



## **BANKING FOR THE ENVIRONMENT**

by

W.M. Gudger and D.C. Barker

**FAO**

**AGRICULTURAL SERVICES BULLETIN 103**

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

M-08  
ISBN 92-5-103286-6

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing and Multimedia Service, Information Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy or by e-mail to [copyright@fao.org](mailto:copyright@fao.org)

© FAO 1993

## FOREWORD

Maintenance of a sound environment is a matter which concerns all mankind. To a greater or less extent all people have a role to play in ensuring that the resources of planet Earth are utilized in a manner that protects the interests of those as yet unborn.

There are some in the population whose work responsibilities make them particularly important in this process. Politicians, planners, developers, farmers all come to mind as being in the forefront of this process. Alongside these persons, and equally important in their own way, are bankers. It is to bankers, and especially to those responsible for rural investment lending, that this publication is directed.

Investment has a vital role to play in correct resource management. The banker is very frequently in a position to significantly influence the direction of such investment. Consequently he or she needs to be sensitive to the issues involved and to have access to the specialized knowledge required in order to make sound lending decisions.

This AGS Bulletin aims at bringing environmental concerns to the attention of bankers. It also suggests ways in which banks could establish appropriate methodology in order to cope with the additional responsibilities involved.

Hartwig de Haen  
Assistant Director-General  
Agriculture Department

## TABLE OF CONTENTS

<u>CHAPTER I The Challenge of Rational Environmental Management</u> .....	1
<u>The Role of Financial Institutions</u> .....	1
<u>The Heart of the Problem - Forest Clearances and Agricultural Intensification</u> .....	2
<u>CHAPTER II Sources of Environmental Degradation</u> .....	5
<u>Land Clearance or Land "Reclamation"</u> .....	5
<u>The Sources of Land Clearance</u> .....	5
<u>A Case Study in Tropical Deforestation: The "Push-Pull" Effect in Dumoga Bone, Indonesia</u> .....	7
<u>CHAPTER III The Economics of Environmental Degradation</u> .....	8
<u>The Theory of Land Degradation</u> .....	8
<u>Land Degradation</u> .....	9
<u>Erosion</u> .....	9
<u>Flooding</u> .....	9
<u>Reduced Economic Viability</u> .....	10
<u>Intensification of Farming Practice</u> .....	10
<u>Case Study: Agricultural Intensification in a Banana Export Industry</u> .....	12
<u>CHAPTER IV Methods for Environmental Cost-Benefit Analysis for Agricultural Lending</u> .....	15
<u>A Contingent Valuation model of Environmental Cost-Benefit Analysis</u> .....	16
<u>CHAPTER V Banking Economics and Environmental Accounting</u> .....	18
<u>Operational Difficulties of Environmental Assessments</u> .....	18
<u>Sectoral Objectives</u> .....	18
<u>Investment Cycles</u> .....	19
<u>Tangible Returns</u> .....	20
<u>Competitive Financial Markets</u> .....	20
<u>CHAPTER VI Banking as Environmentally Constrained Profit Maximization</u> .....	21
<u>International Capital Flows</u> .....	21
<u>Domestic and International Environmental Law</u> .....	22
<u>CHAPTER VII The Environmental Review Process for Banks: a Model for Sustainable Agricultural Lending</u> .....	24
<u>Environmental Impact Assessment for Sustainable Agricultural Sector Lending</u> .....	24
<u>A Checklist For Agricultural Lenders Of The Elements For Environmental Impact Assessment Of Sustainability</u> .....	26
<u>CHAPTER VIII Institutionalizing Environmental Impact Assessments in the Agricultural Lending Process</u> .....	27
<u>CHAPTER IX Non-Institutional Sources of Agricultural Finance and Environmental Degradation</u> .....	28
<u>CHAPTER X Societal Response to Aggregate Financial Flows to Environmentally Degrading Agricultural Sector Investments</u> .....	30
<u>Macro-Economic Accounting: Incorporating the Environment into National Accounts</u> .....	31
<u>Resource Accounting</u> .....	31
<u>Macro-Environmental Policy Formulation</u> .....	32
<u>Micro-Level Policy Formulation</u> .....	32
<u>Recommendations For Agricultural Lending Institutions</u> .....	35
<u>Local Level</u> .....	35
<u>State and Regional Level</u> .....	35
<u>National Level</u> .....	36
<u>Bibliography</u> .....	37

# CHAPTER I

## THE CHALLENGE OF RATIONAL ENVIRONMENTAL MANAGEMENT

There is growing awareness that agriculture in the broadest sense of the word (crop and livestock production, agroindustries, forestry, and aquaculture) has had, and continues to have, a major impact upon the environment of our globe. Thus, tropical ecology has become of vital concern not only for the inhabitants of the developing countries, but also for the urban dwellers in the northern hemisphere. As concern has increased about rapid deforestation, rising levels of "greenhouse" gases<sup>1</sup>, rising atmospheric temperatures and loss of bio-diversity, attention has focused upon strategies to conserve and protect what is increasingly recognized as a fragile, interdependent world ecosystem.

It is only in recent years that the scientific and lay communities have come to understand the interrelationship of the world's ecology and the necessity for a planned, rational, sustainable use of these resources for development. Fundamental to this understanding that the economy is not separate from the environment in which we live is the realization that "there is an interdependence both because the way we manage the economy impacts on the environment and because environmental quality impacts on the performance of the economy."<sup>2</sup> When society consumes its "natural capital", it impairs its ability to sustain income, and perhaps even society itself, over the longer term.

This process of trying to develop rational responses to deforestation, flooding, desertification, environmental pollution, rising ocean levels, atmospheric warming and loss of bio-diversity, has focused a spotlight on the rural sector and upon agricultural banking practice. One of the driving forces in agricultural change and development are certainly credit and investment policies. These policies, if properly conceived and directed, can help channel economic investment into environmentally benign or even beneficial projects. If the environmental concerns are ignored, the effect of these capital flows could be to encourage further destruction.

### The Role of Financial Institutions

The concern in the international financial community has produced a far reaching reevaluation of the basis upon which projects are evaluated and financed. For example, one of the principle sources of capital for projects in the past that have had adverse environmental impacts, the World Bank, has recently reversed many of its past practices of financing the exploitation of forest resources. The new forest policy paper

---

<sup>1</sup> Global warming has been a subject of intense study both in the academic and policy making communities. A good summary of the issues and some of the policy approaches to controlling greenhouse gas emissions, such as a carbon tax (Poterba and Whally and Wigle) and alternative technologies (Barbier, Burgess, and Pearce) is found in Rudiger Dornbusch and James M. Poterba, editors, Global Warming: Economic Policy Responses, Massachusetts Institute of Technology, 1991.

<sup>2</sup> Pearce, D., A. Markandya and E.B. Barbier, Blueprint for a Green Economy. Earthscan Publications Limited, London, 1989.

is an almost complete reversal of previous policy. It states:

"There has been a substantial increase in the world's understanding of and concern about the forest sector of the developing world. [These] forests and woodlands play an even more important economic and ecological role than had earlier been recognized ... in protecting biological diversity [as well as] their role in the world's carbon cycle and climate change."<sup>3</sup>

At the national level there is similarly rising concern about the impact of financing environmentally damaging projects. Both governments and banks in the developing countries are questioning past policies and lending practices. In many countries, the Philippines and Brazil to mention only two, governments and national financial institutions have acted vigorously to change macro-economic policies and redirect lending so as to protect remaining biological resources. The results of past projects are being reappraised in the light of the new environmental consciousness and their successes reevaluated, not exclusively on their financial rate of return, but also in light of their environmental impacts.

The crucial role that national financial institutions could potentially play in protecting, conserving and rationally exploiting the natural capital cannot be overestimated. The importance of these institutions resides in the fact that they are the principal organized source of development capital. This capital is generated through domestic savings, sovereign lending by international banks, or private sector investments. It is to these institutions that falls the task of evaluating, and often overseeing, the implementation of, new loan financed development projects. Because of this, they have a significant responsibility for protecting and preserving the environment and for financing projects that utilize the natural capital in a sustainable manner.

### **The Heart of the Problem - Forest Clearances and Agricultural Intensification**

In recent years, there has been growing recognition that the natural resource base, especially the tropical moist forests (TMFs) and, to a lesser degree, the tropical dry forests (TDF's), can no longer be viewed as a resource to be exploited or even destroyed for private gain by stripping these forests off for fuel, fodder and exports, or for livestock and crop production. The clearance of the forests, as well as the extension of human agricultural activities into them has accelerated in recent decades.

With increasing knowledge, these forests have come to be recognized for the important environmental services that they perform for the globe. They:

- provide habitat and livelihood for forest dwellers;
- shelter over half the world's known species plus numerous species yet to be named and researched;

---

<sup>3</sup> World Bank, Forest Policy Paper, Washington, 1991, p.1.

- protect soils and watersheds;
- provide wood and forest products for present and future use;
- help regulate global climate through evapotranspiration and carbon sequestration.<sup>4</sup>

Managing, conserving and preserving these resources as part of a global effort to modify agricultural production systems, both to produce the required food and fuel for a growing population and to protect the world's environment from the consequences of the past patterns of uncontrolled exploitation of these resources, requires the intimate and ongoing involvement of national financial institutions. It is their role to evaluate lending in the light of the impact upon the environment's capacity to continue to supply these "environmental services."

Likewise, intensification of agriculture on existing grazing and crop land has contributed to environmental degradation. Intensive cropping brings as a consequence erosion of soils left unprotected against wind and water as well as against intensive spray regimes that both destroy beneficial insect populations and endanger the health of people exposed to these chemicals. The heavy use of machinery all too often produces soil compaction and is frequently characterized by the "mining" of the soil's organic matter and nutrients through abandonment of crop rotation and fallowings. Intensive livestock and poultry production and processing produces large quantities of material that prove toxic to the environment if not treated. Tropical product processing industries produce waste products and waters that can, if untreated, produce lethal effects in the environment.

---

<sup>4</sup> Forest clearance and its effect on carbon sequestration have been the subject of sustained debate in recent years. While deforestation is an important source of "hot house" gases and subsequent global warming, it is important to keep the contribution of forest clearances in perspective. The amount of carbon, principally in the form of carbon dioxide, arising from forest clearances and the burning and decay of the cleared plants is relatively small. It is variously estimated as 0.4 to 2.5 billion tons per year. (Here a billion is one thousand million.)

This compares to about 100-115 billion tons absorbed by the oceans and only a slightly smaller amount given off by them to the atmosphere due to some retention in the form of fecal pellets and calcium carbonate shells that sink to the bottom. Air and oceans are largely in balance.

Photosynthesis by green plants removes about 100-120 billion tons of carbon dioxide per year from the air, fixing most of it in plant tissue. However, of this amount, 40-60 billion tons are released in metabolic activities with a net of about 60 billion tons per year retained. About 45 billion tons are stored in trees and 15 billion tons in shrubs, grasses and other plants. By comparison, topsoils store about 1.2 to 1.6 trillion tons of carbon. (A trillion is here a thousand billion, or a million million)

Human activities, such as use of organic fuels and industries such as cement, which cooks carbon out of limestone, release between 5 and 6 billion tons of carbon per year. The effects of deforestation produce a net increase in global carbon levels in atmosphere. The estimates range from a low of 0.4 billion tons to a high of 2.6 billion tons per year. Although small in relative terms, the loss of forest has a two fold effect. It removes the storage area for future carbon sequestration, as well as adding carbon dioxide to an environmental carbon cycle increasingly unbalanced due to human activities. By analogy, it is rather like a small error of navigation multiplied by the distance of travel by a ship. The magnitude of the error increases with time.

Data from Oak Ridge National Laboratory's Environmental Services Division.

In order to understand how developing countries can ameliorate the environmental situation, Chapter II will first synthesize the principal sources of environmental degradation, especially deforestation and agricultural intensification. Chapter III will explore the economic forces that provoke this degradation. Chapter IV outlines some of the methods currently in use to evaluate environmental degradation and presents a brief summary methodology which financial institutions can use to evaluate the environmental consequences of their lending programs. Chapter V explores the economics of banking and the internal structural factors that may militate against developing environmentally beneficial lending programs. Chapter VI argues that these constraints are not as severe as they first appear and that there are sound and compelling reasons for banks to develop environmentally beneficial lending programs. Chapters VII and VIII present the institutional framework for environmentally sustainable lending programs and a method of institutionalizing this program within the present operating procedures of the banks. In Chapter IX, the informal sector's importance as a non-institutional source of agricultural credit is explored. Chapter X outlines a paradigm to permit a societal response to this flow of funds to agriculture in order to preserve, protect and rationally exploit environmental capital and existing agricultural land.

## CHAPTER II SOURCES OF ENVIRONMENTAL DEGRADATION

**Land Clearance or Land "Reclamation"** is the first and perhaps the most irreversible form of environmental degradation. Once the bio-mass is stripped off, especially in the tropics, economic and social consequences are severe and usually immediate. Loss of habitat can lead to the extinction of species and the disappearance of indigenous groups dependent upon forest resources for the survival of their culture and livelihood. Exposed soils, especially in the tropics, erode rapidly, and, in many cases, are subject to declining fertility and desertification; they also degrade the water quality of downstream communities, often contributing to flooding and silting of rivers and dams. Land clearance often extends to the coastal regions and into the sea itself. In Sri Lanka, for example, state sponsored development projects such as harbours and sea walls are reported to interfere with natural forces. Extensive damage has arisen from coral and sand mining and the exploitation of dugong for meat and turtles for meat and eggs, while coastal swamps have been destroyed for firewood by the local population.

The seriousness of the environmental degradation arising from land clearance can be seen from the fact that the developing countries already have lost approximately one half of their forests in this century. Worldwide, some 11 million hectares of tropical forests (moist and dry) were being cleared annually in the 1980's. By the 1990's, satellite observations suggest that the annual clearance rate had risen to around 17-20 million hectares per year, of which about 2.0 million hectares were in Asia.<sup>5</sup> The total forest inventory of Asia and the Pacific area is about 800 million hectares. If present estimates are correct, the clearance rate is about 2.5% per year or 25% per decade.

The consequence of these clearances in human terms is, according to the still controversial Gaia Theory, that:

By early next century, we could have destroyed 70 per cent of the forests and the remaining 30 per cent would not be enough to sustain the ecosystem. It would go to desert and there would be a refugee and famine problem the like of which we have never seen.<sup>6</sup>

**The Sources of Land Clearance** and subsequent deforestation are not simply driven by the profit motive. While it is in someone's financial interest to clear or "reclaim" land, it must also be understood that there are often a number of socio-economic factors that are influential in the process. In some cases, it is population pressure that drives people off marginal lands and onto forested areas. This shift is frequently aggravated by declining opportunities to earn a living on existing agricultural lands, because of diminishing fertility arising from misuse of the land or because cyclical or depressed tropical commodity prices force farmers to seek other income producing opportunities on newly cleared land. All too frequently, demand in the developed countries for the products of the tropical forests creates new markets that attract loggers, farmers and ranchers to the forests. Thus, local peoples are both pushed into the forest by the expanding population and the contraction of opportunities to earn a living in the

---

<sup>5</sup> World Bank, Forest Policy Paper, June 1991.

<sup>6</sup> James Lovelock, Financial Times (London), August 17/18, p. 14.

traditional way and pulled by new markets for forest products, frequently in developed countries.

Forest encroachment has often inadvertently been encouraged by infrastructural developments, especially roads, which have opened the forest frontier. These are promoted by government-sponsored settlements involving land grants (Indonesia, Malaysia, Sri Lanka) or unrealistic government policies that under-price logging concessions. By setting very low stumpage fees or agreements that do not require environmental remediation, such as reforestation, profit margins are increased and harvesting activities further encouraged. Both the laying down of roads and the logging of areas encourages subsequent settlement by farmers and therefore the conversion of forest land to farm land.

Sri Lanka provides a concrete example of population pressure, export oriented economic growth, and poorly thought out government policy which drives this deforestation. G. M. P. de Silva argues convincingly that forest clearances in Sri Lanka arise from poverty, monocultures of tea, rubber, and coconuts, most of which is exported, and development with little regard for the environment. He further reports that the rate of deforestation is accelerating. Sri Lankan forests covered about 70% of the 64,000 square km. surface in 1900. The population that year was estimated at 3.5 million. By 1953, the forest cover was reduced to 50% and the population had risen to 8.1 million. In 1982, only 25% of the surface was left in forests while the population had nearly doubled to 15 million.

Thus, from these figures, one can determine that between 1900 and 1953 the population increased by 4.6 million while the forested area shrank at an average annual rate of about 24,000 hectares per year from some 4.48 million hectares ( 70% of the 64,000 Sq. Km. or 6.4 million Ha.) to 3.2 million Ha. Between 1953 and 1982, the forested area declined from 50% to 25% of the surface at an annual average clearance rate of about 55,170 hectares per year. The targeted annual rate of reforestation is only 8,000 hectares, producing net forest losses in excess of 47,000 Ha. per year.<sup>7</sup>

In Thailand, the situation is equally stark. In the early part of this century, forests covered about 70% of the country's surface. By the 1960s, the portion under forest had fallen to 50-60% and to about 40% in the mid-1970s. Today, only about 30% of the forests remain. Initially, Thai forests were clear felled in order to be able to export teak wood. In the decades following 1910, most of the deforestation was brought about by population pressure. The increasing population slashed off forests in order to be able to engage in subsistence agriculture.

"Forest depletion in Thailand occurred because it was privately profitable. Private return to land clearing for commercial and/or subsistence production was sufficient to underwrite a large expansion in the area under cultivation. The expansion was, of course, in part fueled by rapid rates of population growth. Private returns drove clearing in both lowland and upland areas, both for settled and shifting cultivation. Growth in domestic and foreign demand (decreasingly important over time) made timber cutting and the harvesting of forest products privately profitable, especially when public forest

---

<sup>7</sup> G.M.P. de Silva "Lending Policies Geared to Sustainable Agriculture and Forestry - Case Study of Sri Lanka," Paper prepared for FAO, Rome, 1991.

resources could be exploited for only nominal fees.... These processes were facilitated by [lax] law enforcement of existing legislation, the exemptions and provisions in the legislation itself [as well as inefficient] administration of forest lands in Thailand."<sup>8</sup>

### **A Case Study in Tropical Deforestation: The "Push-Pull" Effect in Dumoga Bone, Indonesia<sup>9</sup>**

The dynamic interaction between the economic forces that "push" people into forests and those that "pull" them and government policy can best be understood within the context of an example from Indonesia. While there are literally hundreds of such projects, this one was selected because it clearly illustrates how the three factors interact and cumulatively can produce major environmental impacts and unanticipated human consequences within the framework of a policy that pursued laudable goals of improving the lot of rural people, but that failed to assess the damage that it could produce to the environment.

The Dumoga Valley is in the northern part of the island of Sulawesi. It has until recently not been subjected to population pressures due to isolation and the high incidence of malaria in the surrounding swamps. The heavy forest cover on the steep hills framing the valley has been able to absorb the monsoon rains, slowly releasing them into streams. Farming in the valley was based mostly on small plots of rain fed rice.

In the 1970s, a government program to create a "pole of growth" in this formerly remote area was launched. A settlement project with a new road and irrigation system was constructed. This was coupled with a government resettlement program to move people from more densely populated regions to this less densely populated valley. This resulted in massive land clearances, not only on the valley floor, but also on the hillsides. The irrigation scheme sponsored by an international bank resulted in the speculative clearing of additional lands in anticipation of higher land prices. The result of these policies was that, within a decade, a substantial part of the forests was cleared, most being burned in situ to open the land to agriculture, principally rice production. These clearances threatened both flooding and water shortages for the irrigation system if they were not halted.

With the land clearances came the inevitable damage to the endemic flora and fauna of the region. The Royal Entomological Society expedition discovered hundreds of previously unknown species.

As a result of a policy providing economic incentives to leave heavily populated areas-- deeded land to those who cleared it and government services--this new economic opportunity "pulled" new settlers into the formerly forested region.

Many of the original inhabitants however were "pushed" out of the valley and onto the steep hillsides. Some former residents were persuaded to sell their land when a speculative boom in anticipation of further growth dramatically increased the price of land served by the irrigation project. Finally, when the government intervened to prevent the complete deforestation and destruction of this uniquely biologically rich valley, many of these original inhabitants, already marginalized, were finally evicted as part of a program to protect the remaining biological resources in a newly created park.

---

<sup>8</sup> David Feeny, "Agricultural Expansion and Forest Depletion in Thailand, 1900-1975" in John E. Richards and Richard P Tucker, World Deforestation in the Twentieth Century, Duke University Press, 1988, p. 127.

<sup>9</sup> This account is largely based on Judith Gradwohl and Russell Greenberg, Saving the Tropical Forests, The Island press, Washington D.C. 1988

## CHAPTER III

# THE ECONOMICS OF ENVIRONMENTAL DEGRADATION

### The Theory of Land Degradation

In economic theory, land clearance or land reclamation involves a market failure. The market does not value naturally occurring resources in the production process. Nature's "capital" is not assigned a value by the market. The externalities that lead to private individuals cutting trees and the real economic costs and benefits to the nation of doing so arise because some of the biosphere's products, especially environmental protection functions, are neither produced goods nor do they have clearly defined ownership. As a consequence, they are regarded as free goods.

Destruction of forested areas, wetlands, grasslands and bodies of water arises because of the difference between the discount rate of the individual and the society as a whole. Poor people, who are responsible for a significant share of the losses--because of their pressing current need for fuel, fodder, water and land for cultivation--assign a higher discount rate to these resources than does society as a whole.

The private interests of poor people and the social interests of the broader society diverge. The interest of poor, local people in using these lands and water resources is intense, immediate and focused--food, fuel, fodder, crop land, and irrigation water. They will (often unknowingly) incur almost any social cost to permit the immediate exploitation of these environmental resources to sustain their livelihood. The interests of loggers, commercial farmers, builders and others who exploit the forests, range and grasslands and water resources are equally intense, but driven more by immediate profit considerations, not by the need to survive.

Society, as a whole, traditionally, has not placed a monetary value on the benefits derived from these resources, as such benefits are not marketable. When society has recognized these resources as having value, it has assigned a diffused, non-specific value to them and has not translated that assigned value into market signals, i.e., financial incentives for preservation or disincentives for destruction of these land and water resources embodied in the nation's legal and administrative system. Thus, the intense, focused private interests are permitted to discount the value of environmental resources to the detriment of the longer term benefits to society of investment in these areas because these resources have neither been given market values, nor a legal, enforceable means of translating value into market signals. The Costs of Land Clearance arising from the exploitation of natural resources for financial gain highlight the problems involved all too clearly, since these resources provide a myriad of functional processes which go beyond the clearly tangible areas of providing food and products for commerce. These functional processes are not merely essential to a sound ecological balance and, therefore, ideologies advocated and imposed on society by conservationists; they are naturally occurring systems, on which the economic well-being of societies at local, national and international level depend.

## **Land Degradation**

Forested areas are especially sensitive to population pressure and commercial exploitation. At a local level, once the trees are felled, the highly productive potential of that region is immediately threatened, since the quality of the soils is generally poor. It is in the mass of vegetation that the nutrients essential to fast growth are stored so that, if the vegetation cover is removed, organic breakdown is almost immediate and nutrients are quickly washed away. When large gaps in the forest canopy occur, the micro-climate of the area is also likely to be changed and the forest floor becomes exposed to direct sunlight. Consequently, both air and soil become dry, to the direct detriment of the land's productivity. Because of these factors, not only has the forest's capacity to provide fuel, food, fodder and shelter been removed, but so has the land's capacity to regenerate them. Degradation is further increased through soil erosion.

## **Erosion**

Around a quarter of a million tons of topsoil are washed from the deforested mountain slopes of Nepal alone each year. On a global scale, about eleven million hectares of arable lands are annually lost through erosion, desertification and toxification; processes which are greatly encouraged by poor resource management.<sup>10</sup> It is human activity that causes natural erosion rates to increase many times over. Steep slopes are cultivated without terracing, irrigation projects are poorly developed and livestock overgraze grassland.

## **Flooding**

The socio-economic impact resulting from a decline in productive capacity due to ecological interactions does not remain localized, especially when forest cover is lost in a watershed. The soil's water retention capacity is lost and the release of rainfall becomes erratic; periods of floods followed by droughts become the norm. Farmers in the valley lands of Southern Asia are particularly vulnerable as rivers such as the Ganges, Brahmaputra and the Mekong no longer supply regular amounts of irrigation. Flooding in the Ganges Plain provides a graphic example of the associated costs of deforestation. As the foothill forests are cleared for agriculture, the 500 million people in the valleys become more vulnerable to flooding. During the 1978 monsoon, India suffered losses of \$2 billion and hundreds of people drowned.<sup>11</sup>

The impact of watershed degradation even extends into urban areas. In the hinterland of Panama City and Manila, deforestation has caused so much injury to the effective functioning of watersheds that domestic water supplies are being threatened, bringing risk of contamination and pandemics. Once the forests have been clear felled, the reduction or elimination of resultant flooding may require very heavy investment in compensatory measures such as channeling, damming, and diking. These measures to reduce the natural patterns of flooding have the potential to damage replenishment of alluvial soils and recharges of soil moisture. They may also damage the vegetation and wildlife on the floodplain, as well as riverine fisheries.

---

<sup>10</sup> N. Meyers, The Gaia Atlas of Planet Management, Gaia Books Limited, London, 1985.

<sup>11</sup> Ibid.

## **Reduced Economic Viability**

The erratic flow of rivers coupled with the problems of erosion is effectively undermining the potential of irrigation projects, as is so evident in the Sri Lankan Mahaweli program. Several large dams were constructed for the generation of energy, as well as for irrigation and flood control downstream. However, the tree cover reduction in the relevant watershed areas has jeopardized the steady supply of water to the reservoirs, on which the success of the project is dependant. Projects are further undermined by siltation, a process that not only causes river basins to silt up (thereby reducing storage capacity), but also chokes hydro-power dams and adversely affects coastal fisheries and sensitive coral formations.

## **Intensification of Farming Practice**

Intensification of agriculture takes two forms. Clearly, the most destructive is putting former grass and marsh lands to the plow. These activities have dramatic and far reaching effects, both on biodiversity and on human communities. Animal and plant species may become extinct if deprived of the environment in which they survive. Human communities are affected by the removal of flood control areas and the land itself is subject to erosion and soil depletion, if not carefully managed.

Intensification on existing agricultural lands can and often does produce significant environmental degradation. For example, the conversion of grazing land into crop production often results in the expulsion of the grazers and their livestock into environmentally sensitive areas, in habitat reduction for wildlife species that coexist with grazing stock, in the felling of the remaining trees and the clearing of land for processing facilities. The introduction of machinery often produces a compaction of the soil, reducing its capacity to absorb rain water, thus speeding up runoff. Unless newly cultivated lands are carefully managed, erosion accelerates and the runoffs of agricultural chemicals contaminate waters. Frequently, when grazing lands are denuded of grasses, wind erosion begins. Soil salinization may result from inadequate irrigation practices. The destruction of adjoining areas is necessary to create the required infrastructure to support intensive agriculture (dams, roads and plants for processing the product).

Large-scale production and processing of many tropical crops has an impact on the environment with the release of untreated toxic wastes. Tea, sugar, cocoa, coffee, rubber, oil palm and fibers such as cotton, require specialized processing facilities which produce effluent that, if not processed and recycled, pollutes the lands and streams adjacent to the processing facilities. Crops that require washing, such as coffee, produce highly toxic wash waters that must be processed before being released.

Agroindustries, including horticultural, forestry, and fishery industries, produce significant volumes of toxic wastes. In many cases, these pollutants are simply dumped into nearby streams or landfills without concern for the environmental consequences. Some industries require large quantities of poles (for stakes in horticulture, for example) or fuel wood. These needs are frequently met by stripping the poles and fuel wood from nearby forests.

In Sri Lanka, de Silva reports that the coconut industry releases large quantities of toxic hydrogen sulphide and organic compounds, which lower the dissolved oxygen in water, thus affecting lagoons and marine life. The rubber industry annually releases into streams the equivalent of 330,000 tons of rubber serum, which contains formic and acetic acids.<sup>12</sup>

The intensified use of agrochemicals presents an especially challenging problem of environmental degradation. High-yield tropical monocultures, without the benefit of rotations and fallows, require heavy doses of pesticides to control pest population build-ups. Many of these pesticides are currently used as a preventive measure before an unacceptable level of pest populations has developed. The spraying often has wide-reaching effects on beneficial insect populations, as well as affecting the human inhabitants in the spray zones, unless the spray programs are very carefully managed as to the dose applied and the method and timing of application. As pest populations become resistant to the current pesticides, higher doses of more potent chemicals are required. Cotton is a good example of a crop that requires massive doses of pesticides to obtain profitable production levels and to meet acceptable quality norms.

Animal-based industries also generate massive quantities of toxic organic effluent. Discharges from poultry, swine and cattle production and processing facilities often pose serious dangers to human health; the organic discharges are a source of disease if dumped untreated into the environment.

Agroindustries present special problems as they affect both the environment and the human ecology. Not only is the environment altered, but the symbiotic relationship between man and the environment may change in unanticipated ways. As an example, the effects of a commercial banana production facility can show the wide ranging impact that an agroindustry may have on an entire region's ecology and human population. In the case study that follows, the facility is in the Caribbean region, but the effects would be similar for other tropical fruit and beverage production facilities in any part of the world.

---

<sup>12</sup> G.M.P. de Silva, 1991.

## **Case Study: Agricultural Intensification in a Banana Export Industry**

The agroindustry is to be developed in a broad valley with very deep alluvial soils. The valley itself is irrigated by a large river which drains a huge watershed in the mountains behind the farm. It has traditionally supplied a steady flow of irrigation water all year around. The river does flood in the rainy season, bringing new fertility to the soils that lie in the floodplain.

The land is currently used for small farmer, mixed crop agriculture. At present, the farmers rotate local tubers with pulses for subsistence on leveled fields. The cash crops of sugar and bananas are also grown on small fields and, with the exception of banana spraying, consume almost no agrochemicals.

The new industry will profoundly affect both the economy and the ecology of the area. At present, the population is engaged in low input, sustainable agriculture. The people require little other than the natural fertility for their agricultural activities. They produce pulses and tubers for family consumption and sell a small surplus in local markets; these are often intercropped with bananas. The impact on the soils is slight, as the farmers rotate their crops and fallow the fields, effectively keeping down pest populations. As most of the labor is manual and supplied by the family, there is little incentive to clear new fields. Old fields are allowed to return to fallow when the soil fertility diminishes, and are quickly colonized by the flora and fauna from the nearby hills.

In addition, most of the women keep kitchen gardens, a few pigs or goats and some poultry. While these animals do forage, they do little harm to the vegetation. The feral pig population is kept in check by steady hunting pressure. The river is rich in edible fish and its banks are covered by highly varied vegetation. The mangrove swamp provides additional food and some netted shrimp to sell to the luxury hotel market for cash income. Recently, farmers have learned to sink bamboo poles to serve as a medium for growing clams. The bay with the coral reef is regenerating from the effects of a small port that existed in the late 1930s and today supplies fish to supplement the diet and to market.

The economy is not completely agricultural. On-farm income is supplemented by seasonal migratory labor. The men and the women unencumbered by child rearing duties (or able to rely on older women to help) migrate to the nearby cities and earn additional income.

The tropical forests on the lower hills have highly diverse flora and fauna. The forests lying higher have been undisturbed since colonial times. The few cocoa trees left from that period have been integrated into the forest vegetation and serve the community as a source of revenue when they find the cocoa pods before the rats. The vegetation shelters a wide variety of animals, some quite rare, and some of the bird species are endangered.

The river and its associated mangrove swamp are equally rich and diverse, as well as very scenic. While the river does flood during the rainy season, this flooding, except in the extreme cases which have arisen in recent years with heavy logging and forestry in the watershed, has little impact on the local population. Their houses are built on stilts. Furthermore, the flooding brings both new soil and nutrients from the mountains. Over the centuries, these floods have built up and maintained the fertility of the valley.

In place of this low input agriculture, the valley will be mechanically leveled, ditched to depths of 10 meters for drainage of heavy rains, irrigated and planted to high yield bananas. The production system will require the installation not only of very deep drains but also of substantial infrastructure, such as cableways, and will rely heavily upon intensive inputs, especially fertilizers and pesticides, to produce exportable yields four or five times greater than at present. The spray application program will be by air and that some pesticide drift into the nearby river and the mangrove swamp at the mouth of the river is inevitable.

The company will need to "train" the river by drag-lining and diking it. The mangrove swamp "plug" lying down river from the farm will be "opened" with canals to help control the flood waters that the new drainage system will pour into the river. The bananas will be exported from a newly constructed terminal on the bay just a few miles from the farm. The bay will be dredged to clear some of the coral heads that obstruct the entry of shipping to the new fruit terminal.

In addition, the valley's rolling hills that are covered with tropical vegetation and currently not "used" will be cleared and planted to citrus. The steeper hills will be cleared of the tropical forest interspersed with century's old cocoa trees and will be planted to hybrid coconuts resistant to lethal yellowing.

The production of coconuts on a commercial scale will help alleviate the critical shortage of edible oils. Coconut oil is the staple of the rural population but, because of lethal yellowing, the government has had to import large quantities of edible oils using scarce exchange reserves.

The processing of both bananas and coconuts will produce substantial volumes of effluent. The bananas that cannot be exported or sold in local markets will be fed to pigs whose effluent waste will be dumped unprocessed into the nearby river. Coconut oil extraction will produce by-products that have no current use and will be dumped into the environment.

The environment will be altered radically by the installation of a tropical fruit production industry. The vegetation will be clear cut not only between the plots in the formerly cropped valley, but also on the hills and mountainsides. The flora will be destroyed and the fauna will retreat into the already ecologically severely affected mountainsides, many of which have been cleared as coffee production has moved to cover the higher elevations.

The river will die as a river. It will become an irrigation canal with no vegetation permitted on the banks. In fact, it will be sprayed regularly with herbicide to keep down the vegetation that shelters pests. Its former beautiful, winding path will be destroyed as it is widened, straightened, diked and deepened. The mangrove swamp will also be channeled and severely impacted, if not destroyed, by the rapid flow of water through the canals and the heavy doses of chemical run offs that the river will carry. The bay will feel the effects of these run offs and the coral heads will again be destroyed to make way for the shipping.

The effect of the project on the human ecology will be massive. The local largely self-sustaining farm villages will become the housing for the wage laborers in the banana, citrus and coconut industries. The local people will have difficulty in continuing to farm, as their time will be dedicated to the industrial regime imposed by commercial agriculture. Those that want to continue farming will have to move away, assuming they have adequate funds to buy new land, or will be pushed into forested areas to clear land for crop production. The older farmers who know no other trade will be left unemployed, as they are not attractive to the new industry which needs strong, young people. Many of the women will give up the kitchen garden and child and domestic animal rearing for jobs in the packing sheds, where they are much preferred to men for their manual dexterity and work habits.

The former pattern of economic activity will, to all intents and purposes, end with the development of this new industry. The largely self-sustaining village farming community that sells some surplus, and some seasonal off-farm labor, will disappear, to be replaced by an industrial village set on the edge of a large plantation producing tropical fruits for export and some coconut oil for local consumption.

The former diversity of income will cease and the community will depend on wages. If the industry flourishes the community will see more cash income than at any time before; if the banana industry should collapse due to natural disasters (as it did in the 1930s after severe hurricanes) or should political changes eliminate the preferential price in the former colonial country, the community will suffer massive economic dislocation. Its principal source of income will disappear and the community will plunge into economic depression. To return to the former pattern of economic livelihood will be almost impossible due to radical changes in the land use and tenure.

## CHAPTER IV

### METHODS FOR ENVIRONMENTAL COST-BENEFIT ANALYSIS FOR AGRICULTURAL LENDING

The social, economic, and environmental consequences of lending are seldom incorporated into lending decisions. To do so would require the use of techniques such as cost-benefit analysis or a somewhat less rigorous, more intuitive Environmental Impact Assessment (EA).

The issue of environmental cost benefit accounting is currently the subject of considerable study and debate. A number of different methodologies to incorporate environment factors into the economic costs and benefits of a project have been put forward. No single current methodology is universally accepted, nor is any single methodology applicable to all cases.

In some projects, especially those involving intensification of agricultural production, market based methods are useful, when market prices can be assigned to production and productivity changes arising from changes in environmental quality. Other market based methods include loss of earnings, where projects affect human health, and changes in productivity, where environmental remediation affects production and productivity (i.e., soil conservation positively affecting income streams).

In other cases, surrogate market values may be useful in clarifying some of the environmental costs of a given project. One could, for example, use property values to price productive land in a flood-prone area and the equivalent land in an area not subject to floods as part of a cost benefit analysis of reforestation. Wage differential and surrogate goods analysis have also been applied with varying degrees of utility.

The benefits of protection or remediation cannot always be estimated easily. This is especially the case when the cost to the environment is over and above the environmental services performed by natural capital. In these cases, a replacement cost approach may be useful. If, for example, trees were felled as part of a project, one could estimate the potential economic loss to the environment as the cost of restoring these same trees.

Contingent valuation methods are useful in the absence of price information and of competitive markets. It is often very difficult, if not impossible, to determine the worth of an environmental service. As we have pointed out, these services are not valued in the market place. They are considered free goods due to the failure of the market. However, such intangibles do have "value" in the sense that people are able to assign a value to them if directly questioned as to how much compensation they would want for tolerating a situation brought on by environmental degradation or how much they would pay for avoiding it.<sup>13</sup> In contingent valuations, the values are generally derived from a

---

<sup>13</sup> A word of caution is in order. People, when asked how much they would pay for the preservation of a natural resource, often give a different answer than when asked how much they would consider fair compensation for the loss of a natural resource. Individual wealth is finite; individual desire for compensation is not. See Michael Hanemann, "Willingness to Pay and Willingness to Accept: How Much Can They Differ?", American Economic Review, June 1991.

survey instrument which questions people in an area affected by environmental degradation on how much compensation they would want for tolerating these problems or what they would be willing to pay to avoid them. While this methodology is highly subjective, there is some preliminary evidence that intersubjective agreement can be obtained at a moderately high level.<sup>14</sup>

In many cases, the value is a "non-use" value arising from the preservation instead of the exploitation of the resource. For example, the Australian Resource Assessment Commission applied contingent valuation to determine that the non-use valuation exceeded the value of minerals to be extracted from the Kakadu National Park.

For resources intended to be left unused, but subsequently "used" through pollution, contingent valuation can often be used to assign values post hoc to the damage done by the party which has illicitly consumed part of society's natural capital. Civil, and perhaps criminal, penalties will be determined in part in the upcoming legal trial of the Exxon Corporation for the Prince William Sound oil spill.<sup>15</sup>

Currently, there is no universally accepted methodology for environmental cost benefit analysis; indeed, not all methodologies are equally useful in all cases. Nevertheless, there is general agreement on the necessary content for such an analysis. These analyses must be multifaceted and multidisciplinary in their approach to the problem of environmental degradation. They should focus upon the effects of the project on the broader environment and the cost of the damage of destroying a resource to the broader society.

### **A Contingent Valuation model of Environmental Cost-Benefit Analysis**

The contingent valuation method can be used to illustrate how banks can apply environmental cost-benefit analysis to their loan decision process. The failure to cost environmental benefits and goods means that current development strategies tend to be narrowly focused on maximizing short-term gains with very little regard being given to proper resource management. It is essential that financial institutions not only weigh up the immediate tangible economic returns derived from projects, but also make a fuller assessment of the longer-term ecological impact. Cost-benefit analysis (CBA) overcomes market shortfalls by attributing monetary values to naturally occurring goods which are directly related to the use value society bestows upon them. The relevant criteria when looking at a decision-making process become the cost of a project, the benefits of a project, and the total economic value that is lost by the development.

On a very simplistic level, the following rulings can be applied:

---

<sup>14</sup> D. Pearce and A. Markandya, Economic Policy Benefits: Monetary Valuation, OECD, Paris, 1989

<sup>15</sup> However, different contingent valuation models in this case have derived different non-use values depending upon whether Alaskans were asked how much they would pay for the nonuse of the sound or whether they were asked how much compensation they desired for its pollution.

1) Banks proceed with investment if  $( B_d - C_d - B_p ) > 0$

2) Banks do not proceed with investment if  $( B_d - C_d - B_p ) < 0$

where:  $B_d$  refers to the benefits of the development

$C_d$  refers to the costs of the development

$B_p$  refers to the benefits of preserving the environment by not developing the area or by not intensifying agricultural production.

This form of accounting can quite simply be taken a stage further by taking into consideration the factor of time, so that project appraisals can be carried out with regard to future, as well as present scenarios.

$$B_t - C_t - E_t (1 + r)^{-t} > 0 \text{ or } < 0$$

where:  $B_t$  is the benefit in time  $t$

$C_t$  is the cost in time  $t$

$E_t$  is the environmental damage done by the project (if there is an environmental improvement, the  $-E$  is replaced by  $+E$ )

$r$  is the discount rate<sup>16</sup>

This simplified model is more heuristic than operational. It is presented here as a means to permit the reader to think in a systematic manner about the environmental costs and benefits of loan decisions in the context of "real world" banking and its daily pressures. In Chapter Five, we will offer a more complete discussion of the issues of CBA and EA.

---

<sup>16</sup> D. Pierce, et al. Blueprint for a Green Economy. Earthscan Publications Limited, London, 1989.

## **CHAPTER V**

### **BANKING ECONOMICS AND ENVIRONMENTAL ACCOUNTING**

#### **Operational Difficulties of Environmental Assessments**

Banks are profit-making institutions operating in a competitive financial market place characterized both by incomplete information and the pressure of the work flow. Introducing a system of environmental cost-benefit analysis into banks' operating procedures would clearly have far reaching implications, on both practical and theoretical levels. With regard to the latter, there is the problem of mitigating the inherent clash between commercial gain and social need. While projects in the public sector should self-evidently be assessed according to the goals and objectives held in society at large, projects in the private sector will be evaluated from a shareholder's perspective, which is based on individual financial gain.

Since the present use of natural resources costs nothing (or nearly nothing), the private investor, in his role as a profit maximizer, will be loath to increase costs through accounting for previously free goods, and this could limit investment initiatives. Investors will reason that, while their own over-exploitation of the land, air or sea may have a detrimental impact on society at large, increased production can be achieved at no extra monetary cost to themselves. It is such reasoning that gives rise to the "tragedy of the commons"<sup>17</sup> and highlights inherent problems with regard to financial institutions assuming an active role in the protection and management of the environment.

The difficulty of banks introducing a form of environmental CBA into financial decisions is that this would clash with the basic and fundamental policies on which banks have traditionally worked. Three major criteria on which banks operate, and the form in which these impact upon the environment, must, therefore, be considered.

#### **Sectoral Objectives**

Financial institutions deal with each project individually and independently. Because of this, the financing of a project which could directly undermine the rate of return of another, would in all likelihood go ahead, despite the fact that the potential total rates of return are being reduced. Obviously, the clear felling of forests in the hills above farming communities will have an impact upon producers on the valley floor. However, the damage done by logging to farming communities is exogenous to a decision to finance a wood industry project. Banks, thus, in their method, lack a means of incorporating the interacting processes within economies. Finance institutions, like other sectoral organizations, tend to pursue sectoral objectives and to treat their impacts on the other sectors as side effects, taken into account only if compelled to do so.<sup>18</sup>

---

<sup>17</sup>This refers to the situation where no real care is taken, especially for the future, of those resources which are freely available for anybody to use.

<sup>18</sup>G.H. Brundtland, Our Common Future, World Commission on Environment and Development, Oxford, 1987.

Furthermore, it is relatively rare that a bank will be able to assess the impact of a given loan decision on the total rate of return. Bank loans are usually fragmented among numerous banks who, for competitive reasons, are unlikely to share information. It is likely that any bank denying a loan to a financially viable project, could reasonably expect that it would be financed by another bank less considerate of the environmental consequences. As banks often compete for loans they deem desirable, they often must act before the borrower seeks finance elsewhere. The creation of goals of sustainability, in contrast, requires the need for a constrained profit maximization model, as well as a holistic approach to development.

### **Investment Cycles**

In the long term, banks would clearly benefit from a broader approach to lending, since a well managed environment gives rise to a healthy economy. However, while environmental cost-benefit analysis will give rise to benefits in the longer term, capital investment is largely dictated by short-term investment cycles. Banks do not, for example, like to support forestry projects because returns take a considerable time to accrue.

There is an opportunity cost to be taken into consideration here, whereby money invested in forestry could have been invested elsewhere, so that the longer trees take to reach maturity, the greater the opportunity cost will be.<sup>19</sup> This warrants further explanation. A bank's source of profit is not only spread between the rate that they pay for deposits and the rate at which they lend, it is also partially fee based. Loan origination fees, for example, often increase banks' intermediation margins. Clearly, therefore, banks have a strong interest in increasing the velocity of the loan funds through short-term, rather than longer-term lending.

Furthermore, longer-term lending is subject to additional price and political risks, especially when the loan is for the production of an internationally traded commodity. Again, in the case of forestry, international prices are volatile and may be quite low when the trees are ready for harvest. There is also an inherent political risk in longer-term lending. Often domestic production incentives (such as tariffs on imports) are abolished during the duration of the loan.

Thus, the long gestation period of much environmental investment weakens its financial worth against that of a short-term and yet ultimately destructive investment.

---

<sup>19</sup> There is a risk of overstating the long term nature of investments in forests, particularly those in tropical zones. S.M. Amatya reports that in Nepal, trees are intercropped with a wide variety of food crops the year before the trees are planted and for three years after planting, providing the farmers with a steady income. Furthermore, with fodder trees, harvest can begin much sooner than is the case with growing for firewood or timber. In fact, fodder harvests can begin shortly after the end of the intercropping of trees with vegetables and grains. Unfortunately, there is no organized fodder market and most of the crop is used on farm. Amatya reports financial internal rates of return as high as 21% and economic rates of return as high as 14%. Nepali banks are lending at 15%. This is presumably some positive spread over the underlying inflation rate. Thus, while forestry is profitable, it is marginally so. Nepal is not the exception to the rule that there are generally better alternative borrowers who can offer banks better collateral and security than that of poor farmers, and can do so without the production risks (i.e., fire and storm) implicit in forestry. See S.M. Amatya, "A Case Study on Lending Policies Geared to Sustainable Agriculture and Forestry in Nepal" Paper prepared for FAO, Rome, 1991. The case for intercropping both food crops and trees is strengthened by research in India which has also established that "agroforestry schemes where wood and food are grown together on the same piece of land are key to sustainable land management in the fragile ecosystems prevailing in the country." See K.G. Venkatraman, "Case Study on Lending Policies Geared to Sustainable Agriculture and Forestry for Asia Pacific Region," Paper Prepared for FAO, Rome, 1991.

## **Tangible Returns**

Banks will grant a loan and the hoped for benefits of capital investment will subsequently be realized through the payment of the loan with interest. They thus work on the basis of receiving tangible returns (normally financial) from their investment plans, which have benefitted the private individual or party.

Investing in, for example, watershed management involves several extraneous factors. First, the benefits of such investments will accrue directly to the communities living downstream in the form of water quality, consistent flows for irrigation, and hydro-electric potential; and to the broader society in terms of preserving the beauty of the landscape, and providing recreational opportunities, but not directly to the borrower and consequently not to the bank.

Second, much lending is equity based. The decision to lend based upon the borrowers' guarantees and upon the borrowers' credit history is supported by banking tradition that holds that loan losses are lower in well collateralized loans. Frequently, banking laws impose a legal requirement as to the amount of collateral to back loans.

When exogenous factors such as environmental cost-benefit analysis are included in lending decisions, the collateral / loan size relationship alters. Environmental costs and benefits are non-financial assets that cannot be directly collected by a bank from either the borrower or the society. Let us say that, if a project to develop a fish processing plant were required to develop adequate disposal of waste waters, instead of dumping them untreated into a nearby river, the cost of the project would rise. The loan size would reflect this increased cost, but the collateral would remain constant. The benefits of such action on the part of the bank would accrue to the inhabitants who live in the watershed, and perhaps to the broader society that uses the river for recreation and transport. The cost to the bank is an increase in the risk/reward ratio of the loan.

Because of these three fundamental factors, problems in reconciling the aims of finance institutions with the creation of a sustainable economy clearly exist. Banks show a clear preference for investment with short-term horizons, supported by tangible and easily marketable securities; in a word, all the things that environmentally correct investment is not.

## **Competitive Financial Markets**

Banks confront a highly competitive environment. If one bank is not prepared to make a loan to a profitable project with unacceptable environmental consequences, certainly a borrower will approach another bank with the project. The same holds true for countries and regions. A region or country rejecting a project does so with the almost certain knowledge that the project will reappear in another country, or even in a different region of the country, that is less demanding and more willing to overlook the environmental degradation that may result from the project.

## **CHAPTER VI**

### **BANKING AS ENVIRONMENTALLY CONSTRAINED PROFIT MAXIMIZATION**

We have shown clearly that banks operate in an industry that mitigates against environmental cost accounting. This is a fact in all developing countries. It does not follow that banks have no role to play in environmental protection and preservation, although it must be recognized that their ability to modify practices is restricted.

Banks are constrained in their operations in numerous ways. Many cannot charge the rates of interest they desire. Most are constrained by prudence and by law to retain certain capital levels and reserves. Banks are not free to collect loans in whatever manner they might desire (seizure of assets without recourse to the courts, for example). In fact, the whole corpus of banking law outlines the constraints under which a banking system operates. While banks may seek to maximize profits (and/or minimize risks), they are constrained as to how they may pursue these goals. They are, in a word, Constrained Profit Maximizers. They seek maximum profits within the parameters imposed by legal, economic, social and political systems.

The reasons that banks recognize that their lending decisions need to incorporate environmental concerns are not entirely altruistic. While it is true that bankers as citizens are exposed to the consequences of their decisions, it is rather unlikely that this exposure will have a great effect on lending decisions. Instead, there are two sets of considerations that argue strongly that banks should begin to build the capacity to carry out environmental evaluations as part of their routine operating practices.

#### **International Capital Flows**

The developing countries are first, almost by definition, capital importers. This capital comes in the form of direct and indirect foreign investment, international loans and, infrequently, grants. The sources of capital, principally in the developed world, have become increasingly concerned about the effects of their activities in the developing world and are imposing (or having imposed upon them legally or politically) additional constraints on their activities in these countries.

A good example of this process is the recently adopted World Bank screening procedure for its loans to a broad variety of financial intermediary lending institutions (FIL's), including central banks, sectoral credit agencies, commercial banks, development finance corporations, rural credit cooperatives, and nongovernmental organizations (NGO's). Under the recently adopted procedures, these loans must be screened and assigned a classification ranging from A to D, depending upon the impact the project has on the environment. An example of the former would be a land clearance project, while the latter would be a project whose major objective is environmental improvement. Furthermore, the World Bank now requires an assessment of the borrowers' institutional capability to carry out an environmental impact review.<sup>20</sup> Those borrowers are required to ensure that if they on-lend, the sub-

---

<sup>20</sup> World Bank, Environmental Assessment Sourcebook, Policies, Procedures and Cross Sectoral Issues., Vol. 1.

borrower has environmental impact assessment capabilities. In addition, several major regional development banks have recently developed or strengthened environmental impact screening systems for their lending programs.

Some borrowers have responded by setting up extensive programs of sectoral environmental impact assessment. For example, Pakistan, with Japanese grant funding, is carrying out an environmental impact assessment of the national drainage program to relieve waterlogging and salinity problems.

Thus, international lenders are beginning to assess the impact of their lending upon the environment in a systematic way and to require borrowers to develop the ability to carry out environmental impact assessments. Likewise, international corporations are being called to account before the courts for the damage caused by their activities, or are being denied access to sensitive areas. These legal challenges are not entirely centred on the developed countries. Some developing countries are beginning to bring before the courts corporations that have damaged human health and the environment. The clearest case is perhaps the Bophal tragedy in India. The environmental cost of lending to projects that have a negative impact on the environment is becoming an issue for the institutions that provide both sources of loan capital, and direct and indirect investment in developing countries.

### **Domestic and International Environmental Law**

A second reason for banks in developing countries to begin to develop in-house environmental impact assessment capabilities is that to do so may be in their enlightened self-interest. There is growing awareness in broad public sectors, as well as in government, that the present attack upon natural capital cannot be sustained indefinitely. In some countries, there is a growing consensus that the destruction of natural resources must be slowed; in other countries, the awareness is in the initial stages. This concern is increasingly embodied in both national and international law. At the national level, in the Philippines for example, new agribusiness projects are required to obtain an Environmental Compliance Certificate issued by the Environmental Management Bureau.<sup>21</sup>

At the international level, a number of treaties require national governments to protect and preserve natural resources. For example, the Convention on International Trade in Wild Flora and Fauna (CITES, 1975) restricts commerce in endangered species. The Vienna Convention for the Protection of the Ozone Layer (1985) links domestic CFC and halon production with the global issues of altered weather patterns. Several other conventions, such as the UN Convention of the Law of the Sea (1982) (not yet in force), and the Convention of Transfrontier Movements of Hazardous Substances (1989), also have extensive environmental provisions. A far-reaching treaty on Biological Diversity, opened for signature in 1992, and a framework Convention on Climate Change also impose important environmental obligations on governments.

---

<sup>21</sup> Gilberto M. Llanto, "Lending Policies Geared to Sustainable Agriculture and Forestry: The Philippines", Paper prepared for FAO, Rome, 1991.

Other regional agreements such as the ASEAN Agreement on the Conservation of Nature and Natural Resources (1985) and the African Convention on the Conservation of Nature and Natural Resources (1968) incorporate the obligation of signatories to protect and preserve natural resources and to ensure the sustainable harvesting of these resources.

This list is by no means exhaustive.

Although the obligation is most often imposed upon governments under international agreements, the increasing pervasiveness of such agreements into national systems will at least make it a sound practice for banks to have regard to the obligations set out in these agreements. Whether or not an agreement imposes obligations specifically on the banks themselves will depend on the precise provisions of the agreement, the constitutional arrangements in the particular country by which such an agreement can have force in national law, and the terms of any legislation implementing that agreement.

Banks provide one of the principal sources of development capital; thus, their lending practices should increasingly incorporate environmental concerns if national governments are to comply with an increasing body of international law.

## **CHAPTER VII**

### **THE ENVIRONMENTAL REVIEW PROCESS FOR BANKS: A MODEL FOR SUSTAINABLE AGRICULTURAL LENDING**

Once it is accepted that it is in the long-term financial interest of banks to begin to develop environmental impact assessment capabilities, the question arises as to the model and the process to be used to institutionalize and nurture this new set of activities within the institutional framework of a banking organization.

We wish here to outline a model that will provide a basic capacity to evaluate the environmental consequences of lending. This model is not to be considered as other than illustrative; many alternate models are equally applicable.

The model put forth here is for Environmental Impact Assessment (EA), instead of a more formal cost-benefit analysis. As noted above, there are numerous approaches to evaluating the environmental consequences of lending. None is applicable to all cases. Furthermore, most of these techniques are still quite new and many are openly experimental.

Environmental Impact Assessment (EA) relies upon a systematic approach to enumerating the effects of a proposed loan-financed investment. It does not require specialized personnel, as does a more formal cost/benefit analysis, along the lines outlined in Chapter Four; instead, it can be incorporated into the existing bank operating routines and utilize present staffing at the local level. The process is less rigorous than a cost benefit analysis, as it does not assign monetary values but, instead, permits more intuitive qualitative and quantitative judgements as to the impact of the loan. Using EA permits banks to study the major potential areas of the environment on which their loans may have some effect and therefore to determine whether the proposed project is likely to be satisfactory in terms of environmental consequences. The EA process can (and does) incorporate both information and value judgements into the loan approval process. These judgements however must be made explicit and the consequences weighed against other uses for the resources, and against the cost of environmental protection and remediation.

#### **Environmental Impact Assessment for Sustainable Agricultural Sector Lending**

Sustainable agricultural sector lending can be defined quite simply as the financing of activities whose impact upon the environment and the natural capital does not exceed the regenerative capacity of the environment.<sup>22</sup>

---

<sup>22</sup> A more extensive definition is found in FAO/Netherlands Conference on Agriculture and the Environment. Issues and Perspectives in Sustainable Agriculture and Rural Development. Main Document No. 1, 'S-Hertogenbosch, The Netherlands, 15-19 April 1991. This definition stresses the maintenance of the natural resource base while meeting basic human needs, present and future, through conservation of natural resources by engaging in environmentally non-degrading economic activities and appropriate technology.

If the income of a project derives from the consumption of natural capital more rapidly than the environment can regenerate it, then it is, in effect, decapitalizing the environment and impairing the future capacity to generate income at the same rate by liquidating resources.<sup>23</sup>

When this definition of sustainability is adopted, the natural capital is given an implicit value. The difficulties of applying the sustainability criteria can be overcome by breaking it down into a number of component fields. When the effects of the proposed loan on each of these components is studied in some depth, and when it is detailed as part of the loan evaluation and review process, the overall environmental sustainability of the loan comes into clearer focus. Bankers can then make informed decisions as to the impact of their lending activities on the environment.

---

<sup>23</sup> The reader should be aware of the extended, and sometimes heated, debate that has characterized the utility of "sustainability" as a key organizing concept. The definition put forward here is designed to be a functional concept to enable banking and other professionals involved in making lending decisions to focus upon the essential feature of the issue—whether a resource is being harvested at its maximum sustainable yield. Here, it is used as a physical concept with the goal being the management of a renewable resource stock (be it trees, fish in the sea, or aquifers).

It is clear that some types of sustained yield resource management can produce the degradation of other resources. Monocultural forests, such as rubber, reduce species diversity by destroying the original flora and fauna. These forests, once established, form a closed and sustainable ecosystem that causes little further damage, as the canopy closes over. This conversion from one type of forest to another is neither intrinsically desirable or undesirable. The costs must be measured against the benefits.

Again, the rubber industry provides an illustrative case. In Brazil, the forests were not stripped and planted to rubber, but instead the wild rubber was tapped without clearing forests. The cost of doing so was such that Brazilian rubber was priced out of the market by the new British plantations in Asia and its market share fell from 60% to only 1% of total natural rubber exports. In Malaysia, rubber plantings grew from 150 Ha. in 1897 to over 1.4 million Ha. in 1940, almost 5% of the surface of the country (and a larger percentage of peninsular Malaysia). The exports constituted over one-half of the total world exports, and as such were a major source of employment and foreign exchange.

The principal challenge to sustainability is not a definition of what is sustainable and what depletes the resource, or even whether changing from one type of forest to another is an acceptable price to pay for the employment and exports generated by the change, but instead the fact that the maintenance of physical stocks produces a decreasing per capita availability over time due to population growth. Sustainability is therefore not a static concept. There are constant trade-offs to be made between sustaining the original ecosystems, sustaining access to crop and grazing lands, and sustaining growth, jobs, and exports. Thus, sustainability cannot be discussed without setting it in the political, economic, social, and demographic context which permits one to view it both as a set of trade-offs for present and future generations. Social welfare gains deriving from destruction or degradation of a resource, may, in some cases, be inevitable, though undesirable, in the circumstances of a rapid population growth, poverty, and limited resources to pursue alternative strategies. Sustaining the present and future level of societal and individual welfare may, sadly, but almost inevitably, imply resource degradation until population growth is slowed.

The steep hillsides of the Philippines provide an interesting case. Farming these slopes, even with diminishing fertility, declining yields, heavy erosion and downstream sedimentation, is the only source of livelihood for perhaps 10 million people. They have been "pushed" into these hills by a lack of economic opportunities in the lowlands. Given the present growth rate of 2.3% per annum, which will increase the population from about 60 million today to over 75 million in the year 2000, just 9 years hence, the expulsion of people from the lowlands can be expected to continue, notwithstanding that there is no likelihood that this population can be accommodated in a sustainable, environmentally non-degrading farming system. It is a "cruel choice" between present consumption of environmental resources to sustain life and its protection both for its services and its value to future generations. The alternative, that is, massive job creating investment in the lowlands, is effectively closed by the poverty constraint.

See John A. Dixon and Louise A. Fallon, The Concept of Sustainability: Origins, Extensions, and Usefulness for Policy. Washington, World Bank, July 1989.

## **A CHECKLIST FOR AGRICULTURAL LENDERS OF THE ELEMENTS FOR ENVIRONMENTAL IMPACT ASSESSMENT OF SUSTAINABILITY**

### **AIR QUALITY**

- greenhouse gas production
- particulates and contaminants

### **LAND CAPABILITIES, STRUCTURE, AND RESOURCES**

- wet and wild lands
- tropical forests
- deforestation and reforestation
- arid and semi-arid lands
- coastal zones
- flood protection
- soil depletion and erosion
- watersheds
- irrigation and drainage
- livestock and rangeland
- roads, dams and other infrastructure

### **FLORA AND FAUNA**

- biological diversity
- habitat destruction

### **HUMAN ECOLOGY AND SOCIAL INFRASTRUCTURE**

- agrochemical discharges and waste water effects on health
- voluntary and involuntary relocation and settlements
- native peoples and cultures
- agroindustries' impact on local communities

### **SURFACE AND GROUND WATER QUALITY AND QUANTITY<sup>24</sup>**

- surface and ground water pollution
- availability and quality of water to downstream users
- flooding
- sediments, the effect of nutrients and pollutants on marshes, wetlands, submerged aquatic vegetation (SAV), epiphytes (fouling plant growth), the microscopic (zooplankton, phytoplankton, bacteria), the permanent and migratory nekton (swimming) and benthic (bottom) communities.

---

<sup>24</sup> This discussion follows World Bank, Environmental Assessment Source Book, Vol. 1, Policies, Procedures, and Cross Sectoral Issues, Washington, 1991.

## **CHAPTER VIII**

### **INSTITUTIONALIZING ENVIRONMENTAL IMPACT ASSESSMENTS IN THE AGRICULTURAL LENDING PROCESS**

From the preceding chapters, it is clear that it is in the enlightened self interest of banks to begin to develop the capabilities to review and understand the impact of their lending programs on the environment and on the human population that shares that environment.

The process of building this capability of environmental impact analysis (EA) into the lending routines of the bank is, in fact, quite easily accomplished. The checklist provided in the preceding chapter outlines the major elements to be considered in reviewing the impact of a potential loan. It is neither inclusive of all the factors to be considered in a particular loan decision, nor should it be considered exclusive of other elements that may be of importance in a given case. Instead, this list will allow bankers to think systematically about the impact of their lending decisions and will help to structure an EA of the loan before it is made.

Some involvement in carrying out an EA should be the responsibility of every lending officer. He/she can prepare a short statement of the anticipated impact of the loan to accompany the project documentation to the loan committee. The loan committee should review this documentation before passing on the loan.

It is unlikely that any single loan officer will have all the expertise required to carry out EAs in the highly diversified fields in which a bank is required to lend. To overcome this difficulty, it is proposed that each local level bank appoint one or more of the loan officers as an Environmental Assessment Advisor to the loan committee. This person, who would function as the environmental ombudsman or spokesperson, will have the responsibility of developing an expertise in EA and will review all EAs attached to loans before they are presented to the bank's loan committee.

Paralleling this local structure, banks at the regional and national level will need to appoint a loan or administrative officer to develop EA capabilities to help the local banks in developing their EA capacities and to review the work of the local banks as well as carrying out some post hoc studies to determine if the original EAs correctly identified and estimated the environmental consequences of loans.

The regional and national level EA advisors will be linked to already existing and newly developing environmental impact assessment expertise both in international lending institutions, such as the World Bank and regional banks, and technical assistance organizations such as FAO, and national based development agencies, (USAID, European and Japanese development agencies), which can supply expertise.

Thus, EA, while carried out at the local level by loan officers who have taken on the additional responsibility of reviewing the consequences of lending on the environment, will be supported by a network of more specialized staff at the regional, national and international levels.

## CHAPTER IX

# NON-INSTITUTIONAL SOURCES OF AGRICULTURAL FINANCE AND ENVIRONMENTAL DEGRADATION

The issues of land clearance and intensification of agriculture cannot be seen as issues related exclusively, or in many cases even primarily, to loan-making decisions by formal banking institutions. While banks are the principal institutional source of capital, they are not always the most important source of credit for agriculture. In fact, in most of the developing world, in terms of aggregate lending volumes, banks generally lend far less to agriculture than does the informal sector.

Therefore, any program designed to confront the problem of the impact of agricultural lending upon the environment must have a broader perspective. The importance of informal capital markets points to the necessity of involving the broader society, and the government in its policy-making role, in the process of protecting the environment and building sustainable systems of agriculture.

To understand the role that banks play in financing agriculture, it is necessary to focus upon the broader capital market and upon the aggregate capital flows from all sources to the agricultural sector. There are three salient sets of features that characterize rural credit markets in the developing world.

First, banks, especially those in the developing countries, lend very little of their total resources outside urban areas and even less to agriculture. Their presence in the rural areas is more frequently in order to capture low cost deposits than to carry out an extensive lending program.

Second, in most developing countries, the informal market is a far more important source of capital than are formal banking institutions which supply a relatively small part of the total volume of credit flows to agriculture. Most production credit, as well as a fair share of term lending, comes not from formal banking institutions but, instead, from the informal market. In the Philippines, for example, "two-thirds of all Filipino farmers who borrow do so from informal lenders".<sup>25</sup>

In most countries, banks offer lower nominal lending rates to farmers than do informal lenders. However, the processing time, repeated travel from the borrower's home to the bank, the paperwork, literacy requirements, the demanding (and sometimes impossible) loan conditions as to equity, collateral, and credit histories, developed by bureaucrats in a distant urban area, as well as the need to repay the loan in cash, add substantially to the cost of borrowing for small farmers. As a result, the effective borrowing rate, even in subsidized credit programs, is quite high. So high, in fact, that many farmers who could borrow at a formal banking institution opt for borrowing in the informal market.

---

<sup>25</sup> V. Bruce J. Tolentino, Thirty-Three Facts About Philippine Agricultural Credit, Agricultural Credit Policy Council, Manila, 1987. In Sri Lanka, de Silva estimates that the formal banking sector provides only about 10% of the total requirements of credit for the rural sector; the remaining 90% comes from the non-formal financial market.

We know relatively little of informal markets, except that in almost all developing countries, they appear to be the predominant source of credit for agriculture, meeting a demand that neither the banks nor the government is able to fill. After years of trying to suppress these lenders, variously called "usurers," "exploiters" or worse, they appear to thrive in the agricultural sectors of developing countries around the world and fill a real need for credit in rural communities unmet by formal institutions.

These sources of credit are difficult to identify and even more difficult to channel into socially desirable forms of lending. After decades of repression, these lenders would certainly view with suspicion any attempt at regulation.

Third, government seldom has adequate resources to meet more than a small portion of the total demand for credit. Total demand for agricultural production credit in the Philippines is estimated at about 60 billion Pesos. About 24 billion Pesos is supplied by the private banks (including commercial, thrift and rural banks). The government controlled only about one billion Pesos of agricultural production credit, or about 2% of the demand.

In the forestry sector, the resource constraint imposed upon the public sector is even more marked. The Philippines has developed an innovative program called the Integrated Social Forestry Program (ISFP) which awards Certificates of Stewardship Contracts (CSC's) on denuded upland areas, and recently in mangrove areas. Llanto reports that in 1983, the program had 748 projects covering 320,000 ha. By 1989, there were 1,088 projects encompassing 450,000 ha., on which the government has issued CSC's covering 303,000 ha.<sup>26</sup> The Philippines occupies about 298,000 square km. or nearly 30 million ha.; thus the ISFP program covered only about 1.5% of the surface of the islands and had awarded stewardship certificates on about 1% of the land.

Clearly, the ability of a society to manage its environment cannot depend exclusively, or even primarily, upon the formal banking system and the public sector. They do not manage the vast majority of the financial resources in the rural sectors. The environmental impact achieved through managing the flow of loan capital must be confronted not only in the formal banking sector, but also in the far broader social stratum of the informal market. Modifying bank loan appraisal practices is certainly a critically important step, but it must be borne in mind that the environmental evaluations carried out by the banking industry will affect only a small part of the volume lent to agriculture and forestry.

If the environmental consequences of aggregate lending volumes are to be successfully improved, a broader approach to the flows of funds to agriculture must encompass all the sources of capital, especially the most important one, the informal sector. This, in turn, requires a broader societal response to agricultural sector finances.

---

<sup>26</sup> Gilberto M. Llanto, "Lending Policies Geared to Sustainable Agriculture and Forestry: The Philippines," Paper prepared for FAO, Rome, 1991.

## **CHAPTER X**

### **SOCIETAL RESPONSE TO AGGREGATE FINANCIAL FLOWS TO ENVIRONMENTALLY DEGRADING AGRICULTURAL SECTOR INVESTMENTS**

In the preceding chapters, it has been argued that the structure of banking does not easily lend itself to comprehensive approaches to environmental concerns. While banks are increasingly aware of their responsibilities to carry out their activities for profit in a manner consistent with environmental concerns and are increasingly required to do so by international and national expectations (and, indeed, by laws in some jurisdictions), there are still constraints on actions they take. Firstly they operate with a foreshortened time horizon; they operate in a "for profit" environment; and they operate in a competitive national and international environment where, if they do not make a profitable loan, some other bank in their country in all likelihood will do so. Furthermore, if the environmental legislation is quite strict in one country, international investment has the option of seeking out countries where environmental regulations are weaker or less rigorously enforced. Banks also operate on a project-by-project basis, not on the basis of a broader planning horizon.

Secondly, as noted above, in most developing countries a very small portion of the total financing extended to the agricultural sector comes from banks. The result of this reduced participation of formal banking institutions in the aggregate loan volumes extended to agriculture, is that, while banks certainly need to review the loans that they do make to ensure that they are environmentally benign, a far broader ranging strategy is required if the fundamental problems are to be addressed.

To address the totality of aggregate investment in agriculture, developing societies cannot depend upon a project by project approach. Such an approach is clearly inadequate:

"The traditional approach...fails to confront the real issues, which have much more to do with the way society works than with the technical aspects of natural resource degradation. Environment-related behavior and policy are in fact at the very heart of social, macroeconomic, and sector policies--especially those relating to agriculture, energy, and industry; domestic and foreign investment; fiscal, monetary, and trade policies, income distribution; and regional planning."<sup>27</sup>

---

<sup>27</sup> Jeremy J. Warford, "Environmental Management and Economic Policy in Developing Countries," in Gunther Schramm and Jeremy J. Warford, editors, Environmental Management and Economic Development, The Johns Hopkins University for the World Bank, 1989, p. 8.

As regards both forest clearance and agricultural intensification, the issue is "how should we treat the natural environment in order that it can play its part in sustaining the economy as a source of improved living standards?"<sup>28</sup> Free markets may be wonderful servants, but they are often poor masters. Clearly, when these markets work to optimize short-term returns at the cost of the destruction of natural capital, the broader society needs to develop policies that direct these markets toward a more beneficial exploitation of natural resources and a less destructive use of the environment. The natural capital stocks can no longer be considered as an essentially free resource and the financial flows to the agricultural sector, whether deriving from formal banking institutions or from informal markets, must be of concern to the broader society.

Within the confines of the present document, it is only possible to outline some of the more promising approaches to incorporating environmental concerns into the policy making and management apparatus of society.

### **Macro-Economic Accounting: Incorporating the Environment into National Accounts**

Currently, national income accounting practices do not incorporate the depletion of natural capital stock into the national accounts. Neither the Gross National Product nor any of its variations (Net Domestic Product, for example) include natural resource depletion or degradation. The result is that the sustainability of the national income is understated and there is a hidden decapitalization of the resource base.

Pollution, likewise, is inadequately accounted for. Identification of the output, the damage, and the costs of abatement with its concomitant benefits would both make apparent the cost of industrial development with inadequate environmental controls, as well as guide growth and environmental policy making.

Changing the way in which the national accounts are prepared is far more than a mere accounting change. It fundamentally alters the way growth is conceived and the means by which interrelationships between the elements of growth policy are understood. By an accounting change, what was formerly viewed as an additional cost not essential to an investment is converted into an investment in future growth and sustainability. Its impact upon the statement of the Gross National Product moves from being a debit to a credit in national infrastructural investment.

### **Resource Accounting**

To date, most of the dialogue concerning depletion and degradation of resources has not quantified the destruction done to the environment in the name of economic expansion. The quantification of a given resource, and the determination of the number of years that will be required to exhaust it at the present rate of utilization, is a straight forward calculation. Once this calculation is incorporated into the national accounts, the discount rate becomes apparent.<sup>29</sup>

---

<sup>28</sup> David W. Pearce and R. Kerry Turner, Economics of Natural Resources and the Environment, The Johns Hopkins University Press, 1990, p.43.

<sup>29</sup> El Serafy and Lutz in Schramm and Warford, 1989.

The quantification of natural resource degradation poses somewhat more theoretical difficulties. As suggested in Chapter Four, there are a number of theoretical approaches which would be particularly effective in demonstrating the environmental damage done by assuming that the natural capital is a free good.

Once the steady assault on the environment is manifested quantitatively in national accounts, it becomes increasingly apparent that some significant portion of present growth actually arises from a depletion of the resource base through the progressive destruction of the very foundations upon which society is built. The accounting changes become a stimulus to debate and to political action. National income accounting, which reflects the amount of present growth that is actually induced by consumption in excess of the regenerative capacities of the environment, with this consumption stated in terms of the number of years to exhaustion, can help to make more viable a number of policy alternatives at both the macro and micro levels.

### **Macro-Environmental Policy Formulation**

Environmental policy in many, if not most, countries manifests two clear characteristics. First, it is implemented through a number of national and decentralized institutions and is characterized by duplication, overlapping functions, conflicting goals and a lack of clear policies. The institutions that are charged with carrying them out are often understaffed and, almost without exception, underfunded.

Second, it is still the exception rather than the rule to have an environmental policy statement, such as, for example, the Philippines Strategy for Sustainable Development (PSSD), which articulates a strategy for a community-based resource management program that tries to balance pressure on natural resources with environmental considerations, resource pricing, conservation of biodiversity, property rights reforms, rehabilitation of degraded ecosystems, and pollution control.<sup>30</sup> Even though the enforcement machinery may be in different agencies and lack coordination, and the resource constraint faced by the public sector may not permit its complete articulation, strategy statements such as these provide a benchmark against which progress can be measured.

### **Micro-Level Policy Formulation**

Once the national accounts system is able to measure the impact of society upon the natural resource base, and natural resource accounting systems are established to quantify the discount rate of resources, the policymaking process is stimulated to formulate policies that will help guide the broader society toward a more sustainable pattern of growth.

While there is a broad range of policies that could be undertaken, depending upon the particular circumstances and resource bases of the countries concerned, the fundamental thrust under these variable circumstances should be to slow, halt, and in some cases, even reverse the destruction of the resource base.

---

<sup>30</sup> Lianto, 1991.

Almost all governments are sensitive to the rate of growth of the GNP and to the quantifiable loss of national resources. Once these are included in the national accounts, many constraints on political action are eased. For example, the management of forests on a sustained annual yield basis, the development of tax incentives to encourage agroenergy plantations, especially for large processors which are wood fired, or for on-farm water management and mini hydro systems, become more politically acceptable, as the consequences of these policies are manifested in a concrete form in the national accounts.

The interests of those industries that currently receive government subsidies are intense and focused. By making clearer the rate at which these industries deplete soil, forest, water, and air resources, it becomes easier for society as a whole to mobilize and for governments to respond to the need to review subsidy policies to bring them into line with a new definition of growth. For example, environmentally damaging or soil depleting crops, such as cotton and tobacco, as well as steep hillside cultivation, would be unlikely to be subsidized when the damage to the resource base is quantified, except in cases where a sustainable system is being operated.

Likewise, once the national accounts reflect the true costs of the present pattern of growth, environmental remediations will be viewed in a different light. Industrial retrofittings to reduce pollution and conversion to less polluting energy will be accounted for as investments in present and future growth, rather than as costs to the economy. Even at the local level, the utilization of plant and animal wastes in producing waste gas fuels, and the development and distribution of fuel-efficient stoves, are transformed from costs into growth producing investments.

The redefinition of what constitutes growth and what constitutes consumption could serve to alter fiscal transfer policy. Relatively rarely do local jurisdictions have taxing authority. Most depend upon central government taxes to support their activities. Indeed, intracountry relations could be restructured to reflect the new growth paradigm. One can envisage a situation in which the financial transfers from the national to the local level may be based upon the efforts of local populations to engage in activities defined by the national accounts as investing in producing growth, such as reforestation.

At the international level, there could be both an expansion of the "debt for nature swaps", once it is clear that central economic growth issues worldwide, not just biodiversity and aesthetic considerations in conservation of tropical forests, are at stake in these exchanges. At present, these exchanges are carried out by Non-Governmental Organizations (NGO's) which must still purchase the debt at a percentage (say 20-40%) of its face value from banks. The banks holding this debt cannot be expected to donate it.

However, export import banks, loan guarantee agencies, national governments and supra-national organizations working in developing countries could also play a role. An example follows. Convinced that exchanging debt for the creation of additional forest reserves in developing countries impacts favourably on the quality of life in their own (developed) country, they might also favour action in this area.

Carrying the logic one step further, an international rediscount facility could be created to reliquidify national lenders who are prepared to make certain types of environmentally beneficial loans. This facility would, in effect, pool the loans for certain types of environmentally beneficial lending, and make a secondary market in the pooled securities, perhaps with government guarantees of interest and/or principal. Such a facility would permit banks to make loans that they would be reluctant to make with their own resources. Instead, they would originate the loan and on sell it to an international facility. This facility would package it with like loans from a large number of countries and sell it perhaps with a guarantee of payment of interest and principal to long term investors. Institutions such as World Bank and/or regional and national development banks could help develop the loan conformity criteria for eligible loans, as well as provide the umbrella under which such a Loan Facility for the World Environment could operate.

Obviously, there is no lack of ideas worthy of serious consideration and no particular approach is advocated in this publication. Ideas are outlined in order to stimulate debate. Fostering the process of redefining the roles of both banks and the informal financial market implies the redefining of society's priorities, developing adequate statistical measures of the effect of humans on the environment in which they live and from which they draw their livelihood, and creating linkages between the developed and the developing countries.

## RECOMMENDATIONS FOR AGRICULTURAL LENDING INSTITUTIONS

These are geared to agricultural lending institutions at various levels, as below.

### Local Level

Banks and other financial institutions which lend to the agricultural sector, which includes livestock, forestry, fisheries, aquaculture, as well as the primary processing, transforming and conversion of agricultural products, should establish an in-house environmental department. In small institutions, this department could consist of a single lending officer whose duties include reviewing all proposed and existing loans for their effect upon the environment. In larger institutions, a specialized officer may be named as the environmental officer, or environmental ombudsman.

All present loans should be screened by using the Environmental Impact Assessment Process (EA) described above. Any, and all new, loans should be sent forward to the loan committee only after EA has been carried out and a brief descriptive narrative of the effects of the proposed loan on the environment is included in the format of the Checklist provided on page 49. This EA should be reviewed by the Loan Committee before the loan is approved, renewed, extended or renegotiated.

The Environmental Officer should be required to check the loan portfolio continually to ensure that the premise upon which the loan was made continues to be valid and to note and report any unanticipated environmental consequences of the loan. These subsequent reports should be sent to the loan committee as part of any proposed action on the loan by the committee.

Local level institutions are the foundation of a nationwide program of environmentally conscious lending. The environmental officer should establish linkages with regional and with national level lending institutions and draw upon these larger institutions for expertise and assistance in assessing the effects on the environment of their institution's lending program.

### State and Regional Level

In those countries where financial institutions are organized along state or regional lines, financial institutions at this level should undertake to develop a more extensive and sophisticated EA capability in order to assist the local level banking institutions, as well as to evaluate the effects of local level bank lending decisions on environmental resources that extend beyond the geographical scope of these local institutions.

The consequences of a local lending decision may manifest themselves in unanticipated ways beyond the geographical boundaries of the local bank. Downstream or downwind pollution are examples. Likewise, regional institutions have a role to play in preventing environmentally destructive industries from moving from one locale to another, seeking to avoid environmental remediation.

Many natural resources can be managed effectively only on a regional or national basis. In cases such as widespread forest resources or migratory species, state or regional Environmental Officers will fill a coordinating role in harmonizing the lending policies of several local level lenders.

At the state or regional level, financial institutions should staff the environmental department with one or more full time professionals. These would assist local banks to undertake studies when such work is beyond the capabilities of personnel at the local level. This regional environmental department can, in turn, call upon specialized personnel at the national level when the proposed loan's effects exceed the analytical capabilities of the regional officers.

The regional environmental officers should also be asked to carry out a periodic evaluation of the lending programs of the local-level banks. This evaluation should be used by regional and national officials in evaluating the performance of personnel at the local level.

### **National Level**

Financial institutions at the national level should establish and staff an environmental department the chief functions of which are to develop lending guidelines that incorporate EA as one of the criteria of loan approval. The national environmental department would also serve as a resource in support of regional and local banks to help them carry out their evaluations, and as a mechanism to oversee their compliance with these environmental guidelines. In some cases, this department may be located within the national office of a commercial bank operating a branch network throughout the country.

The national level environmental department would also be assigned a liaison function. It should establish and maintain contacts with international financial and aid institutions, such as the World Bank, FAO, regional development banks, the EEC and bilateral aid programs. This contact would both enable the new environmental department to help train new staff, and serve as a technical resource that could be drawn upon to assist in difficult evaluations, in planning and developing general guidelines, and in channeling international capital flows to environmentally acceptable loan projects.

This articulation of environmental concerns from the local level through the regional and national to the international levels of banking will permit the concerns and the knowledge at the local level to flow upward, while the research and the technical expertise at the national and international levels can be made available to local level institutions. It is frequently the case that local level lenders' clients have developed quite innovative techniques for managing environmental problems that can be used outside the local setting; conversely, research at the national and international levels is frequently useful to local level lenders.

## BIBLIOGRAPHY

Amatya, S.M., "A Case Study on Lending Policies Geared to Sustainable Agriculture and Forestry in Nepal" A Country Case Study Submitted to the Food and Agriculture Organization of the United Nations, FAO, Rome, 1991, mimeo.

Asian Development Bank. Environmental Guidelines for Selected Infrastructural Projects. Manila, Philippines, 1986.

Barker, D.C., "Bank Lending Policies and Environmental Protection" A Paper Submitted to the Food and Agriculture Organization of the United Nations, FAO, Rome, January 1991, mimeo.

Brundtland, G.H., Our Common Future. World Commission on Environment and Development, Oxford, 1987.

Daly, H.E., and J.B. Cobb. For the Common Good: Redirecting the Economy toward Community, the Environment and a Sustainable Future. Boston, Beacon Press, 1989.

de Silva, G.M.P., "Lending Policies Geared to Sustainable Agriculture and Forestry - Case Study of Sri Lanka". Rome, FAO. 1991, mimeo.

Dixon, John A. and Louise A. Fallon, "The Concept of Sustainability: Origins, Extensions, and Usefulness for Policy". Washington. The World Bank Environmental Department, Division working paper no. 1989-1, July, 1989. mimeo.

Dornbusch, Rudiger and James M. Poterba, editors, Global Warming: Economic Policy Responses. Cambridge, MIT Press, 1991.

Gradwohl, Judith and Russell Greenberg, Saving the Tropical Forests. The Island Press, Washington, 1988.

Goodland, R.C. Watson, and G. Ledec, Environmental Management in Tropical Agriculture. Bolder, Westview Press, 1985.

FAO. FAO/Netherlands Conference on Agriculture and the Environment, 'S-Hertogenbosch, The Netherlands, 15-19 April 1991.

Llanto, Gilberto M., "Lending Policies Geared to Sustainable Agriculture and Forestry: The Philippines". Rome, 1991. mimeo.

Meyers, N. The Gaia Atlas of Planet Management. Gaia Books Limited, London, 1985.

Pearce, David and R. Derry Turner, editors, Economics of Natural Resources and the Environment. Baltimore, The John Hopkins University Press, 1990.

-----, and A. Markandya, Economic Policy Benefits: Monetary Valuation. Paris, OECD, 1989.

-----, A. Markandya and E.B. Barbier, editors, Blueprint for a Green Economy. Earthscan Publications Limited, London, 1989.

Richards, John F. and Richard P. Tucker, editors, World Deforestation in the Twentieth Century. Durham, Duke University Press, 1988.

Schramm, Gunther and Jeremy J. Warford, editors, Environmental Management and Economic Development. Baltimore, The Johns Hopkins University Press, 1989.

Tolentino, V. Bruce, Thirty-Three Facts About Philippine Agricultural Credit. Agricultural Credit Policy Council, Manila, 1987 (mimeo).

Venkatraman, K. G., "Case Study on Lending Policies Geared to Sustainable Agriculture and Forestry for Asia Pacific Region". Rome, FAO, 1991, mimeo.

Von Stockhausen, Joachim, Credit Guarantee Schemes for Small Farmers. Institut für Wirtschaftsforschung Weltforum-Verlag, Munich, 1988.

World Bank, Environmental Assessment Sourcebook. Vol I and II, Washington, The World Bank Environment Department, 1991.

-----, Forest Policy Paper, Washington, Agriculture and Rural Development Department, Policy Research and External Affairs, 1991. mimeo.