supported
by the broader policy environment in which such action takes place.

In terms of project level interventions related to sustainable development, our experience
so far with the FFSD Program leads us to suggest a framework of elements which includes
1) changes in the operational focus of development practitioners and 2) expansion of the
traditional project paradigm which is used in most development agencies. Each of these
categories of changes is discussed below.

Changing The Operational Focus

The basic, practical principles which are needed to guide work related to sustainability of
development projects include the following:

- focus on avoiding nonsustainable development as the operational objective;
- in developing indicators of potential nonsustainable developments, pay close
  attention to the contexts within which those indicators will be used;
- in considering sustainability issues, recognize that there is and will be major areas
  of uncertainty that can be tackled only by building more flexibility into projects;
- focus on the sustainability of benefits or positive ideas introduced by projects, not
  the sustainability of projects themselves.

Focus on avoiding nonsustainable development as the operational objective

As indicated above, the concept of sustainable development is an elusive one. It has great
political and philosophical appeal, and it is useful as a concept on which to base debates on
the fundamental directions in which society should be going with development programs.
However, it provides little guidance in developing concrete programs and projects. We do
not and cannot know the future. Thus, we cannot know now whether a given development
is sustainable or not. What this implies is that we should focus on what can be done to
avoid potentially nonsustainable developments, since this is something which can be dealt
with in a very concrete, operational way in the present.
Actually, in practice most project managers tend to take this approach; and planners often design to avoid failure (nonsustainability) while making limited but meaningful progress in welfare, rather than maximizing welfare gains. For example, the highly successful South Korean program to create fuelwood self-sufficiency in thousands of villages focused on species which gave acceptable growth with minimum chance of failure, i.e., species which could survive under a wide variety of planting conditions and with widely differing planting approaches by inexperienced village planters, rather than species that gave maximum growth, but were less adaptable. Various institutional mechanisms also were introduced to avoid nonsustainable developments (Gregersen 1982).

Understand the context within which indicators of potential nonsustainability are used.

In a practical sense, the practitioner needs to identify the indicators that will be used as early warning signals that a development may become nonsustainable. An example of an indicator of potential nonsustainability would be declining crop yields. In turn, declining soil productivity, declining management input, or adverse change in various institutional factors (land tenure, etc.) could be indicators of potential declines in crop yields. One could go on to develop a hierarchy of indicators, any of which could be used at different stages in the problem identification process.

We need to sort through the various ways of organizing and linking indicators of nonsustainability; and we need to analyze the potential importance of different indicators in different situations (cf. FFSD Working Papers 2 and 4). For example, forest exploitation which removes much of the vegetation is an indicator of potential nonsustainability in all cases. However, the importance of this indicator is much higher in a tropical area, where 75 percent of the nutrients may be tied up in the living biomass, as compared to a temperate area where a much smaller percentage of nutrients is tied up in the living biomass.

There is another problem with indicators such as discussed above. In some cases, a given phenomenon could be an indicator of potential nonsustainability or potential sustainability. For example, in the case of declining crop yields mentioned above, it could be a reduction in yields due to deliberate change to more sustainable technologies. In this sense, reduction in yields per hectare could be associated with more sustainable development. It is important to recognize this point in choosing the indicators which will be used in a given set of circumstances. The context should never be ignored.

In sum, we need to develop an understanding in a generic sense of the factors that are associated with nonsustainable development and the contexts within which such factors are important and the conditions under which changes in such factors may serve as early warning signs or indicators of potential nonsustainability problems. This involves defining the general nature of impacts expected from given activities under given circumstances and then exploring the dimensions of the likely impacts. Most any type of impact can be broken down and analyzed along a number of dimensions. The main dimensions we have identified so far are listed in Table 1.
Table 1. Dimensions of the impacts of development activities.

<table>
<thead>
<tr>
<th>Project impacts should be analyzed utilizing the following dimensions:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nature of the impact from a sustainability point of view.</strong></td>
</tr>
<tr>
<td>Is the impact positive or negative in terms of its contribution to sustainable development (or its contribution toward avoiding nonsustainable development)?</td>
</tr>
<tr>
<td><strong>Level of knowledge about the impact and level of acceptance of it by decision makers.</strong></td>
</tr>
<tr>
<td>Was the impact known, expected and accepted by decision makers or was it unknown and thus unexpected and unintended?</td>
</tr>
<tr>
<td><strong>Incidence of the impact.</strong></td>
</tr>
<tr>
<td>Here there are three dimensions of interest: location, timing, and groups affected, i.e., where are the impacts felt (e.g., upstream/downstream), when are the impacts felt (e.g., right now or next generation), and what specific groups are affected (e.g., &quot;us/them,&quot; poor/wealthy, etc.). It also is important to determine whether impacts are direct or indirect, primary or secondary. It is under this heading that the concept of &quot;externalities&quot; comes in.</td>
</tr>
<tr>
<td><strong>Scale of the impact.</strong></td>
</tr>
<tr>
<td>Here there also are three dimensions of interest: extent, duration and intensity. How widespread are the impacts, how long do they last, how strong are they per unit area and time.</td>
</tr>
</tbody>
</table>

It is important to consider scale of activities when looking at sustainability. "Small may be beautiful" when we think of individuals and their actions. However, when we consider the aggregate actions of many individuals, we often find that summing up all the smalls can make beauty fade. Much of the nonsustainable development that takes place in the world is caused by multitudes of individuals acting quite outside any large development project. Taken individually, they look harmless, but added together, they can create a major force (e.g., the single harmless grasshopper vs. the locust swarm). Consider the goal of a program and then consider whether an aggregation of "smalls" is better or worse than a "large" in terms of the relative impacts which result from meeting the same output objective. For example, in achieving a given total log output, what are the cumulative environmental impacts of many small independent loggers, compared to the impact of a single large modern logging firm?

**Deal with uncertainty by building flexibility into project management**

Quite often, nonsustainability is associated with an overly rigid development system that does not provide the flexibility to adjust to the unexpected. The occurrence of unforeseen events or changes should be treated as the rule rather than the exception. M&A systems need to be designed to provide warning signs as early as possible of unforeseen/unplanned changes. However, it also is possible to plan for the need to change plans in response to new, unanticipated nonsustainable development trends by building in flexible response mechanisms.

In face of uncertainty, the resiliency of a development system becomes an important characteristic to consider, i.e., the ability of the system to bounce back after temporary
setbacks, for example, due to an unusually dry year, a hurricane, or occurrence of some disease or pest damage. Resiliency is critical to sustainability.

Consider sustainability of project benefits rather than projects themselves

Obviously, projects, in the traditional sense of the term, are not designed to be sustainable forever. Thus, looking at sustainability of projects themselves beyond their intended lives makes little sense. Rather, the concern should be with the sustainability or nonsustainability of the benefits flowing from projects, which in most cases relate directly or indirectly to increased levels of welfare of the project beneficiaries.

As mentioned above, there also are issues of sustainability to consider during the lives of projects themselves. For example, a dam may have an design life of 60 years. The practical issue of sustainability is whether the dam actually will provide the expected flow of benefits during its expected life. In many cases, once a dam is built and its reservoir is monitored, the expected useful live of the project is reduced considerably because of an earlier underestimation of upstream erosion rates. A very concrete issue of sustainability thus exists in this case, since the expected benefits from the project will be considerably less than initially estimated unless something is done to reduce the upstream erosion rates.

In sum, focus should be on the sustainability of the benefits which flow from, and have developed because of, a project (or a production process introduced by the project). This is the same point made earlier with regard to sustained yield forestry: There is nothing inherently good or bad about the physical act of drawing down a forest resource (i.e. deforestation). It needs to be judged in terms of the flow of net benefits that result from the deforestation and from using the land after trees are removed. Removal of great areas of forest in the Midwest of the U.S. contributed to the building up of one of the most stable and productive farm economies, while deforestation in parts of the Amazon and other areas has led to destruction and desertification and a total loss of benefit flows from the land shortly after the deforestation takes place.

Expanding The Traditional Project Paradigm

The traditional forestry project paradigm used by most development agencies envisions a project with limited spatial, temporal and sector boundaries. What happens beyond those boundaries tends to be of little concern to the planner or manager dealing with such projects. Their jobs stop at these boundaries, and their rewards are based on how well they perform within these boundaries. We argue here that if sustainability of benefit flows is a concern, then this traditional paradigm and approach needs to be broadened so that project planners and managers:

- internalize key project externalities;
- deal explicitly with continuity of project benefits beyond formal project life;
- consider explicitly the diffusion of positive project ideas and impacts beyond the project boundaries; and
• Consider distributional impacts of projects over time.

**Internalize project externalities.**

Externalities are effects of an action (project or policy) that are outside the decision context or concern of those taking the action. These effects may be known but disregarded by the project planners or other authorities, or they may be unexpected and unintended effects which the project authority would have avoided if they had been anticipated. For example, a pulp mill manager may be aware that dumping waste into a river can create negative externalities in the form of pollution that affects downstream populations. But the manager may ignore the problem because it is cheaper than alternative disposal methods and there are no regulations which require the mill to stop dumping or pay fines for dumping. On the other hand, the manager may not be aware of all the problems created downstream by such dumping.

It is evident that negative externalities can lead to problems of nonsustainability for: i) people outside the project area (spatial externalities); ii) people living in some future period of time beyond the project life (temporal externalities); and iii) sectors of the economy or individuals outside the context, or defined jurisdictional boundaries, of the project (sectoral externalities).

In watershed management projects, externalities often relate to the upstream-downstream relationships: land and water uses upstream affect those who live downstream, for example, through pollution of water, increased sediment loads, changes in quantity and timing of water flows, etc. Thus, project planners have to be aware that what may be a move toward more sustainable development in the uplands may turn out to contribute to nonsustainable development downstream. As another example, the building of a road in a project area to provide access to a multipurpose dam may result in an unplanned influx of new settlers on upland watersheds, which in turn may lead to increased downstream problems.

In the policy realm, policy makers dealing with the agricultural sector may establish high price supports for certain agricultural commodities. In the process, farmers may move onto otherwise economically marginal lands and clear them for crop production. Often these lands may be steep and perhaps critical in terms of watershed protection. With watershed protection decreased, erosion increases, creating problems downstream through loss of storage capacity in the regional dam reservoir, eventually leading to a decline in irrigation capacity downstream. The agricultural price support policy has produced a negative externality that can lead to declines in welfare and nonsustainability of development downstream.

Appropriate monitoring and assessment activities can uncover many of the potentially significant negative externalities associated with projects and policies. However, to do so in an effective manner, M&A activity will have to extend beyond the boundaries of a particular project or policy, since an externality may affect people outside the project or policy boundaries.

Even if M&A activity uncovers the potentially significant externalities associated with given projects or policies, there is no reason why such information will be acted on unless:
• incentives exist within the responsible organization(s) to take action; and
• authority and responsibilities are coordinated and distributed in such a way that the externalities are internalized and become of concern to decision makers.

Institutional arrangements need to reflect the realities of the physical/biological environments within which they will function. If upstream activities can have significant impacts downstream, then some institutional means--supported by appropriate policies--needs to be found to connect upstream and downstream populations and activities.

Japan has had some long standing success in dealing with this issue. Morocco is dealing with the issue of decentralized authority among government agencies by requiring the minister of public works (dams and downstream structures) and the minister of agriculture (upland management) to work closely together in an overall watershed management context. Other countries, such as Colombia, have tried, though not successfully, to develop institutional arrangements for improving cooperation and coordination among government agencies in watershed management. A number of developed countries have instituted approaches which seem to work fairly well. The issues involved are discussed in greater detail in FFSD Working Paper 3.

Deal explicitly with continuity beyond project lives

Most projects have impacts that go beyond their formal lives. If sustainability is of concern, then continuity of positive project benefits and activities beyond the lives of projects must become an objective of those who plan, manage, and fund projects. Adjustments in the ways in which development agencies deal with projects need to be made accordingly.

For example, oftentimes, there is a tendency to choose the cheapest tool or piece of equipment to get a job done within the project lifetime. A common cause of nonsustainability is the inability of local project populations to finance the recurrent costs that occur after project termination due to need for the maintenance, repair, and replacement of equipment and facilities. Buildings, roads, and equipment need maintenance, or they begin to deteriorate and performance suffers. Equipment breaks down and must be replaced. Maintenance and replacement expenditures need to be built into project plans so such costs can be met when the project formally terminates, and so benefits continue on.

During project implementation, early warning signs of nonsustainability (lack of continuity beyond project termination) might appear, such as: inadequate local participation (of those who will have to sustain the project activities and ideas after outside project personnel leave); too much imported technology, materials and personnel; an accelerating drawdown of local resources or productive capacity; or a lack of buildup of funding mechanisms and institutions to support recurrent costs beyond official project lives.

Again, there is no guarantee that indicators picked up by the M&A activity will be acted on unless the organizational incentives are there to do so, and the institutional mechanisms exist to facilitate acting on the information produced by the M&A activity (see FFSD Working Paper 2).
Consider explicitly diffusion of positive project ideas and benefits beyond project boundaries

A small development enclave, with its heavy inputs of external materials, human capital, etc. may look "beautiful" and sustainable. However, looked at in the context of the broader picture of a nation’s development, it may not be as attractive; it may represent an unwarranted overinvestment in one small area at the expense of a broader, but less intensive investment over a larger area/population.

There is the question of how best to spread positive project ideas and technologies outside the project boundaries. In a more global sense, sustainable development requires spread of appropriate technologies and ideas on how better to balance production with protection of the natural resource base on which production depends. While an isolated small project population may move towards more sustainable practices, this will mean little in the long run unless the whole population in a watershed system or country starts adopting more effective practices. Thus, decision makers, project planners and implementors need to be concerned with diffusion issues by encouraging communication linkages, broader policy formation which encourages diffusion, etc. It is important how projects fit in a program context and how national policies support local developments as well as national development.

Consider the distributional impacts of projects

"... physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation." (World Commission on Environment and Development. 1987. p. 43).

Many, if not most development activities are undertaken to remedy adverse impacts on certain groups of people, and to change the existing distribution of positive impacts to benefit certain segments of society. Usually, development is undertaken to benefit a specified target group within a society—the poor, the landless, a segment of industry, small farmers, etc. It often matters very much, socially and politically, who is adversely affected by development, and who gains from this activity. The common measure of development—an increase in average per capita income or consumption—can mask a decrease in welfare for a large portion of the population, with a major increase for a smaller portion. Thus, we come back to the question of "Sustainable development for whom?".

We recognize that however desirable it may be to achieve a more equitable distribution of development benefits through the judicious use of development initiatives, social and political realities force recognition of the existing power structure within a society that is to be affected by development. The distribution of benefits and costs of economic and social activities are strongly governed by those who have power within a community. Development planners must take into consideration the distribution of power in attempting to achieve a more equitable distribution of costs and benefits.
They also need to take into consideration the existing distribution of economic and other resources within the society and how the costs and benefits of proposed development activities are likely to affect that distribution, given the existing power structure. A realistic appraisal of potential distribution issues of a proposed development project could lead to a redesign of the project if the existing design is not likely to lead to a desired distribution of development costs and benefits.

IV. INSTITUTIONALIZING THE FRAMEWORK FOR ACTION

The basic elements and general principles for dealing with sustainability issues, discussed above, probably seem obvious to most development practitioners. They are known; they are accepted as reasonable; but most often they are not applied. Why is the available knowledge not being used more widely in practice now? Two possible answers to this question seem particularly important:

- Practitioners lack some of the specific information needed to implement sustainability principles in practice; and
- Institutional bottlenecks prevent or inhibit the implementation of sustainability principles in practice.

Provide More Useful Information For Specific Applications

In order to move toward more sustainable development, technical information and knowledge applicable to specific development situations must be available to development planners and managers when they need it, in a form that is understandable and useful to them. Such situation-specific information often is not readily available. Thus:

- Additional research and development (R&D) work is needed to improve understanding of the various physical, biological, social and economic linkages and interactions involved in human manipulation of the environment. Although previous R&D has provided much useful information about individual physical, biological and technological processes, what is lacking is an understanding of how these individual processes are linked with each other and how they affect human welfare.

- Such knowledge must be put into a useful and accessible form for practitioners and be made readily available to them. Unless information is understandable, useful, and readily available, it will not be used. A special effort is needed to go beyond the usual research reporting to insure that information derived from scientifically and technologically oriented R&D is translated into a form useful to practitioners, and made available to them through improved technology transfer and other extension activities.

- Particular emphasis should be given to improving valuations of development impacts, i.e., to issues related to the valuation of positive and negative impacts of development activities and to the use of such values in decision making. Noneconomic, as well as local, indigenous economic values often are not given appropriate attention in agency decision making for forestry and related projects.
This mainly is because such values are not formally considered in appraisals of investments nor in monitoring and assessment activity during project implementation. More work is needed to develop practical, relevant, and acceptable methods of identifying, defining and assessing environmental impacts and economic and social values.\(^4\)

**Overcome Institutional Bottlenecks That Inhibit Implementation**

Providing practitioners with improved information is important. However, it is apparent to us--and to many of the key development professionals with whom we are working in the FFSD Program--that the main answer to the question "Why is available knowledge not being used more widely in practice now?", is that *institutional bottlenecks* stand in the way of using existing knowledge (including both hard and soft technologies) to improve the sustainability of development. If we want to insure that available knowledge and information is applied, we need to identify and understand better such institutional bottlenecks. Then we can focus on developing means for overcoming them.\(^5\)

**Provide the means to overcome bottlenecks**

The people who must act within organizations to improve the sustainability of development project activities and results must be provided with adequate:

- **Knowledge and skills.** People at all levels of a development project activity must have the knowledge and skills required to carry out the necessary tasks.

- **Resources.** Financial, human, and other resources must be earmarked for project activities related to avoiding nonsustainable development.

- **Authority.** Before people can act, they must have the power or authority to act. For many development activities aimed at helping the rural poor achieve a sustainable living; a key factor is providing land tenure or other rights in land.

The lack of any of these essential elements could result in institutional bottlenecks to achieving a more sustainable development. It is important in project planning and implementation to ensure that these necessary elements are available to those who need them, when they need them.

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\(^4\) A joint project in this area has been initiated by UNEP, FAO of the United Nations, The World Bank, and the FFSD Program. Other development agencies also have expressed interest in participating in the project.

\(^5\) We see a number of parallels here with Harvey Leibenstein's (1978,1980) work on "X-efficiency." He points out that in production systems, major gains in efficiency can be made by helping producers to narrow the gap between what actually is achieved in production and what could be produced under conditions of maximum known technical efficiency, i.e., to focus on X-efficiency as well as allocative efficiency. Leibenstein (1966) observes: "Clearly there is more to the determination of output than the obviously observable inputs. The nature of the management, the environment in which it operates, and the incentives employed are significant."
Provide appropriate incentives to overcome bottlenecks

One of the principal requirements for overcoming institutional bottlenecks is the creation of appropriate economic, social and political incentives to guide the use of known information, available resources, and given authority. The incentives which guide human activity have a great influence on the extent to which available resources, knowledge, and power are utilized to achieve a more sustainable development.

In relation to incentives operating within organizations dealing with forestry and watershed management, two elements are of particular concern:

- **Enlarging the "project" paradigm**, i.e., issues related to the ways in which professionals in organizations are encouraged or required to view and manage "projects." As mentioned, we have come to realize quite clearly that many development professionals—perhaps the majority—are well aware of concepts of sustainability and approaches that could be applied to avoid nonsustainability in development. What they lack are the organizational incentives, resources, and authority to actively apply what they know. Organizations often are not structured and organized in a way that encourages and facilitates application of available technical knowledge.

A major conclusion based on work to date in the FFSD Program is that following a "project" approach, as commonly is done by development agencies, often discourages sustainable development in two main ways: 1) projects generally have fixed termination dates, and agency personnel are given little incentive to be concerned with what happens beyond project termination/"completion;" and 2) projects tend to have limited spatial, sectoral or beneficiary boundaries that often are too narrow for the consideration of sustainability issues. Again, agency personnel have little incentive to be concerned with what happens beyond these boundaries. We need to find ways of adjusting the traditional project paradigm, ways in which the advantages of the project approach can be built into approaches that are more sensitive to sustainability issues.

**Example.** Development agency "N" closes the books on projects at completion of planned project lives, and the project planners and managers have no incentive to be concerned about projects beyond their termination. Agency "N" does have an evaluation unit which compares what project planners said would exist with what actually exists at project completion or termination. If some

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6Available evidence on sustainability is discouraging. For example, Harrison (1987), in his book *Greening of Africa*, cites a 1985 World Bank study of longer term impacts of agricultural projects. Of the 25 projects studied, all seemed successful in the project completion audits, but after 5 to 10 years, more than half the projects had not sustained their initially introduced benefits. A 1986 assessment of 212 USAID projects ("Sustainability of development programs: A compendium of donor experience." AID Program Evaluation Discussion Paper No. 24, 1988) found that only 11 percent had a strong probability of being sustained after the termination of U.S. assistance and 25 percent had poor prospects for sustainability. Similar assessments are not available specifically for forestry and watershed management projects, but are needed as a first step in making improvements in the sustainability of the positive ideas and results of such projects. Further steps then would involve design and implementation of appropriate means for changing institutional incentives.
additional, systematic effort were devoted to monitoring and assessing what happens beyond completion, it might be possible to gain significant insights into how to improve the sustainability of future development activities, and to do so at acceptable cost to the agency and project beneficiaries. In fact, in the longer run it might even improve performance during formal project life and certainly could significantly improve the contribution of the agency's activity to long-term development. Such improvement would come from establishment of more effective ways to sustain the positive ideas and developments initiated by a project when the formal project terminates, e.g., ways to improve the transition to local management and initiative.

- **Improving the effectiveness of training programs** for development agency personnel. No matter how good a training program is from a technical academic point of view, if personnel are not required, or at least encouraged, to apply what they have learned, then the training program has limited practical value. What types of mechanisms and incentives are needed to insure more effective training programs in terms of end use of what is learned?7

**Example.** In organization "M", existing incentives for design and implementation of development projects tend to discourage employees from applying what they learn from training courses or seminars they attend on issues related to environment and sustainable development. The effectiveness of training activities can be increased if we can: a) change training activities so material fits more harmoniously with existing organizational incentives, or, better yet, b) change organizational incentives, at an acceptable "cost," to improve the ways in which techniques and ideas learned are applied in design and implementation of projects that avoid nonsustainable development.

**Summing Up: Institutional Action Needed**

In sum, although general principles for dealing with sustainability issues are known among development professionals, this knowledge often is not applied in practice. Two obstacles stand in the way of application:

1) Information required for **specific** applications is lacking; and

2) Institutional bottlenecks exist that inhibit or prevent implementation of sustainability principles.

Action needed to provide more appropriate information to development planners and managers includes:

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7 A related issue is how "new" knowledge, especially in the area of social science/policy knowledge, affects decision making. Cf. Weiss (1980) and Rein and White (1977).
Conducting additional research and development work to improve understanding of the various physical, biological, social, and economic linkages involved in human manipulation of the environment;

Putting information intended for practitioners into a more understandable and useful form, and making it readily available to them where and when they need it; and

Improving valuations of development impacts used in decision making to include increased consideration of noneconomic and local, indigenous economic values, and to express environmental impacts in terms of their economic and social values, as reflected in their direct and indirect impacts on humans.

Action needed to overcome institutional bottlenecks that inhibit implementation of sustainability principles includes providing key development professionals with:

- The means to overcome bottlenecks, including appropriate knowledge, resources, and authority; and
- The incentives to overcome institutional bottlenecks.

LITERATURE CITED


