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SCOPE:

A Conceptual Framework for Institutional Sustainability

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PREFACE

This paper is one piece of a larger effort sponsored by the Agency for International Development's (A.I.D.) Office of Agriculture and Rural Development in the Asia/Near East Bureau (ANE) to address the problem of development sustainability. The ANE effort grew out of earlier work on the topic undertaken by the University of Maryland's International Development Management Center (IDMC) and the Department of Agriculture's Development Program Management Center (DPMC) for another office in A.I.D., the Office of Institutional And Rural Development in the Science and Technology Bureau. The predecessor work approached the sustainability topic inductively, reviewing relevant literature and field cases to derive a set of premises and recommendations. This paper, however, is an attempt of elaborate deductively a theoretical framework that subsumes the earlier work within an integrated model that extends beyond simply a systematization of existing practice. The end product is to be specific guidance for use by those involved in designing, implementing, and evaluating development activities to improve the potential for sustainability. This guidance is intended to be validated through field applications.

The framework presented here has been developed iteratively over the past seven months by staff of IDMC and DPMC with oversight and guidance from an A.I.D. working group led by James Lowenthal, director of ANE/TR/ARD, and made up of representatives from the regional and central bureaus. In March 1988 a workshop brought together the working group and a set of external specialists to review the draft framework. The version of the framework presented in this paper reflects the recommendations that emerged from the workshop.

In conjunction with the development of the framework, four case studies were prepared. The cases, examining development activities in Thailand, Morocco, Nepal and Tanzania, were written by individuals with first hand experience with them as a test of the evolving framework.* This approach served as a check on the

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* The cases examine: the Northeast Rainfed Agriculture Development (NERAD) Project in Thailand, the Hassan II Institute of Agriculture and Veterinary Medicine Project in Morocco, the Rapti II integrated rural development project in Nepal, and the Training for Rural Development Project in Tanzania. The cases are presently being revised to reflect the most recent iteration of the framework, but are available in draft form from IDMC or DPMC.

utility of the framework during its development phase by testing its usefulness in identifying key sustainability issues in these already well-understood situations. If the framework didn't help in identifying these issues, then it clearly would offer no improvement over existing analytical tools. Each case helped to sharpen the explanatory power of the framework.

Further refinement of the framework will take place in the next phase of pilot applications in the field. The inclusion of field testing will assure that the framework and its accompanying guidance have a solid theoretical foundation and are operationally relevant for A.I.D. development practitioners.

This paper is the result of a team effort. The lead author is IDMC's Tjip Walker, with major contributions from Marcus Ingle, Derick Brinkerhoff, and Arthur Goldsmith. Robert Charlick has made written inputs. DPMC's Janet Poley provided significant conceptual input, drafting assistance, and review. Kurt Finsterbusch's incisive comments helped strengthen the paper, especially in combining the different theoretical domains the SCOPE model draws upon.

Also deserving of mention are the members of A.I.D.'s sustainability working group: Joan Atherton, Gregg Baker, Tish Butler, Sandra Callier, Gerald Cashion, Kenneth Kornher, John Lewis, James Lowenthal, Michael Morfit, and Margaret Sarles. Their support, guidance, and feedback have been crucial to the development of the paper. Finally, we recognize the contributions of the external reviewers who participated in the March workshop: Robert Charlick, Arthur Goldsmith, Francis Lethem, William Siffin, and Carolyn Stremlau.

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PART I
TOWARD A CONCEPTUAL FRAMEWORK

SECTION 1: INTRODUCTION

A major component of A.I.D.'s Congressional mandate concerns promoting self-sustained development in the Third World, serving as a catalyst to assist developing nations in creating and putting in place the building blocks of socio-economic progress. Development assistance ideally aims not to create dependence, where survival becomes tied to the continuous infusion of outside resources, but rather to foster ongoing learning, skills improvement, and the creation of the wherewithal to ensure independent survival into the foreseeable future, well after the termination of external support.

However, fulfilling this mandate has proven problematic. Many years of attention to trade and macroeconomic issues, national planning, policy reform, program support, and project implementation have not produced the expected lasting benefits or developmental impact. As a result, the development community has, over the last several years, become increasingly concerned with the issue of sustaining the benefits flowing from development activities.

This heightened sensitivity to sustainability has spawned numerous studies, reports, workshops, and initiatives. Unfortunately the available evidence shows that despite increased awareness of sustainability and intentions do something about it, the results have not been encouraging. Surveys of past and present development activities have indicated that few are designed with sustainability in mind (Finsterbusch, 1987), few are implemented with an eye to sustainability (CDIE (A.I.D.), 1985), and consequently few are likely to be sustained beyond the life of outside funding (World Bank, 1985; Devres, 1987; Bossert and others, 1987). One statistical review of A.I.D.-funded projects concluded that only 11 percent had a high probability of being sustained beyond the conclusion of donor assistance (Devres, 1987).[1] And a World Bank (1985) review found that even projects that had been rated as successes during implementation were not able to ensure sustained flows of benefits in approximately one-third of the cases.

Despite this dismal record of success, some instructive lessons have been learned about sustainability. One set of lessons has come from examinations of factors in developing countries that

seem critical to achieving sustainability.[2] These factors include national level commitment (Heaver and Israel, 1986), in particular a willingness to provide for recurrent costs (Heller, 1982; Gray and Martens, 1983); a minimum of distortions in the economy; an appropriate mix of public and private sector institutions (Lamb, 1986; Lowi, 1985; Nellis, 1986) and within the public sector, an appropriate delegation of tasks to the various levels of government (Schroeder, 1987); a sensitivity to issues of ecological degradation and long-term agricultural productivity (Redclift, 1987; Conway, 1986); and finally, adoption of management systems that promote capacity building (Honadle, 1981; Honadle and VanSant 1985) and that are flexible, yet adapted to local conditions (Brinkerhoff and Ingle, 1987).

A second set of lessons has come from examining sustainability from a narrower, sectoral perspective. To date such work has been in the health (Bossert and others, 1987; CDIE, 1987a, 1987b) and agricultural sectors (Panos Institute, 1987).

A third, and final, set of lessons has come from reviews of the effect that internal donor incentives to obligate funds, ensure financial accountability, and take a short-run perspective have had on the sustainability of development projects (Morss, 1984; DPMC/IDMC, 1987).[3]

Taken one at a time, these lessons and recommendations seem reasonable and practicable. After all, they echo accepted development best practice: promote local participation, emphasize learning, decentralize authority, and the like. But taken together these recommendations make a lengthy -- and problematic -- list. Combining them does not give a comprehensive set of key problems and practical guidance. Instead one is left with a hodgepodge of partial, and sometimes competing, ideas.

This situation stems, in part, from the nature of the methodology used to generate these lessons and recommendations. With few exceptions, the analysis of sustainability to date has been inductive; extrapolating general lessons from the successes or failures of one or more particular projects or programs. As there is no logical necessity attached to inductive reasoning, it becomes difficult to establish the conditions under which the recommendations hold or what to do when they compete. Inductive reasoning, including case studies and literature reviews, has not and is not capable, by itself, of providing the kind of coherent and generally applicable guidance necessary to tackle the problem of development sustainability.

What is needed as a foundation and guide for cases and reviews is an articulated theory or conceptual framework based on deductive

reasoning. Some deductive and analytic work on sustainability has been done, but it unfortunately suffers from adopting too narrow a focus (either on a specific type of intervention, like a project (Honadle, 1981) or on a particular unit of analysis, such as an organization (Honadle and VanSant, 1985), utilizing too limited a definition, or not being able to incorporate useful concepts or experience from the field.

Thus the time seems ripe to attempt the construction of conceptual framework for sustainability -- a framework that incorporates existing and new conceptual tools in a unified way, and permits a deeper understanding of development sustainability, and provides guidance toward its achievement. The purpose of this paper is to begin this reconceptualization. The paper develops a clearer definition of the concept of sustainability and identifies the factors contributing to it.

To do so this paper is organized into three parts with eight sections. The first part consists of two sections which provide the context for the description of the framework. Section 1 makes the case for why a conceptual framework of sustainability is necessary. Section 2 then presents the rationale and roots for the reconceptualization of sustainability and overviews the three intellectual domains from which the framework draws. It also offers a definition of sustainability as well as several caveats.

Part II is the heart of the paper, describing the framework in increasing degrees of detail, and focusing principally on how the framework applies to organizational or institutional sustainability. Section 3 presents the core elements in the framework and how they interrelate. Section 4 elaborates on the interactions between an organization and its environment, and Section 5 deals with how the organization can configure itself internally to respond to different external conditions. Section 6 covers interventions and what considerations need to be borne in mind to promote sustainability.

Part III lays the groundwork for future conceptualization about sustainability. In Section 7 the argument is made that an organizational perspective is too limited and then discusses the implications of applying the framework to systems larger than single organizations. Section 8 offers future directions for research and next steps in the further development and field testing of the conceptual framework.

SECTION 2: THE PITFALLS AND PROMISES OF CONCEPTUALIZING ABOUT SUSTAINABILITY

If the purpose of the previous section was to make the case that a reconceptualization of sustainability is necessary, the purpose of this section is to argue that a conceptual framework drawing from systems theory, contingency theory, and political economy is a promising and a feasible response. To show such a framework has promise is to demonstrate how concepts drawn from these domains can respond to the shortcomings and incorporate the insights of current conceptions of sustainability. This will be done by briefly describing the three domains and then relating key concepts from these domains to the shortcomings and insights noted in Section 1. To show that such a framework is feasible is to show that concepts drawn from systems theory, contingency theory, and political economy can be meaningfully combined, <u>not</u> in some haphazard manner, but to form a coherent, unified framework. This latter issue is addressed first.

The Pitfalls

The first pitfall comes from ignoring the limitations of any conceptual framework. As it is used here, a conceptual framework is a set of concepts and their specified interrelationships. As such, it is not as rigorous as a theory that emerges directly from a set of fundamental propositions. Rather, a conceptual framework is more of a heuristic device, intended to provide the vocabulary and perspective to pull disparate ideas together into a more coherent whole.

There is a danger in proceeding as if conceptual frameworks impose no theoretical limitations. They do, in three ways. First, all of the ideas integrated in a conceptual framework must share a common theoretical foundation. Second, the concepts must be incorporated with an eye to parsimony. As with physical tools, it often tempting to add more and more specialized gizmos to the intellectual tool box. At some point these additional tools only serve to weigh down the box and make it unmanageable. And third, a framework only exists if its constituent concepts work well together and become more than a collection of individual ideas.

All three of these strictures have guided the development of the framework presented in this paper. After briefly describing each of the three domains, it will be possible to demonstrate how the SCOPE framework adheres to the first two theoretical constraints. It will be argued that all three perspectives share a common theoretical orientation, thus concepts from each of them can be

logically integrated in a conceptual framework. The case is also made for the advantages to be gained from adding particular concepts from each tradition.

The third requirement is that the concepts merge together into an integrated framework. Measuring the success of the framework against that standard must wait until the end of the paper. But as the goal of this exercise is a truly unified framework, the acronym SCOPE has been adopted to describe the one presented here. The acronym intends to capture the idea of the framework being an integrated whole while at the same time recognizing that it is comprised of concepts drawn from three constituent traditions: Systems, COntingency, and Political Economy. The rest of this section discusses the "s", "co", and "pe" as discrete elements, but the ultimate aim is to put them together to gain increased clarity on the problem of sustainability.

The Three Domains of SCOPE

Each of the three domains -- systems theory, contingency theory, and political economy -- from which the framework draws its central concepts is well within the mainstream of social science. As a consequence, each domain supports a vast literature and an array of vocabulary. Moreover, each domain contains a range of accepted, but differing viewpoints. It is therefore quite audacious to think that a description of a few paragraphs can do any of the domains justice. However, the need to provide a foundation for a discussion of the merits of a framework drawing on all three argues in favor of a thumbnail sketch.

S is for Systems. As might be expected, the central idea of systems theory is a system. Systems are defined broadly as any set of things that are sufficiently well-related to one another to deserve study. Armed with such a broad definition and a predilection to look for inter-relationships, analysts have studied a whole range of things as systems, including something as simple a cell to something as complex as a nation, or to something as concrete and delimited as an individual human or organization, to something as ephemeral as linguistics.

However, there is more to systems theory than looking for relationships. What gives systems theory it coherence is a belief that at some level all systems abide by the same rules. Physical, biological, and logical systems, simple systems and complex systems all adhere to certain principles. Perhaps the most important is the law of entropy[4] This law states that all systems will become less and less organized over time unless energy is expended to prevent this process from happening. Thus physical

systems like stars, biological systems like cells or humans, or logical systems like languages all need to acquire at least many inputs as they expend, if not more, or else they will begin to decay and ultimately die.

If all systems abide by the same rules, then, in fact all systems are related in some way to one another. This gives rise to the second important characteristic of systems theory, an ordering of systems according to hierarchy. All but the simplest system are themselves comprised of systems, which in turn comprise larger systems. A nation, which is itself a system, is comprised of organizations and communities which are smaller systems, which are both comprised of individual humans, who are systems, who are comprised of cells. This hierarchy of systems also means that the environment in which a system finds itself is also a system. This gives a frame of reference for understanding how systems interact with their environment.

In an area as interdisciplinary as international development, the idea of common units of analysis adhering to common principles is very appealing. And indeed, systems theory has been applied to development topics . The popularity of integrated rural development activities in the late 1970s and early 1980s is in part a recognition of, and a response to, systems perspectives. But wider acceptance of systems theory is severely hampered by its level of abstractness. In their search for broad and general terms with which to analyze systems of all shapes, sizes and levels of complexity, systems theorists have created a dense and idiosyncratic vocabulary.[5]

The position adopted here is a middle ground. Systems theory, with its focus on the system as the unit of analysis, its recognition that systems exist in an environment that is crucial for system functioning, its concern and vocabulary for describing different states of system existence, and its observation that there are hierarchies of systems, seems to have many concepts of use to analyses of development sustainability. At the same time, because the scope of this effort is narrower, there is no reason that all of what systems theory has to offer needs to be included in the framework.

CO is for Contingency. Contingency theory has been an important strand in organizational and management theory since it was first articulated in the late 1960s (Lawrence and Lorsch, 1967; Thompson, 1967). It major premise is that the most efficient structure or management style for an organization to adopt must be seen as contingent on various factors, primarily those in the organization's environment. The contingency approach has been caricatured as amounting to nothing more than "it depends." But

in noting that organizational strategy and structure should be dependent on environmental factors, this tradition stands in marked contrast to those that advocate a single solution to all problems.

Given the diversity of cultural, political, and administrative conditions prevailing in less developed countries, it is not too surprising that contingency theory is a significant element of current development management thinking (Israel, 1987; Hage and Finsterbusch, 1987; Paul, 1982; Smith, Lethem, and Thoolen, 1980). So, for example when Honadle and VanSant (1985) observe that special project management units have proven effective in managing civil works projects or those social service projects with a known technology (such as an immunization campaign) but have been very ineffective in most instances of service delivery, they are making a contingency argument. Similarly when Paul (1982) makes the point that successful organizations are those that figure out which tasks need to be centralized and which decentralized, he is making a contingency argument. In both instances, the argument is of the same form: the most effective structure of an organization is contingent on certain factors.

P as in Political, E as in Economy. If there is a single consistent theme to the wide variety of works on political economy, it is the premise that politics and economics, polity and economy, are inextricably linked and must be examined as a whole. There is a considerable range of views about the nature and implications of the linkage between economy and polity, but links at two levels seem particularly relevant to the issue of sustainability.

The first point of linkage can be called substantive: simply, that politics affects the economy and the economy shapes politics. The extension of this idea is that political resources can be parlayed into economic clout and economic resources into political clout. If this idea is combined with the notion of an unequal distribution of resources, both political and economic, the result is the concept of social stratification. Further, if the idea of the fungibility of economic and political resources and stratification are combined with an argument about how the polity and economy are systematically biased to preserve the existing elites, the result is a conception of the underlying structure of society. This idea also gives rise to the notion of legitimacy, which is a measure of the extent to which ideas or practices conform to the underlying structure of a society.

The second point of linkage might be called institutional. The idea here is that economic institutions such as markets or firms and political institutions such as legislatures or bureaucracies

have common or reciprocal societal roles and deserve to be studied from that vantage point. The common roles are often discussed in terms of: a) mechanisms to aggregate individual choices or preferences, into social choices or preferences or b) mechanisms that try to reduce the costs of interactions or transactions between elements in society (both individuals and organizations of various types). The recognition of reciprocal roles stems from the observation that various economic and political institutions are not equal in their ability to aggregate preferences or reduce transactions costs. Indeed some institutions can succeed at a task at which another fails. More often the issue is less clearcut, and the merits of various institutional choices are the subject of debate.

SCOPE as a Conceptual Framework

These thumbnail sketches of the three domains from which the SCOPE framework arises should already be suggestive of how they can be combined into a meaningful, unified conceptual framework. To begin with, all three domains share a common theoretical orientation toward understanding and characterizing the relationship between a particular entity and its environment. Indeed for all three domains the most important determinant of the state or condition of the entity is its relationship to the environment.

However, the three domains have different ways of characterizing these relationships and emphasize different aspects. It is this combination of shared common ground, yet differing perspectives that makes it possible to develop an improved framework from them.

The SCOPE framework starts with the idea of a system. It is for that reason that the S is the first component of SCOPE. The system provides an important building block for several reasons. First, sustainability is a description of the state or condition of something; systems theory has a well-developed set of concepts and vocabulary to describe system states. Second, systems theory is concerned simultaneously with internal processes and the relationship between the system and its environment. Finally, systems theory, with its predilection for searching out inter-relationships between often disparate elements, seems the appropriate place to begin a search for a conception of sustainability that includes both the sustainability of biological and social systems.

However, systems theory, with a few exceptions, does not provide much guidance on how to understand or characterize internal system processes or the relationship between a system and its

environment. Contingency theory shares a concern for environment, but provides more leverage than systems theory about how systems can best attain congruence or fit with the environment. The most trenchant contingency theory has emphasized the importance of attaining congruence between environmental complexity, organizational structure, strategy, and internal processes (Paul, 1982). These ideas are also included in the SCOPE framework.

Another reason contingency theory is included is because all too often the list of recommended actions to promote sustainability are stated as universals. For example: all development activities need to become self-financing (Heller, 1982). Obviously there are exceptions to this. Projects that include provision of public goods like infrastructure or information have a technology that does not lend itself easily to market or fee-based solutions. Technologies of this kind will never be fully self-supporting.

Critical to analyzing sustainability is characterizing the key dimensions of the environment. This is where political economy helps. Political economy focuses on exchanges in a way that both explicates important processes that go on inside the "black box" of the system, and helps identify what the relevant system is, both in terms of its scope (internal organizational, societal, international) and in terms of its tasks (exchanges of a variety of resources). By identifying the circumstances under which the production and exchange of different resources will be stressed, it amplifies on contingency theory. Finally, by identifying the initial differences between sectors, and how different development activities imply different ways of dealing with stakeholders, political economy adds a dynamic to the notion of sustainability, so that it is not equated simply with stability or maintenance of a particular pattern.

The Promise of SCOPE

If systems theory, contingency theory, and political economy have the necessary shared characteristics to provide the foundation of a unified framework for understanding sustainability, the next question is, what can it accomplish that current conceptions cannot? To some extent the answer can only emerge from a full explication of the framework. However even at this point, two things can be said. First, the SCOPE framework encompasses the lessons that have been learned about sustainability from various inductive exercises. And second, SCOPE offers a way of surmounting the definitional problems that have dogged the efforts at deductive reasoning on this issue to date.

Encompassing the Inductive Lessons. In Section 1 a set of lessons were noted that have emerged from various inductive examinations of sustainability. In Table 1 these lessons have been matched to one or more domains from which SCOPE draws concepts or explanations for the observed lessons. These concepts or explanations are also identified. It would be premature to expound fully on the concepts at this time. That is the purpose of Part II of the paper. However, it is worth underscoring that all three domains are necessary to the SCOPE framework.

Surmounting Definitional Problems. Existing deductive analyses of sustainability have been confounded over the definition of sustainability. At one level everyone has an innate sense of what it is, but defining it has proven much more difficult. The SCOPE framework provides a way of getting a simple, but powerful definition of sustainability:

> **Sustainability is the ability of a system to produce outputs that are sufficiently well valued so that enough inputs are provided to continue production.**

This definition of sustainability shares with all other definitions a sense that something is continued. But it does not make the mistake of some definitions that equate sustainability with the continuation of a particular organization or institution. The SCOPE definition states that it is a system that continues to function. As will be seen in Section 5, a system can encompass a range of structural forms. What becomes important is not a particular organization or institution, but the capacity of the elements in a system to continue performance of valued tasks.

Neither does the SCOPE definition make the mistake of equating sustainability with self-financing or other economic measures of viability. To be sure, a self-financing system is sustainable by the SCOPE definition, but it is overly restrictive to think that systems which provide outputs that are not or cannot be valued in monetary terms cannot be sustainable. It seems useful, for example, to talk about the sustainability of governmental programs or policies that do not carry direct monetary equivalents.

Table 2: Relationship Between Sustainability Lessons from Inductive Research and the SCOPE Framework

Lesson	Domain	Corollary in SCOPE Framework
Importance of minimum level of stability to ensure sustainability	S	Stability is one of three components of environmental hostility
Importance of national level commitment	PE	National government or other stakeholders must value project outputs sufficiently to continue provision of inputs
Importance of recurrent cost provision as indicator of sustainability	PE	Recurrent costs as measure of value placed on outputs by government; also willingness of government to forego proliferation of high visibility projects
Importance of matching institutional capabilities with the task to be performed	CO	Issue of institutional choice is one of getting congruence between internal processes and external conditions
	PE	Internal processes determined by technology and structure utilized
Importance of sensitivity to ecological degradation and long-term agricultural productivity	S	Inter-relationship between all systems; sustainability of social systems dependent on sustainability of biological systems
Importance of management systems that are appropriate; adapted to local conditions	CO	Choice of management strategy dependent on conditions prevailing internally and externally
Importance of management systems that promote learning, capacity building	S	For a system to learn it need to survive and therefore to perform. Learning comes from reflection about performance
	CO	Though all systems need a level of capacity, importance of learning for sustainability dependent on internal and external conditions

It is also worth noting that the SCOPE definition has a dynamic element where others do not. Maintaining sustainability is an ongoing process of transforming inputs into outputs, capacity into performance. These ideas will be more fully developed in Section 3.

Finally, the SCOPE definition does not make the mistake of turning sustainability into a normative concept. Sustainability as it is used here is purely analytical. It says nothing about who it is that values the outputs, only that they must be valued. Some may see this stance as a weakness rather than a strength; they may point to political economy's emphasis on societal structures and argue that a definition of sustainability that does not include mention of the disadvantaged is therefore inherently biased toward the status quo.

Those who want a normative definition of sustainability seem to be confusing the notion of sustainability with the notion of development sustainability. Development sustainability, with its concern for insuring that improvements in the prospects of livelihood continue, is a thoroughly normative concept. But it is so because development is a normative concept, not because sustainability is.

If this distinction is accepted then sustainability can serve as an analytic concept, one that allows us to analyze and understand why the status quo is sustainable or not, and one that provides the basis for making prescriptions about how any system can improves its chances of being sustained. Given the meager resources of the world's disadvantaged, it would seem that sustainability of initiatives with them and for them is of critical importance.

PART II
THE FOUNDATIONS OF SCOPE

SECTION 3: CORE CONCEPTS

At the base of the SCOPE framework are four analytical components: (1) a system, (2) its environment, (3) the system's interaction with the environment, and (4) the system's internal processes or strategy (see Figure 1). Each of these four components is overviewed in this section. In Sections 4 and 5, the latter two components are discussed in greater detail.

The System

Some Definitions. For the purposes of this framework, a system* can be defined as a set of units or elements that interact with one another to convert some type of inputs into some type of outputs.[6] By this definition a living organism is a system, as are such diverse social organizations as a government bureau, or the food marketing system in the North East Region of Thailand. The organism is a system because it is composed of elements (subsystems for digestion, circulation, and so on) that convert food and other organic compounds into energy. The government bureau is a system because it is made up of elements (departments or divisions for functions such as accounting or personnel management) that transform inputs of labor, capital, and managerial know-how into public services. Finally, the marketing of food in the North East Region is a system because it is made up of elements (farmers, traders, transporters, consumers) that turn land, labor, raw materials, and expertise into marketable surpluses of food and income.

A difficulty often comes in determining what is or is not part of the system, or in other words where the system's boundaries lie. The physical integrity of an organism makes identifying system boundaries a straightforward task. Even for many man-made systems like the government bureau, defining the boundaries is easy. Here there is no physical skin that separates the system from its environment. But what a government bureau shares with a living organism is that it is a controlled system. That is, within the system one of the units serves to control the others. In the organism it is the brain, in the bureau it is the administrator in charge. Thus the system boundary is determined by those elements that are subject to control by this "decider" element.

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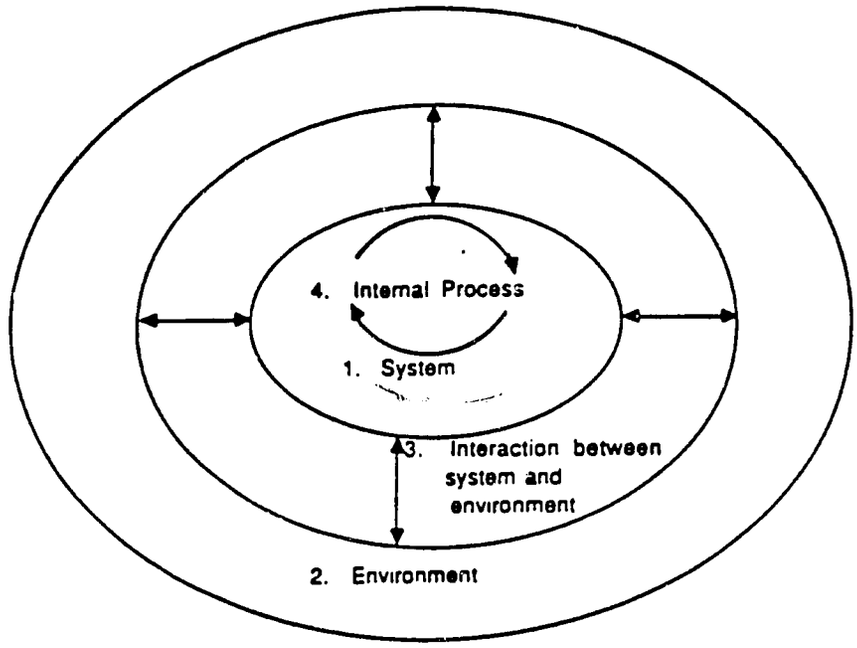
* Important terms are underlined when they are defined.

Figure 1: The Four Basic Components of the SCOPE Framework



The food marketing system is not a controlled system. There is no single decider element that makes decisions for the whole system. Farmers, traders and extension agents all make choices for themselves. The absence of a single decider element with an identifiable span of control makes system boundaries ambiguous, so it is up to the investigator to define them by reference to a particular problem. In making this determination, attention should be given to the intensity and frequency of the interactions between the various elements. So, for example, a food crop marketing parastatal may be an important element in an agricultural system when it produces a marketable surplus (because it makes numerous transactions with farmers and consumers), but be unimportant (and thus safely excluded) when there is no surplus.

Although the inherent subjectivity of defining the boundaries of uncontrolled systems complicates the task, boundary definition is crucial nonetheless, with clear operational consequences. The criticism of "projectized" development that it focuses attention on too narrow a set of activities is an argument about setting boundaries (Moris, 1984). Similarly, the criticism of the organizational bias in much sustainability literature made in Section 2 is also an argument about boundary setting. In both instances the problem is that a controlled system (a project or an organization) has been targeted as a point of intervention when

the intention is to change a larger system (of which the project or organization is only a part.)

System States. One of the advantages of a systems perspective is the vocabulary available to describe different system states or "health." These states characterize the relationship between the inputs the system takes in and the outputs produced. A decaying system is one where inputs exceed outputs, an emergent system is one where outputs exceed inputs, and a homeostatic system is one where inputs and outputs are equal. Thus an agricultural system where production is insufficient to feed farmers and provide seed for the next crop is decaying, whereas one that is able to sell its output for more than the cost of inputs is emergent. A subsistence agricultural society, where households consume what they produce, is homeostatic.

With homeostatic systems, an even finer distinction can be made between those that are stable (or self-correcting) and those that are unstable, and thus lose their capacity to maintain a homeostatic state if disturbed. The issue is how the system responds to shocks or stress. Consider the example of subsistence agriculture again. Drought and other natural events will occasionally reduce the output of food. If the system is subsequently able to return to pre-drought levels of production, it is stable. If the system cannot regain lost ground (perhaps due to erosion or depletion of ground water), it is unstable and ceases to be homeostatic.

Another dimension of a system's state is its degree of artificiality. This refers to the extent to which a system is dependent for survival upon the continuous infusion of external resources beyond those generally available in its environment. A system that cannot function without such infusions is classed as artificial. A classic example is a project management unit created to implement a donor-funded development project. Typically, these units' operating expenses are funded as part of the project, and thus have more and better equipment, more and better-paid staff, and consequently perform better in the short-run than any host country organization with comparable responsibilities (Honadle and Walker, 1986). Even so, artificial systems can be sustainable, as long as the high level of inputs is maintained. However because of its dependency, an artificial system is at greater risk of becoming unsustainable in the future. Indeed, that has been one of the persistent problems with project management units; they often are unable to continue providing outputs once the flow of resources is terminated (Honadle and VanSant, 1985).

The Environment

At one level the environment of a system is anything that is not a part of that system. A more useful definition of environment is that it is those things outside a system that affect the system's functioning. It is important, however, to distinguish between environmental factors that are proximate and those that are distant. The actions of grain producers in Kansas could affect decisions within the tourism system in Kenya, so the grain producers are part of the Kenyan tourism system's environment. But in this instance the connection is distant and the impact trivial. A closer and more influential relationship exists between Kansas farmers and Kenya's agricultural system, and an even closer one with a social welfare project system supported by PL-480 Title III assistance. Here it might be appropriate to include Kansas farmers in the proximate environment.

As with system boundaries, the inclusion of something in the environment is a function of the problem at hand and the judgment of the investigator as to what elements outside the system are important influences on it. In the case of the Thai North East Region agricultural system, the investigator identified the Thai Ministry of Agriculture and regional representatives of other Thai ministries as key elements in the environment, but not donor agencies or the political apparatus. By contrast, in the case of Morocco's Hassan II Institute of Agriculture project, donors are important parts of the system's environment.

It is important to keep in mind that the environment is the source of the system's inputs and also the recipient of the system's outputs. The fertilizer and improved seed used by the Thai agricultural system come from the environment; the surplus food and political quiescence in the region are outputs received by the environment.

Finally, it worth noting that environments, as well as systems, can also exhibit artificiality. The systems perspective incorporates the idea of hierarchy where higher level systems function as environments for lower level ones. Thus a higher level system, say for example a national economy, could be dependent upon outside resources, thereby creating an artificial environment for the lower level systems operating within it. Recurrent cost problems have been analyzed from this vantage point, where analysts have noted that the aggregate financial demands of individual projects have been hidden or ignored because an artificially maintained national operating budget appeared able to sustain the funding levels required.

Direct and Indirect System-Environment Interaction

The influence of the environment on a system can either be direct or indirect. Direct influences are the effects the environment can have on the system whose impacts are not mediated through intervening steps or factors. These effects can impact upon inputs to the system, its outputs, or its structures and processes. The environment can affect system functioning by changing the amount or valuation of inputs needed by the system or by changing the valuation of the system's outputs.

A simple example is the effect that a labor shortage or an increase in wage rates usually has on the behavior of individual farmers. Microeconomics holds that farmers will change their production patterns, substituting capital or some other less expensive input for labor. For similar reasons, an increase in demand for crops will stimulate greater production, by getting farmers to use more of the same mix of inputs or to combine inputs in a new way (technological improvement). In each case, the environment has induced a change in the system by directly affecting inputs or outputs.

An example of direct influence upon a system's structure or processes is a situation where legislation mandates a change in hiring practices of public sector employees, thereby forcing the system to modify the mix of people it employs. This shift in the system's legal environment changes its internal personnel practices.

The environment can also have an indirect influence on a system. Indirect influence occurs when policies or incentives from the environment influence the system's internal processes. These are classed as indirect because their impacts affect the system through the mediation of intervening steps or factors. Education is an example of an indirect influence on a farming system's internal processes. Better education will not directly affect the cost of agricultural inputs or outputs, but it may improve the productivity and adaptability of farm workers -- although this might be offset by new attitudes toward manual labor that make it difficult to hire farm workers. The point is that a change in national education policy could indirectly influence how the individual components of an agricultural system interact.

By the same token, a system can influence components of its environment both directly and indirectly. Direct influence occurs,for example, when the system is able to extract additional resources from the environment or to alter the environment's valuation of outputs. The Moroccan Hassan II project has been successful at getting continued donor support, adjusting its

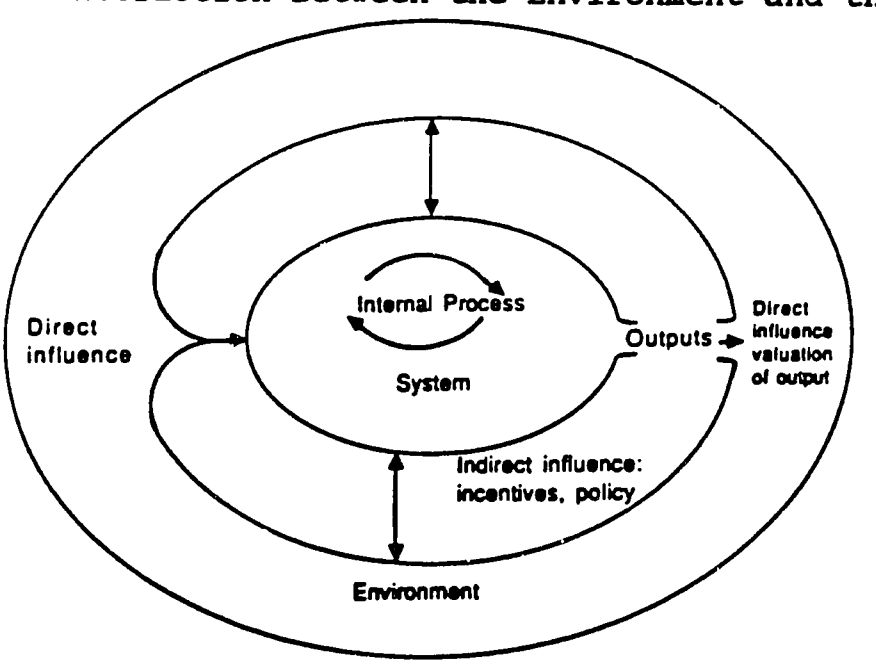
requests over time to be in tune with changing donor priorities. Until recently, the Tha Phra agricultural center in Thailand had been unable to get its immediate environment to value its research output. But of late, the center has been able to generate external support for its role as a coordinating mechanism and information clearinghouse. This change has significantly increased the likelihood of the center's continued existence.

A system can have an indirect influence on its environment as well. This occurs, for example, when the system produces changes that ultimately have an impact on the external policies or incentives that affect it. Take the case of a rural credit agency whose loans to farmers lead to increased economic activity in the region, which leads the government to establish a policy of regional growth poles. This in turn creates better markets for farmers' crops. Here, the system has indirectly had an impact on national economic policy, which could eventually increase demand for lending. These two sets of relations are illustrated in Figure 2.

Internal Dynamics

There are many ways to classify the internal processes of a system. One way is to analyze a system according to certain necessary functions (Miller, 1978). Another is to identify and catalogue subsystems. For our purposes, the most useful way is to distinguish between a system's capacity and performance, and examine the strategy behind their interaction.

Figure 2: Interaction Between the Environment and the System



Capacity. Capacity is the latent ability to transform system inputs into outputs. As such it is a characteristic of the system as a whole and not identifiable with a particular element in the system.[7] This means a system's capacity is not determined simply by its stock of human and physical capital, but also reflects the system's ability to combine these resources for maximum output.

An important feature of capacity's latent quality is that it is not visible. As such it cannot be seen, experienced, or directly measured. To be sure, there are proxy measures of system capacity such as the academic degrees or job experience of its work force, or the amount and condition of its equipment. But the only way to demonstrate capacity is through action, when capacity is translated from a latent state into performance.

Performance. Performance is the translation of a system's capacity into visible results, into action. Because action is visible, performance is directly measurable. There is no direct way of gauging the North East Region's capacity to produce food and cash crops, but its actual output provides as good an indication as is possible.

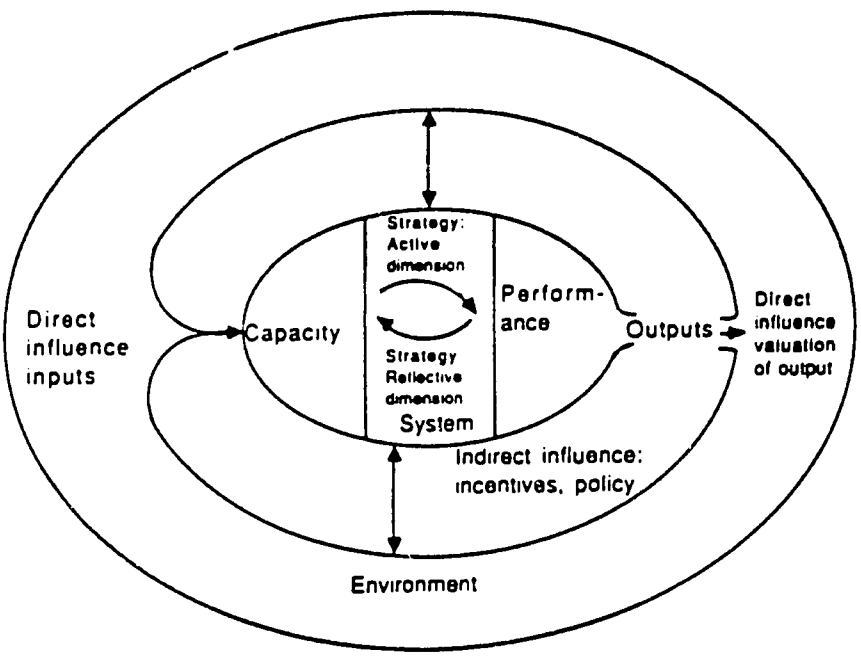
Strategy. It is important to distinguish between capacity and performance because there are a number of distinct ways that a system can go about the process of translating capacity into performance. The way a system translates capacity into performance constitutes its strategy. The usual connotation of strategy is a set of conscious and articulated policies often contained in an action plan for achieving long-range objectives. However, here the term is used more broadly, so that any discernable pattern of decisions made by key actors can be described as a strategy (Mintzberg, 1978). Thus in some systems, particularly less controlled ones, the strategy may well be unconscious and inchoate.[8] Moreover, in some systems with an articulated strategic plan, the actual strategy, as evidenced from the decisions of key actors, may be considerably different from what is written or intended.

The importance of strategy for the SCOPE framework is that the way a system goes about translating capacity into performance is a critical variable in determining how systems change, learn, and increase the likelihood of sustainability. This is due to the dynamic relationship that exists between performance and capacity. While in some systems the level of capacity is fixed, as in a machine whose physical limitations put a ceiling on performance, many systems are capable of altering their capacity. These systems do so by feedback or reflection about performance, that is, through learning. With reflection comes the possibility of

altering how the system configures itself, which in turn may facilitate a new, higher level of performance.

The iterative, dialectic relationship between capacity and performance is depicted in Figure 3. Capacity cannot be effectively built without a focus on developing the performance of a system. Similarly, performance cannot be enhanced unless attention has been given to the development of internal capacity. This iterative notion of how learning and improvement occur forms the foundation of experiential learning models and action-training, which builds capacity through a process that includes a focus on short term performance and reflection (Kerrigan and Luke, 1987).

Figure 3: Capacity/Performance Dynamic



This being the case, one way to distinguish between strategies of translating capacity into performance is to note whether the system's emphasis is on the active dimension; that is, on the accomplishment of a particular task, or on the learning or reflective dimension. It would be wrong to conclude that this distinction reflects a division into "bad" systems and "good" systems. Learning is a time-consuming and risky business and draws resources away from the performance necessary to generate the outputs that will keep the system viable. In other words, the

strategic decision about whether to emphasize action or reflection is a contingent one, based on environmental conditions and other internal factors.

Another way to distinguish strategies is to note whether the focus of attention is principally internal or external. A purely internal orientation means that the system takes the environment as a given, accepting both direct and indirect influence without making an effort to influence the environment in any way. By contrast, a purely external orientation is one in which the system is fully engaged with the environment, attempting to survey and affect it. As with the choice over which dimension of capacity to emphasize, the strategic decision over which orientation to adopt is a contingent one; one is not inherently better than another, only more appropriate to the conditions at hand.

Figure 4: System Strategies for Translating Capacity Into Performance

		Orientation: internal	Orientation: external
Dimension of capacity emphasized	active	mechanical	adaptive
	reflective	reactive	inter-active

Although the active/reflective and internal/external distinctions are more continua than opposing poles, it is useful for conceptual purposes to depict them graphically on a 2 by 2 matrix that categorizes system strategies into four basic types (see Figure 4.) These categories of system strategies are ideal types that never correspond completely to real world systems. All real systems, however, can be seen as adopting a strategy that corresponds more or less to one of the four ideal types.

As can be seen from Figure 4, a system emphasizing the active dimension and focusing internally adopts a mechanical strategy. With such a strategy a system translates capacity into performance, but with minimal reflection, either about the skills themselves or about the larger environment in which the system

finds itself. It may be very efficient at doing well-defined tasks, but it is not configured for anything beyond isolated learning. One example might be a developing country's system for preparing bananas or other tropical crops for export. Peasant organizations have widely mastered the simple, repetitive jobs of assembling, transporting, processing, and packing such commodities. But they often have little capability for improving their internal operations, let alone for responding to shifting tastes in the international market. Another, classic example is a licensing agency. Set up to issue permits or licenses to a set of clients meeting predetermined criteria, this bureaucracy provides a standardized service to a specific class of person; as long as the need for licenses remains and the issuance criteria are unchanged, little learning is required.

A system that adopts an adaptive strategy also emphasizes the active dimension of capacity at the expense of learning. But because it has an external orientation, which allows it to match problems with actions selected from its repertoire of potential actions, such a system can adapt to changes in the larger environment. When farmers cultivate larger plots of land or traders handle more food in response to increased demand in the environment, the agricultural system is adapting. Similarly, nomadic herdsmen who respond to overgrazing by expanding their individual herds, or farming communities that deal with land shortages by cultivating steep, easily eroded hillsides are adapting. These sorts of quantitative adaptations (using more resources but in familiar ways) result from matching environmental changes with an existing response potential, which does not require the kind of reflection or learning that is needed for making qualitative changes (using resources in novel ways).[9]

When a system follows a reactive strategy it reflects and learns, but that learning is principally directed to improvements in internal operations and/or skill levels. When external disturbances begin to affect performance, the system has the capacity to react. Only the reaction tends to be internally-oriented, focusing upon making internal changes to respond to the new external conditions. A rural credit bank that revises its lending procedures and institutes a new training course for loan officers in response to rising default rates is applying a reactive strategy. The focus of change is internal to the system.

Contrast these examples to what they would look like if the actors involved had adopted interactive strategies. Here the focus of reflection and learning is the environment. The herdsmen would realize that over-grazing is a problem of collective action and would try to affect the environment by reducing the overall cattle population. Similarly, the farming community would try to

influence the environment by getting the government to implement land reform policies. And, the credit bank would identify and seek to modify external factors contributing to farmer loan defaults, such as crop pricing structure, availability of complementary inputs, marketing networks, and the like.

As was noted earlier the choice of strategy most likely to promote sustainability is contingent. It might seem self-evident, for example, that interactive systems are the most likely to sustain themselves. But this might only be the case in a turbulent environment and not be true universally. In a stable environment mechanical systems might have the advantage, for under these conditions an external orientation may be unnecessary and reflection simply a distraction from adequate performance. Further, reflective learning and an external orientation are costly, both in time and resources. The aim of the next two sections is to examine the factors in the environment (Section 4) and within the system (Section 5) that determine under which circumstances each strategy is most appropriate.

SECTION 4: THE INTERACTION BETWEEN THE SYSTEM AND THE ENVIRONMENT

The initial discussion of the interactions between the system and the environment in the previous section focussed on the distinction between direct and indirect influence. This section pursues this distinction in greater detail, first in terms of the environment's impact on the system and then in terms of the system's effects on the environment.

Influence of the Environment on the System

Direct Interaction Between the Environment and the System. Direct influence by the environment on a system was defined in Section 3 as changes in the availability of and level of demand for system inputs and outputs unmediated by intervening steps or factors. Because direct influence has significant effects on a system, development assistance agencies often stress a direct approach in their projects and programs. The provision of credit, subsidized agricultural inputs, or infrastructure are intended to lower the cost or increase the amount of inputs needed by a system. Similarly, subsidized producer prices or social marketing campaigns are intended to lower the cost of outputs or increase demand for them.

It is important to note that demand and value of inputs and outputs are not narrow economic concepts. One of the key features of the SCOPE framework is its emphasis on the political and social element of system inputs and outputs. Value is more than an objective measure of energy produced or marginal costs, but is a subjective measure of utility.

This explains how a system may produce very little in the way of economic outputs, but may nonetheless be highly prized from a political or social standpoint. Take the apparent paradox of parastatals in Africa. These are inefficient systems -- the ratio of outputs to inputs is low. Their inefficiency has long been recognized, and, indeed, has often been the target of donor-initiated reforms. Yet, parastatals persist, a testimony to the value placed on political control over key economic sectors by African governments. A similar example is government management of agricultural systems, which in many developing countries keeps producer prices at unremunerative levels to provide inexpensive food to the more politically important urban areas (Bates, 1981). In this instance political quiescence in the cities is considered more important by the government than the viability of the domestic agricultural system.

Value can exist in sociocultural as well as political or economic forms. Adherence to certain norms, such as consensual decision making or centralized authority patterns, or deference to religious practices can be highly valued as well. Economic and technical efficiency in the conversion of inputs into outputs is only one indication of value -- and not always the most important one. For a given system, sustainability depends on the ability to identify and produce a mix of outputs that are prized in economic, political, and sociocultural terms.

Another influence on value is whether a system produces "public" or "private" goods. More is meant by these terms than ownership. Political economy defines private goods as items that can be used exclusively on an individual basis. Public goods, by contrast, are non-excludable and/or can be jointly consumed. Non-excludability means it is difficult to prevent other people from using the good once it is provided to one person. Common range land, which is available for all pastoralists to graze their cattle, is an example of a non-excludable good. Joint consumption signifies that many people can enjoy the good without diminishing each other's enjoyment. Rural roads and other physical infrastructure are examples of goods that can be jointly consumed.

There are few pure public goods, but many goods that have elements of non-excludability or jointness of consumption. Even primarily private goods usually have some public dimension to them, or what economists call an "externality." Often these externalities put a hidden cost on society at large, as for example occurs with charcoal in the Sahel. This fuel is bought and sold as a private good, but its manufacture has public consequences due to the destruction of forests and desertification.

Because of their characteristics, it is harder to accurately gauge the true value or level of demand for public goods. This fact has often been used as the rationale for why public goods should be provided by institutions other than markets, since markets will not function effectively to supply the latent demand for public goods or fully account for externalities. By the same token, the system supplying public goods will find it harder to generate support for its output.

Indirect Interaction Between the Environment and the System. Indirect influences are those environmental conditions, incentives, or policies that affect the system's internal processes (the interaction between capacity and performance) via some kind of intervening step or factor(s). Three types of indirect influence seem to be particularly important: <u>stability</u>, <u>flexibility</u>, and <u>distortion</u>. Each of them is discussed in turn with an emphasis on how they affect internal system processes.

Stability. Stability (or the rate of change) in the environment is an important source of indirect influence on a system because it allows for greater certainty in the structuring of internal processes. Mechanical systems often begin to malfunction when faced with moderate environmental change due to their inability to learn. Adaptive and reactive systems are better able to handle moderate change but cannot usually respond fast enough in highly turbulent environments. Interactive systems, with their ability to anticipate and respond proactively to environmental changes, are best positioned to deal with turbulence. But this comes at high cost in terms of pressure on their information-gathering and boundary-spanning components. If system resources are scarce, responsiveness may be achieved at the expense of a system performance.

One need only look at the disastrous consequences for development activities of Haiti's recent political unrest (Brinkerhoff, 1987) to see the importance of a minimum level of societal stability and certainty for system vitality. In contrast, the Thai case illustrates that stability over time facilitates sustainable development.

Flexibility. Flexibility (or permissiveness) in the environment is important because it conditions the possibilities for system change. Three of the four ideal types of systems (all but mechanical) are capable of changing, so an environment that permits system change strongly affects their potential for sustainability. Without flexibility, new patterns of internal organization are resisted, thwarting the capacity/performance dynamic and threatening system vitality. As with stability, scarce resources mean that dealing with an inflexible, non-permissive environment takes away from performance.

Rigidities in the environment are frequently cited as a major hurdle for developing countries (Kiggundu, 1986). Not surprisingly, increasing flexibility is a frequently suggested remedy for development problems; for example, calls for bureaucratic reorientation (Korten, 1982), administrative decentralization, or privatization.

Distortion. That a system's environment can be described as artificial or distorted was noted in Section 3. The importance of distortion is most clearly seen in economic terms. In the last several years developing countries have been encouraged to "get prices right." One part of the argument is that distorted economic signals create unreal environments which in turn promote artificial systems. Thus the push for revaluing exchange rates,

raising interest rates, and allowing prices to respond to market conditions becomes an argument about distortion. Undervalued exchange rates mask the true cost of imports and promote an artificially high volume of imported inputs. These distortions are expensive and unsustainable, stunting growth and jeopardizing the ability of the national system to continue purchasing needed inputs.

Although the logic of price reform draws on the dangers of artificial environments, the conclusion should not be that distortion is always inappropriate. Indeed, economists often argue that conscious price manipulations are a good thing, as when tariffs are used to protect infant industries. Instead the conclusion should be that distortion exposes the hierarchy of systems to a risk of non-sustainability.*

To summarize this discussion of the types of indirect influences, Table 2 lists examples of each subdivided into economic, political, and sociocultural dimensions.

Influence of the System on the Environment.

Direct. Obviously, for a given system some elements in its environment are more important. The underlying structure of society determines that certain individuals, groups, organizations, or larger systems will be central to the sustainability of the system. These actors are the system's stakeholders. Stakeholders can be customers or clients who value economic products of the system by paying for them, patron groups or organizations who value the political services or functions provided by the system, or sociocultural elites who value the norms inherent in the system. As a result, stakeholders weigh

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*As was noted in Section 3, there are hierarchies of systems. An organization like the Hassan II Institute of Agriculture, which is itself a system, is part of a larger system (the Moroccan agricultural system), which in turn is part of yet a larger system (the Moroccan national system) and so on. To a given system these suprasystems are part of its environment and thus the sustainability of these suprasystems becomes an important influence on the system in question.

Table 2: Means of Indirect Influence of the Environment on a System

	Types of Indirect Environmental Influence		
Dimensions	Stability	Flexibility	Distortion
Economic	Stable markets and market arrangement Little inflation	Absence of institutional rigidities; willing to consider range of economic institutions or arrangements Room to consider range of economic strategies	Little distortion in "macro-prices": prices, wage rates, interest rates, currency exchange rates Debt and current spending related to revenue Economic activity undertaken with fair valuation of ecological inputs: land and natural resources
Political	Stable political situation (no internal strife; no impending coups) No serious political cleavages (ethnic, religious, geographic)	Absence of over-bureaucratization Willing to consider alternative institutional arrangements: authority devolved or decentralized to lower governmental levels or to non-governmental organizations	Current political structures or political organization perceived as legitimate
Sociocultural	Social patterns not disintegrating	Willingness to accept changes in social patterns	Direction of sociocultural change perceived as legitimate

differently the outputs of a system. What is important is that they all value the outputs and thus provide the means for the system to procure the necessary inputs to maintain itself.

Over time, stakeholders adjust their evaluation of the system and what it produces. The system's level of influence on the environment therefore is subject to change. Sustainability is affected by the ability of system members to exert influence both at specific points in time and over an extended time period.

In the case of Morocco's Institute of Agriculture, the king was an important stakeholder as a member of the sociocultural elite, and he was a key political stakeholder, as was U.S.A.I.D. and, more recently, the college's alumni group. In the case of Thailand's NERAD project the principal stakeholder, both economically and politically, was the Ministry of Agriculture and Cooperatives (MOAC). The MOAC did not value the research activities undertaken at the Tha Phra Center. Only after the center convinced the MOAC of its ability to coordinate activities in the North East Region, was government budgetary provision won.

The Thai case illustrates that systems have the possibility to influence the environment's valuation of its outputs. One approach to analyzing a system's environment is in terms of degrees of "influenceability" (Smith, Lethem, and Thoolen, 1980). A system needs to understand who its stakeholders are and what they value, so that it can develop appropriate strategies for influencing its environment. Specific actions depend upon the particular case; what can be generalized and categorized are the different types of environmental reconnaissance and the demands they place on the system. Not all systems are capable of conducting all types of reconnaissance, nor should they be. The appropriate and desirable amount depends in part upon an understanding of indirect environmental influences, to be discussed next, and the characteristics of internal system processes which will be dealt with in Section 5.

Indirect. If the scope for direct influence of a system on the environment is limited, the scope for indirect influence is even more so. With direct influence there are outputs over which a system and its stakeholders can negotiate, and the absence of intervening factors makes the linkage between action and outcome clear. With indirect influence relations, stakeholders remain, but the system has less ability to induce changes in the policies or incentives emanating from the environment. In addition, because of the presence of mediating factors, the linkages between policies and/or incentives and system functioning are frequently neither readily apparent nor subject to universal agreement.

Indirect environmental influences are important for system functioning and sustainability, yet their characteristics make it difficult for developing country organizations to address them. Donor agencies have played an important role here. The dimensions of indirect influence have been the targets of conditions precedent, policy dialogue, structural readjustment, and many of the recommendations on factors affecting sustainability (Bossert and others, 1987; Devres, 1987; IDMC/DPMC, 1987).

Hostility

The direct and indirect influences discussed above combine to determine the overall hostility of a system's environment. It is the combination of influences, more than any single one, that determines the amount of stress on a system. The limited demand for public marketing agencies' services, for example, is much less of a problem in a stable environment with powerful and supportive stakeholders. Greater environmental instability and changing values among key stakeholders -- events that are happening in some countries -- change markedly the prospects for sustaining this sort of system. The factors affecting hostility are summarized in Table 3.

Taking this discussion of the constituent elements of hostility as a whole, leads to the following proposition about its relationship to sustainability:

Proposition 1: Environmental hostility is inversely related to sustainability.

Table 3: Factors Determining Level of Environmental Hostility

	Factors Contributing to Low Hostility in the Environment	Factors Contributing to High Hostility in the Environment
DIRECT INFLUENCES		
Level of demand for system outputs	High level of extant demand; demand creation unnecessary	Low level of extant demand; demand creation necessary
Nature of system outputs	Outputs are private in nature, easily translated into value or inputs	Outputs are public in nature; hard to value or translate into inputs
Characteristics of stakeholders	Members of lower socio-economic strata, unorganized, low demand-making ability; conflicting interests	Members of political, economic, or socio-cultural elite; high demand-making ability; non-conflicting interests
INDIRECT INFLUENCES		
Stability	Environment is stable along economic, political, and socio-cultural dimensions	Environment is unstable along economic, political, and socio-cultural dimensions
Flexibility	Economic, political, and socio-cultural features of the environment permit and/or support system change	Economic, political, and socio-cultural features of the environment do not permit and/or support system change
Distortion	Environment displays low levels of distortion along economic, political, and socio-cultural dimensions	Environment displays high levels of distortion along economic, political, and socio-cultural dimensions

SECTION 5: FACTORS INFLUENCING THE ORGANIZATION OF INTERNAL SYSTEM PROCESSES

In concluding the preliminary discussion of internal processes in Section 3, the point was made that the relationship among the four system types and sustainability is contingent. Under specific circumstances, mechanical systems can be maintained as successfully as interactive ones. System sustainability depends on the "fit" between the system and its internal processes and its environment.

Section 4 explored the contingencies bearing on the strategic choice between an external and internal orientation. One conclusion was that systems whose outputs are in demand need less external orientation compared to systems that have to mobilize demand for their goods or services. A second conclusion was that systems whose environments are unstable, inflexible, and distorted have to be much more outward oriented than ones in stable, flexible, and undistorted environments. Conditions in the external environment, however, make up only one set of contingencies that a system must consider. Factors affecting the internal capacity/performance dynamic need to be weighed as well.

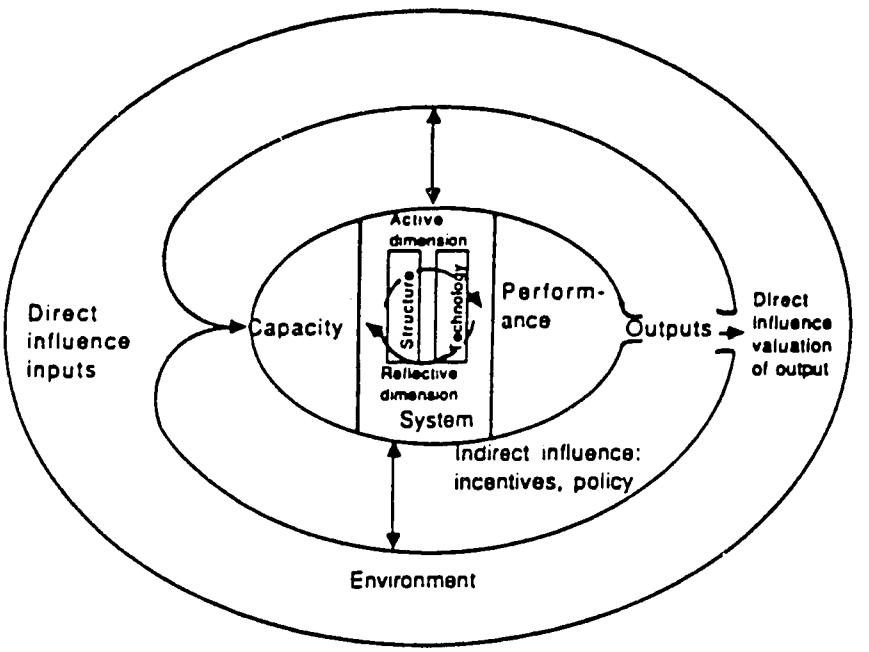
Characterizing the Internal Contingencies

In Section 3, the principal internal process of systems was defined as the conversion of capacity into performance. Active and reflective dimensions to the conversion were noted as was the strategic choice over which dimension is emphasized. However little attention was paid to factors that affect the choice of the most appropriate strategy. In this section two such factors are examined: technology and structure. Individually each can be seen as a filter or prism that affects the interaction between capacity and performance. The trick is to match technology, structure, with the appropriate strategy so they mesh and reinforce each other. This smooths the flow of inputs to outputs, as Figure 5 tries to capture graphically. When these contingent elements are mismatched, however, performance and learning suffer and sustainability is jeopardized.

Technology. Technology is usually understood to refer to the application of science to particular problems, such as agricultural technology. However, a literal translation of the Greek roots of the word is "an understanding of the art or craft." It is in this broad sense that technology is used here. Technology impacts upon the essential characteristics of a particular capacity/performance dynamic. At least four technology-related dimensions can be identified with key

implications for sustainability: publicness and privateness, variability and frequency, economies of scale, and principal/agent relations.

Figure 5: Complete SCOPE Framework



Public versus Private Goods. Among these four technology-related dimensions, the best studied is the extent to which the goods or services being produced, exchanged, or consumed by the system are public or private. Public goods and private goods create different types of incentives for individual behavior, and thus influence whether people will persist in supporting a particular project, program, or policy. This fact is often neglected in development. An integrated rural development project in Jamaica, for example, tried to protect soil from erosion (primarily a public good) by paying hillside farmers to build terraces and ditches (primarily a private good). The farmers perceived little individual benefit from soil conservation itself, especially in relation to maintenance costs, and after project subsidies were removed they allowed the earthworks to fall into disrepair (Blustain, 1985).

Variability and Frequency. Two important dimensions of technology are the variability and frequency with which capacity is transformed into performance. Variability captures the idea of how standardized or routine the technology is. With invariable technologies the transformation process is conducted in the same standard way over and over again. Food processing is usually

predicated on an invariable technology, as is information collection for field surveys. Other technologies are variable and change every time capacity is translated into performance. Variability is frequently linked to complexity; complex technologies, especially social ones that are only partially understood, are less amenable to routinization. The World Bank's training and visit system of extension, which breaks agricultural knowledge into discrete parts, is one example of an effort to standardize what is usually treated as a non-standard technology.

Frequency is the number of times a particular operation is performed. Some procedures are done often, some only once. Weeding a crop, for example, tends to be a more repeated task than land preparation. Although there is a similarity between variability and frequency, they are separable notions. Variable activities tend to be performed infrequently, but they needn't be. In either case, learning and incentives are affected.

Consider the success of the Kenya Tea Development Authority. The smallholders involved in this scheme have to pick ripe leaves on almost a daily basis and deliver them to pickup points for immediate curing. With repeated experience they have become highly skilled at these and other operations. The technical requirements of the crop also create regular opportunities for tea officials to monitor and to pay farmers (Lele, 1975). The invariability and frequency of tea technology are not the sole reasons for the authority's long record of accomplishment, but they have facilitated its internal organizational cohesiveness.

Economies of scale. Some development activities are best undertaken on a large scale, others are done more efficiently on a limited basis. There are many examples of the latter in development, such as the primary health care movement, which attempts to make simple health services accessible to poor people. Clients may derive more benefit from primary health care facilities compared to conventional clinics or hospitals, but this does not mean economies of scale are entirely absent. Some functions may still be best done in a big way; for example when purchasing medicine, it is probably sensible to buy in volume to secure a discount. A major challenge in development is to identify the relevant economies and diseconomies of scale.

Principal/agent issues. Coffee berries do not ripen at the same time, thus the coffee harvester must be selective, picking only the ripe ones if high quality is to be maintained. Rice is different, the small variation in ripeness is not worth considering when harvesting. These two crops exhibit different technologies that affect the relation between a principal (landowner) and an agent (farm laborer).

The interests of principals and agents often diverge, and the resulting clash has many implications for sustainability. Consider how a land-owner is motivated to compensate labor at harvest time. In the case of coffee the land-owner would insist on paying on the basis of the ripeness of the berries, in the case of rice simply on the amount harvested. Hired workers might prefer a flat daily rate to either of these compensation schemes, while family workers might not experience the principal/agent conflict at all. Whenever the parties to transactions have dissonant claims like this, workable solutions need to be carefully thought through. Planned development interventions often fail to appreciate this fact.

Structure. While technology defines the feasible range of the interaction between capacity and performance, structure sets boundaries around that process. By structure we mean the way the system is organized -- the roles, responsibilities, and relationships of the individuals and groups involved. As used here, the term is analogous to the standard social science definition of institution. Markets, families, joint-stock corporations, parastatals, political parties and minstries of agriculture are all examples of different types of institutions that can be structured in various ways.

The structure of a system is important for three major reasons. First, it shares with technology an effect on incentives, encouraging some behavior and discouraging other behavior. For example, a community development agency where supervisors enforce a standardized set of procedures for village-level workers' tasks will discourage innovative activities that respond to client-identified felt needs and encourage activities that fit the agency-determined standard.

Second, structure is important because it influences the flow of information within the system. Timely, usable information is the scarcest resource in many systems, and different structures vary in their ability to acquire and use it effectively. For example, many developing country sectoral ministries establish separate monitoring and evaluation (M&E) units that are charged with collecting and analyzing project output and impact data to provide feedback on implementation progress and guidance for future project design. Frequently however, M&E staff have difficulty obtaining timely and usable information and their reports are rarely consulted by project managers or designers; the ministry's functional structure, which separates M&E from line operations, blocks the incorporation of output and progress reporting into managing the production of goods and services.

Information is closely related to the third issue of transaction costs. These are the equivalent of friction in a mechanical system. Essential staff functions such as planning, supervision, and evaluation all use up energy, but are not immediately productive. Systems tend to minimize outlays (time, financial resources, and so forth) on these and similar activities (Williamson, 1985). Structures that generate excessive transaction costs are often nonviable, which is one reason for the non-sustainability of many integrated rural development projects. Because they took on ambitious, multifunctional objectives these complex projects were management-intensive. Much effort had to be put into coordinating so many different activities. The burden of these transactions was too great for many developing countries to maintain over the long-run.

Structure can differ along numerous dimensions. The most important ones for our purposes are authority, formality, hierarchy, and centralization.

Exchange versus authority relationships. This distinction of Lindblom's (1977) helps to separate market and market-like institutions that rely on voluntary exchanges from administrative or bureaucratic ones where relationships are tied to underlying authority patterns (superior/subordinate, patron/client, and so forth). Most organizational structures reflect a combination of exchange and authority. Whether the mix is sustainable depends partly on the technology being used.

Markets tend to be a low-cost way of organizing the production and distribution of private (non-public) goods, but to be less efficient in allocating public goods. Or, in different words, markets efficiently organize private firms to transform capacity into performance for a technology whose output is a private good, but will be a poor choice when dealing with a public good. The reason is that parties who exchange private goods can capture the benefits (and bear the costs) of the transaction themselves. This does not happen with public goods because their externalities spill over onto third parties.

The agricultural system in Thailand's North East Region provides a useful example of the structural implications of public good/private good technology on organization. Rice is an excludable, individually consumed commodity that can be bought and sold for profit. It is not surprising that Thai rice is successfully marketed within a market structure. Rice also has a public dimension, however, in the sense that it can be used to eliminate malnutrition among low-income people and augment the common welfare. Distributing rice through voluntary exchange will

not always assure its equitable distribution. This is one of the main arguments for organizing food distribution within a non-market structure, as occurs in many African countries. The drawback is that such a structure creates avenues for authorities to skim off surpluses for their own benefit rather than society's.

Non-market structures often work best in supplying public goods that are tangible and can be used by everyone equally. Research on village-level development organizations in North Yemen (Walker, Carapico, and Cohen, 1983) showed they were very successful in providing wells and roads, but were uniformly unsuccessful in providing intangible public goods, like services, or public goods that were more discriminatory in benefits, like schools. Indeed, in more than one instance, the technology of the good became such a crucial issue within the particular village, that a once emergent system completely decayed. A study of Harambee groups in Kenya found the same patterns (Walker, 1984).

Non-market structures can also be strengthened when they use private goods as prerequisites to get leverage for providing public goods (Olson 1965). An example is South Korea's New Community Movement. The program provided villagers with building materials to improve or even rebuild their own houses. The quid pro quo was that they also had to contribute labor and other resources to construction projects that would benefit the entire village (Goldsmith, 1982).

Degree of formality. Another important dimension of structure is its degree of formality; that is, the extent to which the structure is specified in formal, written rules. Cooperatives are examples of more formal structures, while traditional labor exchange networks are examples of less formal ones. Formal structures tend to have higher transaction costs because they require specialized training, familiarization with new roles, and so forth. This may be one reason why they often fail to take root in developing countries (Esman and Uphoff, 1984).

Degree of hierarchy. A third dimension of structure is hierarchy. Hierarchy refers to how "narrowly" or "flatly" a structure is set up. The narrowness or flatness of the organization is described in terms of other features associated with hierarchy, including: number of organizational levels, span of control (how many subordinates a given supervisor is in charge of), degree of authoritarianism, and intensity of supervision. Narrow hierarchies tend to be associated with high numbers of levels, narrow spans of control, authoritarian superior/subordinate relationships, and close supervision. Flat ones usually exhibit few levels, wide spans of control, collegial reporting relationships, and loose supervision. The former also tend to

encourage vertical flows of information, while the latter facilitate horizontal ones.

There is a populist tradition in development that prefers flatter hierarchies as a matter of principle, for they tend to be more participatory and less bureaucratic. This global judgment ignores the basic tenet of contingency theory. The optimal degree of hierarchy (and associated bureaucratic rules) is conditioned by factors inside and outside of the system. Consider the question raised earlier about the variability and frequency of technology. Non-variable processes lend themselves much more to bureaucratic structuring and quantified monitoring and evaluation while variable ones do not. This is at the root of recent criticisms of the project management unit (Honadle and VanSant, 1985). The argument is that projects are useful ways of organizing activities that are performed infrequently and are highly variable, such as the construction of major public works. But projects have proven themselves an inappropriate structure for trying to perform the frequent and standard activities undertaken in many planned development schemes.

Degree of centralization. A fourth characteristic of system structure is the extent of centralization. It is often associated with hierarchy, but should be kept conceptually distinct. Centralized systems are those where decision-making is limited to a small number of individuals or entities; decentralized ones disperse decision-making widely.

Centralization presents one of the classic dilemmas in organization theory. Structures that concentrate authority at the center have advantages in being able to make quick decisions, to mobilize resources, and to assure homogeneity. But they pay a price by being out of touch with threats and opportunities in the periphery. To improve their ability to accumulate and process information, some organizations therefore try to introduce elements of decentralization, which can take such forms as deconcentration, devolution, delegation, and privatization (Rondinelli, 1981). Decentralized structures have problems of their own, of course, such as duplication, loss of control, and lack of coordination.

Resolving this dilemma is difficult. An interesting compromise is the structure of agricultural research in India. The Indian Council of Agricultural Research focuses attention on farm problems it thinks are nationally important via its control of funds for research. Most research is carried out at sub-national institutions, however, which forces scientists to pay attention to specific problems in the states. This approach gains the unity of purpose associated with centralization, without sacrificing the

greater responsiveness of decentralization (Lele and Goldsmith, 1988).

Complexity. Together, the technology and structure of a system determine the extent of its internal complexity. The less challenging the technology (for example oral rehydration therapy in a health program) and the simpler the organization structure (such as a focused T&V extension system), the lower the internal complexity. Sophisticated technologies and elaborate structures increase the level of complexity. Specifically, complexity can be described in terms of the following dimensions: a) the number of components (or units), b) the degree of differentiation among the components, and c) the degree of interdependence among the components. Systems with fewer components are less complex than those with more. Systems whose components are relatively uniform either in terms of function or structure are less complex than those whose components are highly differentiated functionally and/or structurally. Systems whose components operate relatively independently of each other are less complex than those whose components are interdependent. Interdependence can be thought of as situations where various components' outputs serve as inputs for other components. Table 4 illustrates the relationships among the factors contributing to complexity in summary form. This discussion also produces a second proposition:

Proposition 2: Internal complexity is inversely related to system sustainability.

Table 4: Factors Determining Complexity of Internal System Processes

	Factors Contributing to Low Internal Complexity	Factors Contributing to High Internal Complexity
Technology	Output is a private good	Output is a public good
	Low or no variability in translating capacity into performance	High variability in translating capacity into performance
	Regular frequency	Irregular or unique frequency
	Principal-agent incentives reconcilable	Conflicting principal-agent issues
	Requires few units to produce	Requires many units to produce
	Tasks are simple, separable into independent sub-tasks	Tasks are complex and require coordination and integration
Structure	Formal	Informal
	Hierarchical	Non-hierarchical
	Centralized	Decentralized
	Relatively few units	Relatively more units
	Units perform similar tasks	Units perform different tasks
	Units operate relatively independently	Units are interdependent

"Putting It All Together": Strategy Formulation and Implementation

In Section 3, four types of strategies were identified, differentiated from one another depending on whether the active or reflective element of capacity was emphasized and whether the orientation of the system was internal or external (recall Figure 4.) In Section 4, the elements that affect the hostility of the environment were identified, and earlier in this section, the factors determining the complexity of internal process were described. Building on all of these concepts, it is now possible to put them all together; to relate external and internal conditions under which the four strategies -- mechanical, adaptive, reactive, or interactive -- is most likely to promote sustainability.

Before doing so, one brief caveat should be noted. The terrain of these contingent relationships is not fully mapped; only the general contours are known. Moreover, even in areas where the terrain has been surveyed, as in the public-private goods area, the structural and strategic implications of these differing types of technology are in dispute.[10] In other words, although the variables that emerge from this analysis as key seem well-grounded, their relative contributions, interactions, or multiplier effects are unknown. Nevertheless, the SCOPE framework leads to clear statements, or propositions, about which combinations of these contingent elements are more workable and more likely to be sustained. Four propositions emerge:

Proposition 3: **Under conditions of low internal complexity and low external hostility a mechanical strategy will promote sustainability.**

Proposition 4: **Under conditions of medium internal complexity and medium external hostility an adaptive strategy promote sustainability.**

Proposition 5: **Under conditions of high internal complexity and medium external hostility a reactive strategy will promote sustainability.**

Proposition 6: **Under conditions of medium internal complexity and high external hostility an interactive strategy will promote sustainability.**

Table 5 summarizes the discussion of these propositions. In Section 3, the primary internal process was identified as the dynamic between capacity and performance. It was pointed out that this process has an active dimension (the translation of capacity into performance) and a reflective dimension (the ability to learn from performance as the foundation for greater capacity and increased performance.) Reflection and learning, however, is a time consuming and uncertain enterprise. As such, more of it is not always better.

The two internal contingent elements (technology and structure) affect the active and reflective dimensions differently. Low internal complexity (for example the use of technologies whose outputs are private goods and are performed frequently) make the conversion of capacity to performance relatively straightforward. Combined with a supportive environment -- one that is stable, flexible, and authentic, and displays constant demand -- systems that use this kind of technology may be able to flourish and endure with a minimum of learning. In other words, even mechanical strategies will likely be sustainable under this combination of internal and external circumstances.

Table 5: Relationship Between Strategy Type and Sustainability

Type of System	Strategy Characteristics	Conditions that Strategy is Suitable for: Level of Complexity in Internal Processes*	Level of Hostility in the Environment**
Mechanical	Internal orientation; emphasis on active translation of capacity into performance; little reflection	Low	Low
Adaptive	External orientation; little reflection, but able to accommodate changes emanating from external environment because of flexibility inherent in existing capacity	Low to Medium	Medium
Reactive	Internal orientation; able to reflect on internal processes and increase capacity	High	Low to Medium
Interactive	External orientation; able to analyze and anticipate change in the environment	Medium+	High

Notes: * Degree of complexity in internal process appropriate for sustainable functioning given acceptable level of environmental hostility/complexity.

** Maximum level of environmental hostility the system can cope with and still be sustainable.

+ It is assumed that no system has a high likelihood of sustainability if it depends on highly complex internal systems and exists in a highly hostile environment.

At the opposite extreme are highly internally complex systems (for instance ones employing technologies whose outputs are public goods and are performed infrequently and with high variability each time they are performed). If this type of system is confronted with a highly hostile environment as well, then it is highly unlikely that it will be sustainable. The internal complexity demands to be the focus of managerial attention and learning. But so does the external environment. Given limited managerial resources, it is impossible for everything to be done at the same time or for the system to remain sustainable for long.

If the system is to become sustainable, one of two things must happen. Either the system finds a way to simplify its internal processes so that managerial attention can be more fully concentrated on interactions with the environment or it finds a way to lessen the external hostility so that managerial attention can be directed toward facilitating the complex internal processes. In the first instance the system has adopted an interactive strategy, and in the second a reactive strategy.

One corollary of this analysis is that there is no one, single best, or most suitable strategy. Although strategic management as applied to conventional business has recognized this fact, it is far less appreciated in development management.[11] An apt case in point has been the debate over blueprint versus learning approaches. Those advocating learning approaches (Sweet and Weisel, 1979; Korten, 1980) have often argued that they are always best. Yet, more recent research has suggested that in certain circumstances an approach of structured-flexibility is more appropriate (Brinkerhoff and Ingle, 1987). With the SCOPE framework, it becomes clear that the approach to be adopted is part of the larger strategic imperative of facilitating the transformation of capacity into performance under particular internal and external conditions.

A similar analysis can be applied to the issue of participation. Participation is less necessary for some situations than others -- consider the different participation requirements of a large-scale irrigation project versus a small-scale tubewell project. Getting popular input is not always feasible, either. Recent research points out that participants incur transaction and opportunity costs, and that these sometimes outweigh the gains of taking part in planning or implementation. An adverse benefit/cost ratio is one reason that farmers often "vote with their feet" by withdrawing from government marketing associations, for example (Goldsmith, 1986). The irony is that too little voice and influence make it difficult for systems to learn and adapt their behavior.

Other important strategic issues in development include (but are not limited to) decisions about the "target group" (women, landless laborers, small farmers, and so forth); about the scope (single versus multiple functions), depth (intensive versus extensive), and scale (large versus small) of activities; about the rate of expansion (slow or fast); and about sequencing (what should happen first.) Any of these can have a major impact on sustainability.

Were we to conclude at this point, it might leave the mistaken impression that in the grand equation of trying to promote sustainability the external variables that comprise hostility and the internal components of complexity are the givens, and strategy is the main variable open to choice. To some extent the bias in favor of the preeminence of strategic management is a product of the focus of this paper on institutional sustainability and its concern for the internal process of organizations. Of the components within a system, strategy is certainly the most amenable to managerial discretion and control. Consequently, this section has emphasized strategy as the lever for ensuring congruence between external and external conditions.

But this does not mean that structure or technology can not be manipulated also. Formal, centralized, narrowly hierarchical structures and non-participatory strategies do not lend themselves to a reflective learning process. They are entirely appropriate ways to manage the active dimension of translating performance into capacity, but they are poor ways to set up a high degree of reflection if this is called for. By the same token, informal, decentralized, and flat structures that adopt a participatory strategy are better able to learn, either about internal processes or the environment, and may be appropriate for reactive or interactive systems. The downside is that this combination of structure and strategy is generally slower to translate capacity into performance, and often requires more resources to do so.

By the same token, from the standpoint of the policy-maker who is more concerned with the sustainability of larger, uncontrolled systems, not just a single organization, the most amenable lever may not be strategy choice, but alterations in the environment to lower hostility or change the valuation of system inputs and outputs. This suggests that there are a range of appropriate points of intervention to promote sustainability. This topic is the focus of the next section.

SECTION 6: INDUCING SYSTEM CHANGE: THE RANGE OF INTERVENTIONS

It would be useful if precise interactions between systems and environments could be identified and substantiated either quantitatively or qualitatively through field experience. This would provide strategic guidelines for change agents concerned with having a lasting impact on the systems they are working with. The data are not yet available to do so. Nevertheless, SCOPE suggests general considerations worthy of further investigation.

Development agencies active in the Third World have often employed discrete development projects, sets of activities with predetermined life spans and separate organizational structures and procedures. By definition, project interventions represent artificial systems -- they use one-time inputs of outside funds, equipment, and technical assistance that are going to be withdrawn (or at least renegotiated) at a definite time in the future.

There is, however, a range of artificiality associated with development projects. On the low end is what might be called the seed grant strategy frequently used by private agencies such as the Ford and Rockefeller Foundations. Here the idea is to provide a few critical resources to induce the host country environment to provide the principle inputs for a bounded system. This strategy has been effective in building sustainable educational and research institutions in India, Nigeria, and many other countries.

At the high end of artificiality is the bypass strategy that donors sometimes choose for particularly hostile country environments (for instance, Haiti), with the intention of creating systems that can be isolated and controlled from the outside. These sorts of highly artificial systems are not seriously intended to be sustainable without continued foreign support.

Most projects fall between these two extremes -- an intervention to build feeder roads that uses local labor and simple technology would tend to be less artificial (especially if the host government is prepared to support maintenance costs), whereas an integrated rural development project with subsidized credit, infrastructure, and marketing services would tend to be more artificial. The important point is that artificiality threatens sustainability, which is captured in the following proposition:

Proposition 7: System sustainability is inversely related to artificiality.

Development practitioners need to avoid underestimating the degree to which a particular project depends upon distant (that is foreign) stakeholders, or to overestimate the support from more proximate ones.

Dissatisfaction over the performance and sustainability of development projects has drawn donor attention in recent years to non-project strategies. These try to change environmental parameters, as opposed to focusing on the internal processes of the smaller, bounded systems targeted by the project approach. The notion is that no matter how great the capacity of a system, a hostile environment can reduce its performance below acceptable levels. In recognition of the potential overwhelming impact of the environment, several donors have initiated policy-based financial assistance intended to make country environments less distorted by allowing markets freer play and by cutting back on administrative controls on economic activity. Structural Adjustment Loans from the World Bank are the most evident example of this strategy.

Ironically, however, non-project interventions are often themselves highly artificial. Artificiality is a function of the complexity, intensity, and size of an activity. "Policy dialogue" to influence an environment often assumes a level of sophistication and effort that is beyond a host country's capacity to respond. Domestic economic reforms may require administrative skills the country does not possess. The scale of resource mobilization required may be unrealistic in terms of the nation's resource endowment, while monitoring compliance with conditionalities may necessitate information that does not exist or is too soft to be of practical value.

Faced with the multiplicity of largely uncontrollable factors that contribute to environmental hostility, external stakeholders often have little leverage to make system environments more hospitable. This argues in favor of reactive or interactive systems that emphasize learning. Yet what we find in most developing countries are mechanical ones that stress control. Even donor-funded projects have major mechanical dimensions, dictated by the financial oversight and accountability demanded by the donors own stakeholders (for example by the United States Congress for U.S.A.I.D.) Development assistance should do more to improve the capacity of systems to scan their external environments and to reflect both on their environments and on their internal processes.

PART III
TOWARD A SYSTEMIC UNDERSTANDING OF SUSTAINABILITY

SECTION 7: EXTENDING SCOPE BEYOND A SINGLE ORGANIZATION

As discussed in Section 2, the inclusion of a systems perspective in the SCOPE framework highlights the importance for sustainability of the linkages and interactions between an organization and key components of its environment. Restricting interventions to only organizations limits their ability to deal with issues that may be critical to sustainability. To see this, consider the Northeast region of Thailand. The ultimate aim of the NERAD project is a sustained increase in small-holder production. The means selected to achieve the project aim has been to focus on an organization, a regional agricultural research center, and build its capacity to develop and disseminate improved agricultural practices. Sustainability has been considered in terms of the ability of the center to continue to conduct research and disseminate information to farmers. In short, an organizational focus has been adopted.

Though not wrong, this organizational orientation does not go far enough. The difficulty arises because the agriculture of the Northeast region is more than a single organization, it is a system. The regional agricultural research center is certainly an element in the system, but it is not the only one. More importantly, the center may not be the most important element for achieving the ultimate aim of increasing small-holder production.

Even if the major constraint is production practices, an organizational focus is incomplete. Such an approach looks only through the organization's eyes and thus unduly emphasizes the importance of the organization's activities. While service delivery is important for sustaining development of the agricultural system in the region, it is no more so than generating demand among the farmers for improved information and inputs. Farmer demand for services not only provides the basis for local-level accountability, but indicates a measure of value for the center's activities. At the same time, accountability to farmers may be threatening to researchers and extension agents. If the center is not responsive to demand, then the demand and farmer responsiveness to service delivery will cease.

This interaction between the center and the farmers is a systems-level relationship. Building this linkage will require work with both elements of the system. Work solely on the organizational side will prove futile. It is because important interactions of

this kind keep reappearing that a systems orientation is necessary.

The reason that current work on sustainability has this organizational focus is not hard to trace. Some of the earliest discussions of sustainability were contained in the institution-building literature of the 1960s, where the term, institution, was synonymous with organization, such as a training institute, and sustainability was understood to mean organizational longevity. The obvious shortcomings of equating sustainability with perpetuation have been noted by Honadle (1981) and others advocating capacity building (DPMC/IDMC, 1987). But in arguing that it is the flow of benefits an organization provides and not the organization's existence that matters, the emphasis has been changed, but the focus on organization remains. The advantage of the SCOPE framework is that while it is perfectly applicable to single organizations (as Sections 3 - 6 have indicated), it is equally applicable to larger systems as well.

Moving beyond the organization, however, raises several operational difficulties that need to be considered. First, extending an intervention target beyond a single organization, which can be treated as a unitary decision-making entity or a controlled system, implies a significant leap in complexity in terms of action. This is not a new difficulty, indeed it is one of the major findings of the research on integrated rural development (see Honadle and VanSant, 1985). But it remains a stumbling block because managing the capacity/performance strategy requires some kind of coordinated decision-making among actors that all hold a sustainability objective.

The second difficulty flows directly from the first. Beyond the single organization level the locus of management responsibility becomes diffuse and hard to identify. Few managers are willing or able to take responsibility for system performance; simply too many factors are beyond their control. Taking the systems view requires managers who are comfortable with lobbying, influencing, and politicking, and many of the managers in developing country public sector agencies concentrate almost 100 percent on internal control.

Third is the issue of setting boundaries. As noted above, the organization offers a relatively clearcut delineation between inside and outside, one that coincides with what managers are responsible for and what they are not. The systems perspective, however, encourages looking at linkages and interactions, and the problem becomes one of deciding when and where to stop. Often, the incentives inherent in a particular situation discourage looking very far.

Fourth, and related to all the others, the systems viewpoint entails a greatly expanded set of stakeholders and clients. As in the NERAD project, looking at sustainability as including farmers, middlemen, markets, input suppliers, etc. vastly increases the groups that an intervention needs to pay attention to. Further it raises the issue of competition and conflict among the various groups. As experience has shown we cannot assume that everyone's interests will mesh together harmoniously.

However, there are some successes in applying a broad systems perspective. In the Tanzania project, the resident advisor assumed a coordinator role and sought to get different agriculture and rural development officials in the District and Ministry structures to communicate with each other on a regular basis. Under the advisor's guidance they gradually built up and practiced working relationships that allowed the project to take action on a level that extended beyond the reach of any of the involved organizations' singular capacity. This system network has remained in place and functioning following the advisor's departure and the termination of external funding.

As the preceding section points out, sustainability requires a range of interventions. Targeting individual organizations is still important, but needs to be done both as part of a larger set of actions and with the recognition that important factors will always lie beyond the specific target. The systems level perspective can open our eyes to the kinds of linkages and interactions that we wouldn't necessarily consider. This has happened with farming systems research, and it should be a part of sustainability analysis as well.

SECTION 8: CONCLUSIONS AND NEXT STEPS

The SCOPE framework, as elaborated above, provides a systematic way of thinking about sustainability and the various components of a development situation that must be taken into account in efforts to intervene in developing country systems to promote enduring change. Key precepts from systems theory, contingency theory, and political economy have been combined to form an integrated framework in which attention is focused on the relationships among a defined system with inputs and outputs, the system's environment, its capacity and performance, and the power structure and the different degrees of valuing various groups place on the system's inputs and outputs. The model also suggests a set of contingencies relating four capacity-performance strategies to levels of hostility in the environment and complexity in the internal conditions involving technology and structure.

The next step in moving toward operational guidance is conducting pilot applications of the framework in the field. Field testing will involve several kinds of decisions. A.I.D. financial and time limitations do not permit undertaking fieldwork dedicated solely to testing SCOPE, therefore field applications will have to be piggy-backed onto other field activities. The purpose of the field visits is two-fold. The first aim is to validate the framework as an explanatory and analytic tool. The second is to determine whether it has utility and appeal to development practitioners.

Currently, pilot field applications are planned for six countries: Morocco, Indonesia, Pakistan, Nepal, Bangladesh, and the South Pacific. In each application, at least one member of a consulting team will be responsible for collecting data consistent with the SCOPE framework.

After the field application step, the subsequent step comprises an analysis and revision phase. The framework presented in this paper will be modified in light of the information and feedback received from the field. This revised framework and the field data will initially be included in a paper to be presented at the ANE Agricultural and Rural Development (ARD) Strategy Symposium in September 1988. Institutional sustainability has been identified as one of three cross-cutting issues that need to be considered by all contributors to the preliminary ANE/ARD strategy work.

This could be followed by an implications workshop, where the premises of the ST/RD supported work and the ANE framework are reviewed, a more informal review with the A.I.D. working group, or both. At that point, a set of Agency policy and program recommendations could be prepared.

Important though this initial work is, it only begins to scratch the surface of the many questions posed by the SCOPE framework or take up the many promising lines of inquiry stimulated by this new perspective. Clearly more work needs to be done in establishing the relative importance and interaction effects of the various factors that have been identified here as comprising external hostility and internal complexity. Equally, more work needs to be done in further specifying the operational implications of the four sustainability strategies emerging from SCOPE.

But this is relatively easy compared to understanding the systemic imperative of the framework. Sustainability is ultimately a systems concept, and thus a more systemic perspective needs to be adopted by all concerned with international development if the poor record of sustaining development activities is to be reversed. Unfortunately, as the last section made clear, we lack tools to analyze or act from a systemic perspective and they will be hard to come by.

This argues that continued research is essential. Two issue areas seem of immediate importance. The first concerns further elaboration and refinement of the concepts that will be important if we are to manage, or improve the management, of systems. Already calls have been made for further research on administrative systems and policy space (Cohen, Grindle, and Walker, 1985) and new institutional economics (Nicholson and Connerley, forthcoming). These and other ideas will be important as we move from the narrow organizational perspective to a broader systemic one.

But these management concerns are still within the boundaries of institutional sustainability. The second research imperative is to begin developing a common perspective between those concerned with the sustainability of social systems and those concerned with the sustainability of biological systems. Already there is recognition that sustainability, true sustainability of a life that allows all of the globe's inhabitants to have more and be more, requires both a sustainable social and biological foundation (Gow, 1988). Now we just need the courage to tackle this difficult, but crucial, problem.

ENDNOTES

1. A recent review by Finsterbusch (1988) of the few quantitative studies on sustainability showed that the statistical methods used in the Devres study were flawed. But as Finsterbusch notes, the methodological problems only undermine the particular statistics and not the clear underlying reality that few of the projects in the Devres study are likely to be sustained.

2. For a recent review of the lessons that emerge from the literature about sustainability, see IDMC/DPMC (1987).

3. Although this paper does not specifically address this issue, it ultimately may be of greater significance than any conceptual framework.

4. The more scientifically inclined will recognize the law of entropy as the Second Law of Thermodynamics.

5. Another serious criticism of systems theory has been its reliance on a structural-functional methodology. Structural functionalism is viewed critically because of its circularity of logic: if a system is viable it must have x and thus if it has x it must be viable. as the systems concepts contained in SCOPE are very basic, these problems should be largely avoided.

6. This is really a definition of a real, acting system according to systems theory (Kuhn, 1974: 24).

7. Though it would be perfectly appropriate to examine that element's capacity, if that smaller system were the subject of inquiry.

8. In the case of a controlled system such as a government bureau, managers are responsible for putting together their employees and equipment to create the bureau's capacity. In an uncontrolled system, such as Thailand's North East Region's agricultural system, there is no unitary system management team. Instead the managerial aspect of capacity is diffused among the various elements in the system and is a product of their ability to work together.

9. It is worth noting that uncontrolled systems are more likely to be adaptive than controlled ones like organizations, though they too can malfunction. This is because uncontrolled systems evolve and adapt over time without the direction or assistance of a single managing or deciding element, thus no single element of the system can consciously choose to interfere with the

adaptation process. In the case of a controlled system, a decider unit is involved, and due to the constraints of information availability, information-processing limitations, and attention span the unit does not always make appropriate decisions in terms of adaptation or evolution.

10. Consider the example of agricultural research. How much of it should be done in the public sector and how much in the private sector? Agricultural research can be a public good, since farmers can quickly share most new knowledge about agriculture, which suggests governments and non-profit foundations ought to provide this knowledge. Sometimes, however, agricultural technology looks more like a private good. This is true of hybrid crop varieties because farmers cannot reproduce such seeds themselves. This type of technology argues for relying on private sector R&D. There is no simple resolution to this controversy, but by making some assumptions about the relative predominance of the research products' public or private good characteristics choices can be made regarding the most appropriate sectoral placement for agricultural research.

11. In business administration, three generic strategies have been identified: cost leadership, differentiation, and focus on market niches (Porter, 1980). Each can be effective if the circumstances are right.

BIBLIOGRAPHY

Blase, M. G. (1973). Institution building: A source book. East Lansing, MI: MUCIA.

Blustain, H. (1985). The political context of soil conservation programs in Jamaica. Human Organization. 44 (Summer), 124-31.

Bossert, T. and others. (1987). Sustainability of U.S. supported health programs in Honduras. Draft paper. Washington, DC: AID.

Brinkerhoff, D. W. (1986). The evolution of current perspectives on institutional development: An organizational focus. In Brinkerhoff, D. & Garcia-Zamor, J. C. (Eds.), Politics, projects and people: Institutional development in Haiti. New York: Praeger Publishing.

Brinkerhoff, D. W. (1987). Management capacity building in Haiti's Planning Ministry: A country assistance report. College Park: University of Maryland, International Development Management Center.

Brinkerhoff, D. W. & Ingle, M. D. (1987). Integrating blueprint and process: A structured flexibility approach to development management. (Working paper No. 100). College Park: University of Maryland, International Development Management Center.

Bryant, C., & White, L.G. (1982). Managing development in the Third World. Boulder: Westview.

Bureau for Program and Policy Coordination. (1985). Lessons learned from AID program experience in FY 1984: Review of the year's project evaluation and audit reports, world-wide (AID Evaluation Occasional Paper No. 5; sector observations). Washington, DC: AID.

Bureau for Program and Policy Coordination. (1987a). An evaluation of the factors of sustainability in the Gambia Mass Media and Health Practices Project. (AID Evaluation Special Study No. 51). Washington, DC: Author.

Bureau for Program and Policy Coordination. (1987b). An evaluation of the factors of sustainability in the Lesotho Rural Health Development Project. (AID Evaluation Special Study No. 52). Washington, DC: Author.

Burns, T., & Stalker, G. M. (1961). The management of innovation. London: Tavistock.

Cohen, J., Grindle, M., & Walker, T. (1985). Foreign aid and conditions precedent: Political and bureaucratic dimensions. World Development. 13(12), 1211-1230.

Development Assistance Committee, Expert Group of AID Evaluation. (1987). Sustainability, a report on DAC members' evaluation experience. Washington, DC: AID.

Devres (1987). Analysis of institutional sustainability issues in USAID 1985-86 project evaluation reports. Washington, DC: AID.

Development Program Management Center & Interamerican Institute for Cooperation on Agriculture. (1983). Guidance system improvement: An emerging approach for managing agriculture and rural development. Washington, DC: Author.

Esman, M. & Uphoff, N. (1984). Local organizations: Intermediaries in rural development. Ithaca, NY: Cornell University Press.

Finsterbusch, K. & Van Wicklin, W. A. (1987). Unanticipated consequences of A.I.D. projects: Lessons from impact assessment for project planning. College Park: University of Maryland, Department of Sociology, draft.

Goldsmith, A. A. (1982). Popular participation and rural leadership in Korea's New Community Movement. Rural Development Participation Review. 3 (Spring), 1-7.

Goldsmith, A. A. (1986). Exit and voice in Jamaica's export agriculture: The organizational dimension of agricultural decline. Agricultural Administration. 21 (4), 205-21.

Gow, D. (1988, April) Beyond the project: An integrated approach to sustainability. Paper presented at the symposium, Sustainable Development: In Search of Lasting Solutions, John F. Kennedy School of Government, Harvard University, Cambridge, MA.

Gray, C., & Martens, A. (1983). The political economy of the 'Recurrent Cost Problem' in the West African Sahel. World Development, 11(1).

Grindle, M. S., & Thomas, J. W. (1987). The political economy of policy change in developing countries. Washington, DC: AID.

Hage, J., & Finsterbusch, K. (1987). Organizational change as a development strategy: Models and tactics for improving third world organizations. Boulder: Lynne Rienner Publishers.

Hammergren, L. S. (1983). Development and the politics of administrative reform: Lessons from Latin America. Boulder: Westview.

Heaver, R. & Israel, A. (1986). Country commitment to development projects. (Discussion Paper No. 4). Washington, DC: World Bank.

Heller, P. (1982). The problem of recurrent costs in the budgeting and planning process. Washington, DC: International Monetary Fund.

Honadle, G. (1981). Fishing for sustainability: The role of capacity building in development administration. Washington, DC: Development Alternatives, Incorporated.

Honadle, G., & VanSant, J. (1985). Implementation for sustainability: Lessons from integrated rural development. West Hartford: Kumarian Press.

Honadle, G. H. & Walker, S. T. (1986). L'Avenir des Campagnes: Le Pouvoir Locale et la Qualite de la Vie Rurale, in J. Havet (Ed.). Le Village et le Bidonville: Retention et Migration des Populations Rurales d'Afrique. Ottawa: University of Ottawa Press for the Institute for International Development and Cooperation.

Ingle, M. D. (1979). Implementing development programs: A state-of-the-art review. Washington, DC: AID.

Ingle, M. D. (1985). Integrating management and production: Improving performance in Portugal's Ministry of Agriculture. College Park, MD: IDMC.

International Development Management Center & Development Program Management Center. (1987). Sustainability of development assistance efforts: Lessons learned and implications for donor agencies (Version 2). College Park, MD: IDMC.

Kerrigan, J. E. & Luke, J. S. Management training strategies for developing countries. Boulder: Lynne Rienner.

Kiggundu, M. N. (1986). The limitations of the application of sociotechnical systems in developing countries. Journal of Applied Behavioral Sciences, 22 (3), 341-353.

Korten, D. C. (1980). Community organization and rural development: A learning process approach. Public Administration Review, 40 (Sept.-Oct.), 480-511.

Korten, D. C. (1983). The working group as a mechanism for managing bureaucratic reorientation: experience from the Philippines. NASPAA Working Paper no. 6. Washington, DC: NASPAA.

Korten, D. C. (1987a). Development as empowerment: Alternative approaches to managing development resources. Boulder: Rienner.

Korten, D. C. (1987b). Third generation NGO strategies: A key to people-centered development. World Development, (Supplement) 15 (Autumn), 145-61.

Korten, F. F. (1982). Building National Capacity to Develop Water Users'-Associations (Staff Working Paper No. 528). Washington, DC: World Bank.

Kuhn, A. (1974). The logic of social systems. San Francisco: Jossey-Bass.

Jones, A. L. & Clyma, W. (1986). An approach to management improvement for irrigated agriculture: The management training and planning program for Command Water Management, Pakistan. Water Management Review, 1 (2), 13-16.

Lamb, G. (1986). Institutional Dimensions of Economic Policy Management. Washington, DC: The World Bank.

Lawrence, P., & Lorsch, J. (1967). Organization and environment. Cambridge: Harvard University Press.

Lele, U. (1975). The design of rural development: Lessons from Africa. Baltimore: Johns Hopkins University Press.

Lele, U. & Goldsmith, A. (1988). Development of national agricultural research capability: India's experience with the Rockefeller Foundation and its significance for Africa. Economic Development and Cultural Change, (forthcoming).

Lieberson, J., Miller, D., Eckerson, D, & Keller, H. (1987). An evaluation of the factors of sustainability in the Gambia mass media and health practices project. Washington, DC: AID.

Lieberson, J., Miller, D., & Keller, H. (1987). An evaluation of the factors of sustainability in the Lesotho rural health development project. Washington, DC: AID.

Lindblom, C. E. (1977). Politics and markets: The world's political-economic systems. New York: Basic Books.

Lindenberg, M., & Crosby, B. (1981). Managing development: The political dimension. West Hartford: Kumarian Press.

Lowi, T. J. (1985). The public character of private markets. Ithaca: Cornell University.

Miller, J. G. (1978). Living systems. New York: McGraw-Hill.

Mintzberg, H. (1978). Patterns in strategy formation. Management Science, 24 (9), 934-948.

Morss, E. R. & VanSant, J. (1984). Timing, Implementing rural development projects: lessons from AID and World Bank experience, E. R. Morss & D. D. Gow (Eds.). Boulder: Westview.

Morss, E. R., Crawford, P. R., & Honadle, G. H. (1982). Toward self-reliant development: A guide for evaluating the sustainability of project benefits. Washington, DC: Development Alternatives, Incorporated.

Nellis, J. R. (1986). Public enterprises in Sub-Saharan Africa. (Discussion Paper No. 1). Washington, DC: World Bank.

Nickolson, N. K. & Connerley, E. F. The impending crisis in development administration. International Journal of Public Administration, (forthcoming).

North, W. H. (1987). Program sustainability: Some questions for determining progress and achievement. Washington, DC: AID.

Olson, M. (1965). The logic of collective action. Cambridge, MA: Harvard University Press.

Panos Institute. (1987). Towards sustainable development: Reports on 14 Nordic-supported projects in Bangladesh, Ethiopia, India, Kenya, Malawi, Mauritania, Mekong Basin, Sri Lanka and Tanzania. Alexandria, VA: Author.

Paul, S. (1982). Managing development programs: The lessons of success. Boulder: Westview.

Perrow, C. (1986). Complex organizations: A critical essay, (3rd ed.). New York: Random House.

Popkin, S. (1981). Public Choice and dural development -- free riders, lemons, and institutional design. Public Choice and Rural Development, C. Russell and N. Nicholson, (Eds.). Baltimore: Johns Hopkins University Press.

Porter, M. (1980). Competitive Strategy: Techniques for analyzing industries and competitors. New York: Free Press.

Redclift, M. (1987). Sustainable development: exploring the contradictions. New York: Methuen.

Rondinelli, D. (1981). Government decentralization in comparative perspective: Theory and practice in developing countries. International Review of Administrative Sciences, 47 (2), 133-145.

Rondinelli, D. (1982). The dilemma of development administration: Complexity and uncertainty in control-oriented bureaucracies. World Politics, 34, 43-72.

Schroeder, L. (1987). Economic and financial aspects of project sustainability. Syracuse, NY: Syracuse University.

Smith, W. E., Lethem, F, & Thoolen, B. (1980). The design of organizations for rural development projects -- A progress report (Staff Working Paper No. 375). Washington, DC: World Bank.

Sweet, C. F. & Weisel, P. F. (1979). Process versus blueprint models for designing rural development projects, in G. Honadle & R. Klauss (Eds.). International development administration: Implementation analysis for development projects. New York: Praeger.

Thompson, J. (1967). Organizations in action. New York: McGraw-Hill.

Timberlake, L. (1985). Africa in crisis: The causes, the cures of environmental bankruptcy. Washington, DC: International Institute for Environment and Development.

Tisdell, C. (1988). Sustainable development: Differing perspectives of ecologists and economists, and relevance to LDCs. World Development, 16 (3), 373-384.

VanSant, J. (1984). Sustaining development benefits (Paper presented to the Southern Regional Section of the International Studies Association). Raleigh, NC: International Studies Association.

VanSant, J. (1987). Benefit sustainability. Washington, DC: Development Alternatives, Incorporated.

VanSant, J. & Crawford, P. (1984). Coping with political, economic, environmental, and institutional constraints. Implementing rural development projects: lessons from AID and World Bank experience, E. R. Morss and D. D. Gow, eds. Boulder: Westview.

Walker, S. T. (1984). Ta'awon and Harmambee: Lessons from successful local self-help organizations in Yemen and Kenya. Cambridge: Harvard University, J. F. Kennedy School.

Walker, S. T., Carapico, S., & Cohen, J. (1983). Emerging rural patterns in the Yemen Arab Republic: Results of a 21-community survey. Ithaca: Cornell University, Rural Development Committee.

Warwick, D. P. (1982). Bitter Pills. New York: Cambridge University Press.

White, L. (1987). Creating opportunities for change: Approaches to managing development programs. Boulder, CO: Lynne Rienner Publishers.

Williamson, O. E. (1985). The economic institutions of capitalism. New York: Free Press.

World Bank. (1985). Sustainability of projects: First review of experience. Washington, DC: World Bank.