Planning for Sustainability in Agricultural Development Projects

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Agriculture remains the engine of economic development in most developing countries, and a more sustainable agriculture is more likely to provide the long term benefits required to achieve sustainable development anti-poverty reduction. The foundation for sustainable agriculture is maintenance of biological production potential, particularly maintenance of land and water quality, and genetic diversity. The following discussion describes progress in the World Bank to evaluate sustainable development, and activities in the scientific community to develop principles and procedures to evaluate sustainable agriculture and sustainable land management.

The generally accepted definition of sustainability was given by the Bruntland commission (WCED, 1987):

'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their needs'.

Although philosophically attractive, this definition has prompted many interpretations and it has been difficult to put into practice. It has often been interpreted to mean that the next generation should inherit exactly the same amount and composition of natural capital as was available for us, and this precludes the economic growth and expansion necessary to alleviate poverty in developing countries. As a consequence, sustainability has remained more an area of research than an operational concept.

However, some progress is being made in various institutions - among others the World Bank - to develop the new lines of thinking and the scientific paradigms necessary to evaluate and monitor progress towards sustainability.

Evaluating sustainable development

Work in the World Bank has been focused on developing more environmentally responsive procedures for assessing the impacts of development programs, and on developing lending portfolios for client countries. This has been done in two ways:

1. Sustainability Criteria and Indicators.

Economic, environmental, and social indicators of sustainability are being developed, to address the immediate concerns for assessing the sustainability of development projects. The major achievement so far has been the "sustainability triangle" (Serageldin and Steer, 1994), which later was modified as the "sustainability matrix" (World Bank [b], 1995). All development projects are required to be evaluated on their economic and financial viability, as well as ecological and social sustainability. Criteria and indicators for ecological sustainability, such as ecosystem integrity, carrying capacity, and natural resource conservation, are being developed, but these are poorly defined. Indicators of social sustainability are even more poorly defined, although the recognized criteria are equity, social mobility, social cohesion, participation, empowerment, cultural identity, and institutional development.

A related, but more focused effort, is the new program to develop indicators of land quality (LQIs) to ensure more sustainable use of land, water, and biological resources and to monitor progress towards environmental sustainability (Pieri et al., 1995). In this context, land refers not only to soil, but to the combined resources of soil, water, vegetation and terrain that provide the basis for land use. Land quality is the condition or health of the land relative to its capacity for sustainable land use and environmental management. LQIs will be used to address major land-related issues of national and global significance, such as land use pressures, land degradation, and soil and water conservation, as well to monitor trends towards sustainable land management.

The immediate objectives of the LQI program are to develop a set of standardized LQIs for managed ecosystems (agriculture and forestry) in the major Agro-Ecological Zones (AEZs) of tropical, sub-tropical and temperate environments, identify sources of data and develop standardized methods for analyses,
aggregation, and application of the LQIs, and to strengthen the capacity of national institutions responsible for collection of LQI data. The LQI program is being sponsored by a global coalition consisting of the World Bank, the Food and Agriculture Organization of the United Nations, the UN Environmental Programme, the UN Development Programme and others.

2. Sustainability as Opportunity

This is an exciting new paradigm being explored by the World Bank for assessing sustainability and national wealth. In this approach, national capital stocks (national wealth) rather than income is used as the criteria for assessing economic and environmental performance (Serageldin, 1995). The concept is that national wealth, or the capital stock of a nation, is the sum of man-made capital, natural capital, human capital, and social capital. These four forms of capital are inter-linked to a high degree, and they are supplementary and sometimes complimentary in contributing to economic activities. Thus, the change in capital stock identifies the change in economic and non-economic opportunities available to the population now and in the future. In this context, "sustainability as opportunity" is defined as:

"Sustainability is to leave future generations as many, if not more, opportunities as we have had ourselves."

This is a more positive and practical approach to sustainability than the Brunt-land view. The new approach recognizes the legitimate use of resources for economic activities, providing that the capital stock, defined in the four forms of capital, is at least the same if not larger at the end of the process than at the start. Accounting for losses and gains in capital (national wealth) over time, including real losses in natural resources, enables one to estimate the kinds and extent of opportunities in the future, and thus to gauge progress towards or away from the goal of sustainability.

Evaluating sustainable land management and sustainable agriculture

Sustainable management of land, improved technologies and improved economic performance are central to achieving the goals of sustainable agriculture. The objective of sustainable land management is to harmonize the complimentary goals of providing environmental, economic, and social opportunities for the benefit of present and future generations, while maintaining and enhancing the quality of the land resource (soil, water and air) (Smyth and Dumanski, 1993). Land provides an environment for agricultural production, but it also is an essential condition for improved environmental management, including source/sink functions for greenhouse gases, recycling of nutrients, amelioration and filtering of pollutants, and transmission and purification of water as part of the hydrologic cycle.

Agriculture is unlike other resource-based industries in that it is made up of millions of small-scale entrepreneurs who make individual decisions on the management of their (natural) resources and on investments of their capital. Although the land use decisions of individual farmers may seem to be insignificant, these decisions are repeated over and over again in the landscape, and collectively can achieve major regional and even global significance. Agriculture is often cited as being part of the environmental problem, and it is recognized that agricultural land use systems are often significant contributors to non-point environmental degradation.

The global scientific community, lead by the International Society of Soil Science (ISSS), the International Board for Soil Research and Management (IBSRAM), FAO, World Bank, the International Fertilizer Development Centre (IFDC), the Rockefeller Foundation, and others are co-operating to develop an international framework for evaluation of sustainable land management (FESLM) (Smyth and Dumanski, 1993). In this context, sustainable land management (SLM) is defined as:

'Sustainable land management combines technologies, policies and activities aimed at integrating socio-economic principles with environmental concerns so as to simultaneously:

- maintain or enhance production services;
- reduce the level of production risk,
- protect the potential of natural resources and prevent degradation of soil and water quality;
- be economically viable;
These factors are referred to as the five pillars of sustainable land management. Performance indicators for each pillar are used for assessing the contribution of that pillar to the general objectives of sustainable land management. For any given development activity, true sustainability can be predicted if the objectives of all five pillars are achieved simultaneously. However, as is likely to be the case in the majority of situations, only degrees of sustainability can be predicted if only some of the pillars are satisfied. At the same time, recognising partial sustainability provides valuable direction on the interventions necessary to enhance sustainability.

Indicators of sustainable land management are necessary to monitor progress towards the goal of sustainability. These are required for use by scientists, program planners and policy makers to monitor the condition and trends in use of land and water resources, and the performance of agricultural and non-agricultural programs and policies. Although most indicators have to be "fitted" to the agro-environments and the land uses being considered, the following indicators are emerging as possible international standards for evaluation and monitoring of sustainable land management (Dumanski, 1994): Philippines.

- Crop Yield (trend and variability)
- Nutrient Balance
- Maintenance of Soil Cover
- Soil Quality/Quantity
- Water Quality/Quantity
- Net Farm Profitability
- Participation (of farmers and society) in Conservation Practices

These indicators must be modified and tailored for specific uses in local environments, but they provide a good starting point for further investigation.

**Principles and guidelines of sustainable land management**

Sustainability will remain an area of research and debate in the foreseeable future. However, decisions are often required immediately on many aspects of agricultural development. In these situations, the principles and guidelines being developed for sustainable land management can be used to estimate the impacts of development projects towards or away from sustainability. The most useful of these are summarized below (Dumanski, 19194; World Bank [a], 1995):

**1. Global concerns for sustainability.**

- Sustainability can be achieved only through the collective efforts of those immediately responsible for managing resources. This requires a policy environment that empowers local decision makers, including farmers, to reap benefits for good land use decisions and be held responsible for inappropriate land uses. Although the concerns for sustainability are global, the required actions must be local and national.

- Integration of environmental and economic interests in a comprehensive manner is necessary to achieve the objectives of sustainable land management. This requires that environmental concerns be given equal importance to economic performance in evaluating the impacts of development projects, and that reliable indicators of environmental performance be developed.

- There is urgent need to resolve the global challenge to produce more food to feed rapidly rising global populations, while at the same time preserving the global biological production potential and the global environmental maintenance systems. This is necessary to achieve orderliness in the policy environments of developing countries, and in the lending objectives of donors.

**2. Sustainable Agriculture.**
- Good land management in balance with accepted ecological and economic principles is more likely to ensure sustainability. Sustainable land management, if properly designed and implemented, will ensure that agriculture becomes a part of the environmental solution, rather than remaining an environmental problem. Arguing for the continued maintenance of agriculture without reference to environmental sustainability is increasingly difficult. Indicators of land quality are needed to guide us along the way.

- Agricultural intensification is often necessary to achieve more sustainable systems. This often requires shifts to crops with higher yields or value, more inputs per unit of production, and higher standards of management (more knowledge intensive). This generally results in higher output per farmer (and consequently fewer farmers per unit area), but also more job opportunities in the agricultural service sectors.

- The importance of opportunities for off-farm income, to supplement cash flow on the farm, and generate an investment environment for improved land management, should not be underestimated.

- Sustainable agriculture will have to work within the bounds of nature not against them. This means matching land uses to the constraints of local environments, planning for production not to exceed biological potentials, and carefully limiting fertilizer, pesticides, and other inputs to ensure that they do not exceed the capacity of the environment to absorb and filter any excess.

3. Sharing responsibilities for sustainability.

- Although farmers and land managers directly affect how the land is managed, sustainable land management is the responsibility of all segments of society. Governments must ensure that their policies and programs do not create negative environmental impacts; society needs to define requirements for land maintenance and develop a "social" discount rate for future land use options; and farmers and land managers must expand their knowledge of sustainable technologies and implement improved procedures of land stewardship.

- Environmental problems do not recognize political or land ownership boundaries, or geopolitical spheres of influence. Land degradation affects yields obtained by the farmer, but the higher impacts are often off-site, e.g. degradation of water quality, loss of habitat, loss of biodiversity, etc. Further, the collective impacts of land use decisions by the millions of farmers worldwide can impact on global biogeochemical cycles and ultimately on global life support systems.

4. Challenges for the future.

- The importance given to limitations in land and supply of fresh water as primary factors of production must be reestablished, given that for the first time in history we will have run out of good land for agricultural expansion at the same time that demands for increased global production are increasing. The increased production, however, will have to be achieved in a manner which does not degrade the global stock of agricultural land and thereby decrease production potentials.

- Technological and scientific advances will be instrumental in the transition to sustainable agriculture, but political, economic and institutional structures will also have to be part of the solution. This will require some major changes in economic theory to ensure more complete accounting for the use and misuse of natural resources, and to put higher value on environmental maintenance. The procedures being developed to assess and monitor national wealth, and the concepts of "sustainability as opportunity" need to be further developed to balance the bias towards economic efficiency as the primary criterion for sustainability.

- Agricultural production technologies will have to be more carefully tailored to local environmental conditions than has been the case in the past. Fanning systems will have to be more flexible and more diversified, and developed on a broader genetic base. There will have to be higher efficiency of (high-cost) inputs, and more emphasis on value-added marketing. Environmental maintenance, including habitat preservation, will have to receive more attention.

Conclusions

The concept of sustainability will remain uncertain and imperfect until better procedures for assessment and evaluation are available. However, the concept can be usefully employed in development projects even with the current imperfections in the definition. Progress is being made in developing practical and operational
definitions of sustainability, and principles and guidelines are becoming available for sustainable land management and sustainable agriculture. Also, sustainability indicators are being identified to monitor progress towards this elusive and fuzzy objective. While purists would argue that this is poor science and that further progress cannot be made in the absence of a more comprehensive (quantified) definition, practical experience indicates that simply knowing whether we are tracking towards or away from sustainability is still very useful. This is not unlike monitoring economic performance, where the interest is in the direction and the rate of change, rather than the attainment of specific (sustainability) targets.

Sustainable land management in developing countries requires long-term, sustained support and investment in the prudent management and conservation of natural resources to achieve the combined goals of increased production and environmental maintenance. In most cases, the quality of the resource base is inherently poor; and the soils are fragile, less resilient and more susceptible to degradation under improper management than is the case in temperate environments. At the same time, immediate demands on these resources are great and increasing. There is continued expansion of cultivation on lands of increasingly marginal quality, with deforestation, land degradation, decreasing yields and continued poverty as the results. This can only be turned around through farsighted national and international development policies which seek to create a stable agriculture that is well suited to local environments, and supported by affordable and reliable credit and extension systems. Agribusiness will also have to be instrumental in the transition to more sustainable systems by providing increasingly more reliable advisory systems, absorbing excess rural labour, and providing increased opportunities for improved national and international trade.

The search for sustainable systems involves integrating the objectives of income enhancing activities with environmental maintenance, i.e. identification of the so-called "win-win" situations, and sustainable agricultural production systems are some of the best examples of these. This involves investment and promotion of activities such as soil and water conservation, integrated soil nutrient management, integrated pest management, and land tenure reform (World Bank [a], 1995). Success, however, often depends on the degree of empowerment, commitment, and accountability accorded to local farmers, village councils, and administrators, and the extent to which the project benefits from local knowledge of farmers and NGOs.

Bibliography


