

## 2 Introduction

The question posed by Congress and addressed by this study may be stated as follows:

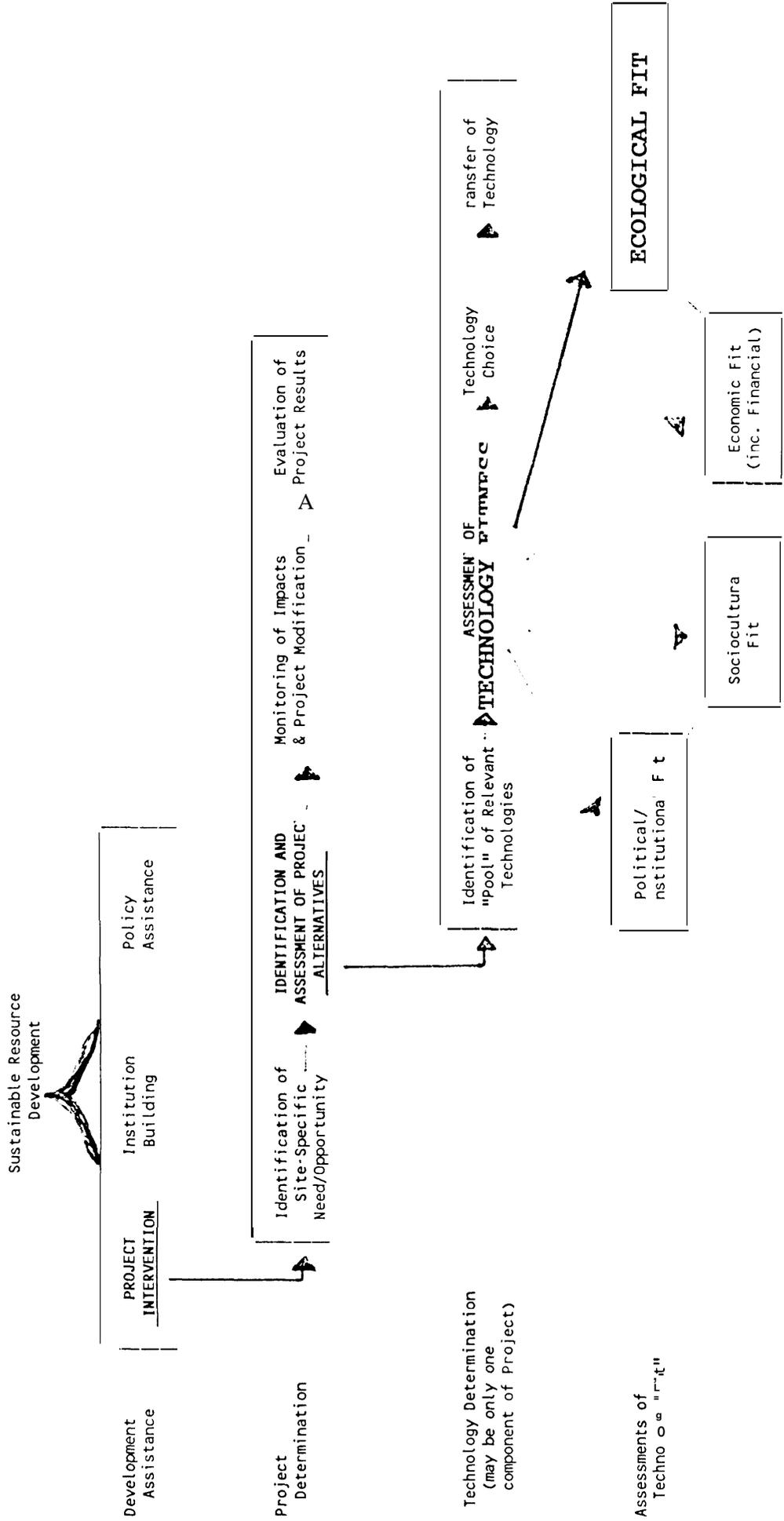
*How can international development assistance agencies improve their ability to choose technologies that are compatible with biological and physical conditions at the sites where the technologies are to be implemented?*

For the purposes of this study, technologies will be considered compatible with biological and physical conditions if they support and prolong the contributions of local natural resources to the provision of goods and services for human consumption. Such technologies will be called “ecologically sustainable technologies.”

Finding an answer, and instituting the solution or solutions, does not imply eliminating or even minimizing the potential for adverse environmental impacts from development assistance projects. These can occur from the failure to transfer the technology to the practitioners, and from failure of the development projects for reasons other than the ecological sustainability of the chosen technology (see figure 1). Even when choosing a particular technology, further questions are relevant, such as:

- o Are the eventual practitioners likely to have cultural aversions to the technology?;

Figure 1: THE ROLE OF TECHNOLOGY / ECOLOGY "FIT" IN DEVELOPMENT ASSISTANCE



- o Is the technology within the means of these practitioners?; and
- o Will governmental or other institutions provide the necessary support to ensure continued operation of the technology in a manner appropriate to local conditions?

Thus, to minimize the possibility of adverse impacts from development assistance activities in general, one must address a considerably broader arena of issues than just technological/ecological fit. Such a study, however, is beyond the request at hand, and the resources for this Staff Paper.

The ecological underpinnings of development assistance

Development assistance interventions commonly are designed to facilitate development of human and natural resources in recipient countries. Three general modes of intervention are 1) tangible project in-tervention, 2) local institution building, and 3) policy assistance (figure 1). In aggregate, these interventions are designed to assist developing countries to establish institutions for orderly improvement of the quality of life, to effect policy changes needed for satisfactory project performance, and to undertake investments that are properly engineered, financially feasible, and economically and environmentally sound.

Views of the relative importance of the three types of development assistance are mixed. The Environmental and Energy Study Institute (EESI) study and the Science and Technology Committee's request to OTA indicates that the primary focus of development assistance--projects and programs--can visibly, tangibly affect the quality of life and environment in developing countries. These activities also

have important interactions with developing country environments. However, project interventions can beneficially or adversely affect how renewable resource systems are used, the benefits derived from them, and the impacts of their use on other communities or future populations. Thus, while such activities probably should continue to be a major focus, they should be designed specifically to minimize the potential for adverse impacts.

A second view is that development assistance can contribute only marginally to the damage or conservation of natural resource systems, because the scope of resource system abuse generally is so much greater than the scope of development assistance projects and programs. Therefore, to promote resource conserving technologies effectively, assistance agencies must use their influence to encourage governments to design and enact policies that will reward resource-conserving development and discourage resource-wasting development. The extent of influence is usually related more to the level of general support funding an agency provides than to the specific development assistance projects it sponsors. Support for the second view is growing at the U.S. Agency for International Development (AID) and the World Bank, where it is thought to have a potential at least equal to that of improving the environmental soundness of site-specific projects.

The third approach is based on the perception that, while project interventions and support for policy development can have substantial impacts, the only means to ensure that development be widespread and appropriate to the local needs and conditions is for development activities

to be defined, planned, and implemented by the assistance recipients themselves. Thus, proponents argue that ensuring local participation in all phases of project assistance and emphasizing local institution building projects is fundamental to long-term development. Support for this approach is well-based in U.S. nongovernmental organizations, and is growing in development assistance organizations.

In practice, no clear lines can be drawn between the three types of assistance: developing local institutional capabilities may require and be accompanied by policy assistance grants and loans, and projects may have institution-building components. Indeed, institution-building itself can be seen as a project. Thus, the three types are complementary and the balance among them in development assistance can only be determined on a case-by-case basis.

The purpose of the tangible project interventions usually is to improve the well-being of some target population by causing a prolonged increase in production of goods or services. Thus, many of these projects are related directly to resource use and include activities such as agricultural intensification or expansion, dam-building, etc. Such interventions often include introduction of new technologies or improvement and expansion of existing ones.

Clearly, selection of appropriate development interventions must be based on a number of development site conditions. Development assistance organizations have identified that the specific sociocultural, political, economic and ecological conditions of a development site create

the framework into which their efforts must be integrated. Regardless of the cause of resource degradation or damage, developing countries generally cannot afford even temporary decline in the food or foreign exchange derived from their natural resources, and lack sufficient economic resources to implement reclamation or restoration activities. Thus, selection of ecologically appropriate technologies becomes imperative.

Successful interventions depend on the existence of the conditions necessary to support the new, improved, or expanded technologies. Compatibility of the technology with local ecological conditions is prominent among these (see Appendix D for an elaboration of the necessary conditions for successful technology transfer). Development interventions sometimes have failed because ecological compatibility has not been assured. Consequences have included irrigation canals filled with silt, range lands degraded by expanded cattle herds, or settlements abandoned because of declining soil fertility. Thus, *the problem is to develop technologies that are ecologically sustainable under the political, social and economic conditions that will prevail when assistance has ended.*

The agencies' response

Over the past decade, the U.S. Agency for International Development (AID) and the World Bank have developed procedures designed to incorporate certain environmental considerations in their assistance activities. Despite progress, however, the agencies' abilities to identify ecologically sustainable resource development interventions still are frequently criticized.

A 1975 lawsuit brought against AID by the Environmental Defense Fund, Inc. culminated in Agency compliance with the National Environmental Policy Act (NEPA). As a result, AID established well-defined environmental procedures and a small cadre of environmental officers to screen projects for significant environmental effects and to focus planning attention on likely negative impacts of development projects (Appendix E).

Amendment of the Foreign Assistance Act in 1977 mandated that AID increase investments in projects and programs explicitly intended to conserve as well as develop the productivity of developing countries' renewable natural resources. AID responded with numerous programs designed to enhance client country abilities to manage resource development, and projects addressing some immediate symptoms of resource deterioration. Examples include the AID Country Environmental Profiles program, and the numerous AID projects that sponsor distribution of tree seedlings and technical assistance to farmers on "fragile lands."

The World Bank also developed a process to focus planning attention on projects likely to have significant environmental impacts (e.g., construction of large dams, roads that penetrate forests, and extractive industries). The Bank has had a small environmental office since 1970 to screen proposed projects and alert project officers when detailed scrutiny of environmental impacts seems warranted.

Recently, Bank officers have begun to evaluate the relationships between economic policies and resource-use practices in certain countries. If these analyses reveal how national policies could be changed to enhance ecocodevelopment, the Bank then may promote such changes in its policy dialogues and offer support through sectoral loans for natural resources. Finally, the Bank's current reorganization is expected to strengthen the bureaucratic status of its environment operations while establishing positions for natural resource professionals in regional offices, thus giving them a more direct role in project identification and design.