

# Environmental and Food Security Objectives in Rural Project Design

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## Introduction

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Almost all the bilateral and multilateral aid donor agencies have been strengthening their capacity to analyse the effects of their project portfolio on the environment. More attention is now being given to external environmental costs that would not be covered typically by conventional project appraisal techniques. More resources are being made available for projects where a major objective is some form of environmental amelioration. These developments, the greening of aid, have been extremely rapid and there has been little opportunity so far to assess their impact on the quality of aid. It might appear that giving added weight to environmental objectives in project design could only be to the good; in fact this need not be so — especially if other objectives, e.g. improved food security, are compromised. Using an Indian example, this article shows how commitment to environmental objectives, notably sustainability, and neglect of food security concerns was directly responsible for poor project performance. Section 1 deals with the project context in general terms and describes two basic conceptual problems in the design phase affecting this and many other projects when specifying environmental objectives and complementarity with food security. Section 2 provides a brief description of the project itself and analyses the reasons why the project focus on sustainable agricultural practice was unworkable in the absence of a coherent food security strategy for the supposed beneficiaries. Throughout, the specific project is described and discussed in anonymity since our underlying concern is with generalisable lessons about the relationship between environmental objectives and food security objectives and not criticism of a particular activity — moreover the project continues and, no doubt, lessons are being absorbed.

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## 1 Environmental Objectives in Rural Project Design

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There are an increasing number of situations where smallholders are adopting non-sustainable natural resource management practices. The imperative need to ensure short-term food security dictates adoption of such practices even though it may be very well

appreciated that they cannot be sustained and that yields will fall. These situations occur in different agro-climatic conditions but are particularly common in rainfed slope land agriculture — as with the Indian project area discussed below. In many cases, population pressure has led to intensification of cultivation, loss of fallow periods and a reduced ability to invest resources for soil and moisture conservation. Annual production of food crops takes place on land that is better suited to perennials. Lack of alternative sources of food make this a necessary survival strategy for poor households. The problem of increased population is often compounded by restricted land rights. In this particular project area the indigenous population are scheduled tribes, who now have very little access to the irrigable valley bottom land which has been taken by outsiders. As a consequence their cultivation of annual crops has now spread to middle and upper slopeland which is actually owned officially by the forestry department and they are liable to be fined at any time for illegal encroachment. This absence of land rights means there is no incentive for land improvement and incipient gullying is a pervasive feature in the area.

Under these types of circumstance an environmental objective can be clearly defined in terms of a shift to a sustainable pattern of land use. Typically, this will involve replacement of annual cropping by perennials — as was the case in the Indian project. However, this is a purely technical response and says nothing about the food security and livelihoods of those households currently using the land for annual cropping. They are maximising short-term gains at the cost of longer-term sustainability in order to feed themselves; any proposals for change, such as a shift to perennials, must involve measures for interim food security and, for the longer term, sustainability of livelihoods. If such changes are possible they would allow a move out of a situation of conflict between environmental sustainability and food security needs to one of complementarity.

One problem occurs frequently and inhibits achievement of this complementarity. It is that during project preparation, situation specific analysis often concentrates almost exclusively on the technical problems; i.e. on identifying physical inputs and land use patterns that will allow sustainable production. The institutional framework, and most fundamentally, the

nature of beneficiary participation in design and implementation of project activities, is frequently a secondary and rather peripheral concern. One main reason for this bias is that the dominant interest in much early analysis of the environmental implications of different land use patterns was the downstream effects of soil erosion. Watershed management planning was dominated by soil conservation scientists and irrigation engineers who were primarily concerned with the effects of soil erosion in the catchment area on the useful life of dams. This meant that the Environmental Impact Assessment (EIA) models applied to slopeland agriculture such as in the Indian project area were directed to assessing downstream benefits from natural resource conservation measures and neglected the economic choices relating to soil and moisture conservation facing individual decision takers. And this methodological bias was consonant with the inherent conservationist stance of mainstream environmental science that focused on natural resources not human resources.

A second basic conceptual problem, or rather group of problems in attempting to identify complementarities between environmental objectives and food security or poverty alleviation objectives, relates to methods of economic evaluation. The first aspect of this problem is the uncertainty about what should be optimised given an environmental concern. Whilst there is more or less general agreement that 'sustainability' is the goal, there is little agreement about what exactly it means and even less about how it should be measured. This is a particularly serious problem with non-renewable natural resources but even with renewables major uncertainties arise when measuring sustainable resource use. Much has been said on this elsewhere and we shall not elaborate here any further except to note that, in project context, this lack of clarity in defining environmental objectives tends to result in emphasis — over-emphasis — on preservation of natural resources. This occurs because of preference for an anticipatory rather than a reactive approach to natural resource management; environmental economists [e.g. Pearce et al 1989] promote this preference because, under conditions of uncertainty, risk aversion dictates 'prudent pessimism' rather than a wait and see policy which may not be adequate to assure sustainability.

The second issue arising in relation to economic evaluation and environmental objectives concerns the appropriateness of the measurement methods usually proposed. Much of the methodological innovation associated with recent EIA is driven by developed country concerns, pursuing objectives and using techniques which are not applicable in developing country rural project context. For example, the concern with the recreational value of the environment has led to development of surrogate-market pricing

techniques based on travel costs as a measure of rational individual valuation of a recreational resource. Similarly, contingent valuation techniques, usually employing questionnaires, are used to measure consumers' 'willingness to pay' for an environmental objective. These techniques are firmly rooted in conventional neo-classical economics and take no heed of issues such as income distribution and livelihood dependence. The pursuit of these approaches is also driven by the notion that the 'polluter pays' (or the 'resource degrader pays') and that environmental regulation by the state is concerned with identifying environmental externalities associated with individual activities and devising methods to incorporate them into the price system — i.e. internalising the externalities. In many rural areas of developing countries application of this notion would be tantamount to punishing the poor because they are poor. This is for at least three reasons.

First, the rural poor in developing countries have a very high degree of direct natural resource dependence — much more so than the vast majority of people in developed countries or of policy-makers and economic planners in developing countries; therefore, tinkering with the price system in an attempt to include marginal external costs of natural resource use will inevitably discriminate against the rural poor. Second, and related, in urban areas and in developed countries incorporation of such marginal external costs will result in some diminution of both producer surplus and consumer surplus. But, in the case of subsistence producers such sharing is not possible and they will have to bear the full marginal external costs (to the extent that government is able to devise a pricing or fiscal policy to achieve this).

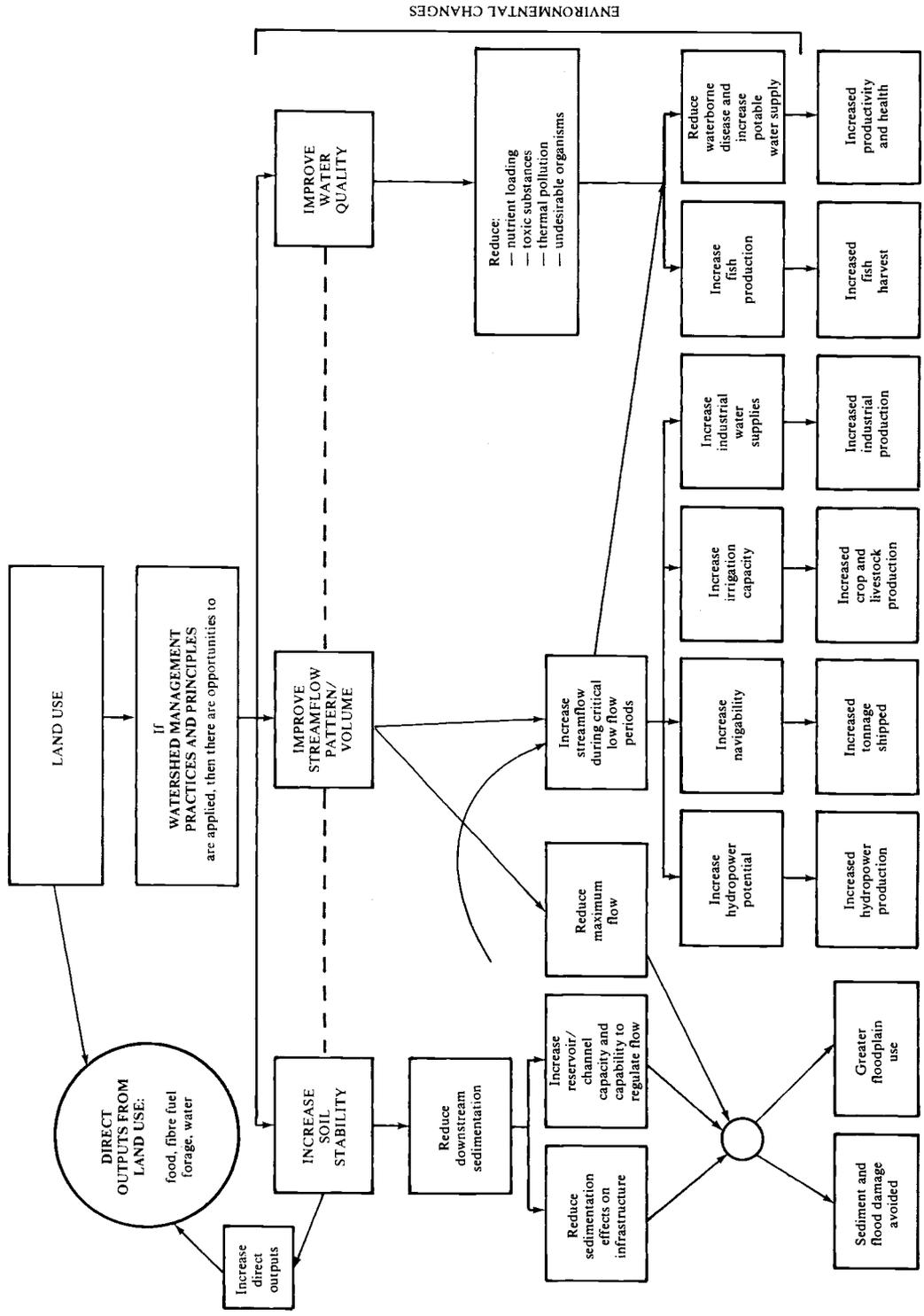
Third, the poor have a much higher subjective rate of time preference or discount rate than average or than the state; this is reflected in their adoption — dictated by desperate need — of non-sustainable land use practices. But a concern with sustainability will be associated with a lower discount rate; and attempts to make market prices incorporate external environmental costs also implicitly involve promotion of a lower discount rate. Thus, internalising environmental externalities within the price system will penalise the poor precisely because of their higher subjective discount rates.

A third problematic aspect of economic evaluation concerns our capacity to actually apply environmental accounting methods in an integrated way with conventional project appraisal. In the specific project discussed here, as in many cases, the cost-benefit analysis undertaken during appraisal was necessarily rather rough and ready given the length of the project (10 years of development expenditure) and the mix of activities (see next section). A main activity of the project was the replacement of annual crops by perennials. Figure 1 illustrates the range of possible



Figure 2

Possible Benefits from Improved Land Use



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effects (costs) in the absence of attempts to maintain tree cover. Figure 2 identifies the very wide range of benefits that might arise if the project is successful in promoting more sustainable land use. Figure 1 corresponds to a 'without' project situation and Figure 2 to a 'with' project situation. The conventional cost-benefit analysis undertaken at the appraisal stage only included the direct (incremental) outputs from land use — the top left-hand box of Figure 2. In this specific project context one could debate the relative importance of some of the items covered in the Figures but, potentially, all of them are relevant. Their incorporation would have a substantial impact on the cost-benefit calculations. Where, as in the case of this project, the effects on environmental externalities are likely to be positive — they are at least designed to be so — inclusion of an EIA will always serve to improve the benefit — cost ratio. But, putting an exact economic value on any of the changes illustrated in the Figures is a highly uncertain exercise. The **internal** environmental gains require an unverifiable guess as to how much land productivity would have fallen in the absence of the project. Many of the **external** environmental effects (see Figures 1 and 2) will, given their nature, be impossible to estimate accurately. Inaccuracy could only be reduced through expensive survey work and resolution of difficult measurement and valuation problems. In practice then, it is unlikely in a project of this sort that it would be possible to satisfactorily integrate environmental accounting with conventional project appraisal.

To summarise, there are two basic conceptual problems affecting analysis of project-led transitions to sustainable land use patterns. The first is the predominant tendency to concentrate on the 'technical' problem of identifying suitable physical inputs and alternate crops and to ignore the needs and perceptions of beneficiaries. The second (set) is the lack of rigour in existing definitions of sustainability, the problem of measuring and valuing environmental costs and benefits and the problem of satisfactorily integrating them into conventional project appraisal. These problems have not led to the circumspection one might have expected in advocacy of environmental objectives — especially sustainability — in rural project design. On the contrary, environmental concerns have become central to much rural development planning, driven more by the heightened awareness in developed countries, and hence in donor agencies, of environmental issues than by any improved understanding of how to approach such issues in food security, poverty alleviation and other rural development projects. The project described below, whilst certainly a victim of this 'sustainability sickness' is far from alone as the greening of aid reaches epidemic proportions.

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## 2 Environmental Objectives in Rural Project Practice

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In the remainder of this discussion the focus is entirely on the Indian project that provided the firsthand experience of how environmental objectives can ride roughshod over food security objectives. The previous section described two overarching reasons why such a bias often occurs; in this section, after briefly describing the project components, eight more specific reasons are advanced for slow progress with the project.

This project should have had a major advantage with regard to managing a marriage between food security and environmental objectives since both could be served by a more sustainable pattern of land use; i.e. they were complementary. The failure to target both food security and sustainability was not due to any variant of conventional notions of trade-off between the environment and growth. In the particular circumstances of the beneficiaries prior to the project, their existing practices did involve such a trade-off but the proposed changes involved complementarity between economic growth and sustainability; the failure lay in not operationalising this complementarity. This 'latent' complementarity is a feature of many rural development situations as briefly described in the previous section. Rainfed slopland agriculture in developing countries often involves this potential complementarity because of poverty-induced non-sustainable land use practices; such areas are now a focus in many countries, often through watershed development schemes as in this case, having suffered relative neglect in past decades due to their limited crop yield potential.

This project area has certainly suffered neglect. It is in a predominantly tribal region of eastern India where exposure to outside interests has generally resulted in exploitation of local labour and resources. There is a very poor infrastructure but this has meant that outside trading interests — especially for timber and fuelwood — have not penetrated everywhere and the natural resource base is far from totally degraded; the soils are deep, free-draining and of moderate fertility so there is good potential in the area. The maximum elevation is 1,200 metres, and the slopes are generally not very steep; but with the moderate rain (perhaps 1,100mm per annum but local records are not reliable) concentrated in four months, only a single crop is possible. There are almost no water storage structures of any sort serving agriculture. The project area, a single administrative block, has about 100,000 people living in some 400 often rather small villages. The main crops grown are millets, pulses and maize; there is much mixed cropping and slash and burn shifting cultivation is the predominant practice. Fallow periods, traditionally and optimally, are at least eight years but almost everywhere are now much shorter

and in some areas the soils on these slopes are rapidly eroding under the pressure of annual cultivation.

Government intervention has been minimal. Indeed, apart from a handful of minor irrigation works by the government and by an NGO the only land-based activities have been planting programmes, generally by the Forestry Department, which result in total exclusion of the indigenous population from that area (usually a specified hill or hills) — fortunately these programmes are few in number. There has been no agricultural extension, input provision or credit for slopland cultivators from government sources since, technically, annual crop cultivation at greater than 10 per cent slope is not allowed.

The proposed project, of about 25 million dollars, was designed explicitly to provide sustainable economic improvement to the tribal population and to ensure that the most disadvantaged were amongst the beneficiaries. The project had additional objectives in that, through experiments, it was to establish a replicable model that would allow both 'delivery' and 'receiving' systems to continue functioning after project completion. Thus the project provided an important opportunity to develop lessons of potentially wide application on managing sustainable development. Certainly, the documentation during the design and planning phases did suggest that a very substantial effort was being made to marry the poverty alleviation goal, initially concerned with food security, and the environmental sustainability goal in what appeared on paper to be a harmonious union. To achieve this there were seven project components.

The first and most important one was agricultural and natural resource development in which the main activities were of three types: construction of physical conservation measures; annual crop development (i.e. improved seed and minor irrigation for valley bottom land) and perennial crop development. Many of the target population no longer owned any valley bottom land so their principal opportunity to benefit was via the physical conservation measures and the planting of perennials. The conservation measures included vetiver grass bunds, gully plugs and diversion drains. The perennials included coffee, sisal, fruit trees and miscellaneous mixed plantations. These two types of intervention were at the heart of the project. The basic idea was to replace annual cropping on the slopes with permanent crops that would generate higher household incomes. These would be supported by the soil and moisture conservation structures that would prevent further degradation; together the interventions were to demonstrate a strategy of complementarity between agricultural growth and natural resource sustainability.

In support of this strategy there were six other components: human resource development; land survey and settlement; rural infrastructure; commercial

development; applied research; and, support for project management. These inputs were carefully justified in project documentation and a great deal of thought went into their detailed specification for their role in supporting agricultural transition. Leaving the last two for which justification is more or less self-evident in this poorly serviced and little understood area, the other four supporting elements all had key roles. The human resource development was to build substantially upon a local (but quite large) NGO which had developed lasting relations in many villages through its community development work. A proposed feature of their input was to be the organisation of grain banks at village level to provide a form of food security assurance to beneficiaries. This was an important strategem for managing the food security transition in the gestation period between subsistence production of annual food crops and sale of output from perennials. But during project implementation the role of these food banks was given little attention largely because, in the absence of participation by beneficiaries, the seriousness of the transient food security obstacle was not appreciated.

The land survey and settlement inputs, by providing land title, were an essential prerequisite; much of the area, including almost all land beyond the valley bottoms, had never been surveyed. The rural infrastructure and commercial development inputs were both included in recognition of the increased market dependence of the new agrarian system proposed. The products from the perennials being planted will eventually need to be sold and the income used to buy food grains. In the past, subsistence production was the norm and there was little faith in the market since the tribal population have had a long exposure to exploitation with very limited protection from law enforcement agencies over commercial standards and pricing.

Overall, with these six supporting components the project offered a fairly comprehensive approach to agrarian transition. Moreover, pre-project documentation paid some considerable attention to beneficiary participation in implementation. This did not happen — at least during the first third of the project which was completed prior to our extended study visit. As the following criticisms make clear this failure was, in one sense, fundamental since effective beneficiary participation could have prevented the other problems from emerging or being serious impediments. However, it is also questionable whether the circumstances could ever have existed for such participation to emerge. The design phrase problems discussed in the previous section suggested substantial inherent difficulty in moving very far away from fairly tightly (and top-down) defined physical targets meeting environmental concerns and offering little scope for beneficiary participation.

The implementation phase problems described next support this perspective. They suggest that food security or poverty alleviation objectives are less well-served by main stream project planning and implementation than environmental objectives involving specified physical outputs identified through top-down planning. No clear-cut order or 'story-line' exists, but together the weight of evidence leads to the final point- the failure to efficiently address the transitional food security needs of the target population.

**A Natural Resource Endowment and Equity** The main vehicle for delivery of long-term project benefits is alternative land use practices linked to physical conservation measures and supported by agricultural extension and other service activities. The distribution of benefits from the project is therefore critically dependent upon land ownership and use rights which may be very uneven. More specifically, in the context of this project: the productivity of lowlands is greater than medium or high lands; project inputs such as water harvesting measures will have most benefit in lowlands; ownership of lowlands is inequitable and the target population (Scheduled Tribes) have limited access to lowland both in the sense that they own little of the lowland and in the sense that lowlands are a very limited proportion of their total (usufruct) rights over land. This project illustrates how otherwise valid productivity interventions can fail to redress inequities or even aggravate them unless the linkage of benefits to poorer sections of the community is carefully analysed, prior to final project design.

**B Target Group V Area Approach** This project, and food security or poverty alleviation projects in general, have very specific target groups. In this case the target group has been specified in terms of membership of Scheduled Tribes rather than in terms of a poverty line or a related indicator. But environmental objectives, which in rural projects are largely concerned with improving soil and water management, typically require an area approach. Clearly, there is a potential clash between target group approaches and area approaches.

**C Rural Infrastructure Development** Project implementation is initially dependent on strengthening of the rural infrastructure especially upgrading roads and improvement of water crossings. Such strengthening is vital also to allow the 'market-oriented' slopeland development strategy to operate. But rural infrastructure development is a double-edged sword. In the more remote, and less densely populated areas, the immediate consequence of better roads is the enhanced access of urban and peri-urban fuelwood consumers to new sources of supply. Degradation of hills has been driven by access to such

external markets. The regulatory environment is not sufficiently strong to prevent such unsustainable exploitation of the natural resource base.

**D Data Base Dependence V Beneficiary Perceptions of the Environment** Environmental objectives lend themselves, at least superficially, to highly technical top-down planning procedures. Most of the conservation measures undertaken in the project have been identified through such procedures. Moreover, project performance targets have been laid down in terms of completion of these physical conservation measures.

Such measures have not been identified through beneficiary participation in planning and only to a limited extent in implementation. This causes two main types of problem. First, the project staff are concerned primarily with physical target attainment and little concerned with effective on-going utilisation of the measures. Secondly, beneficiary perception of environmental problems may lead to a different prioritisation for action yet, without participatory planning, their priorities count for nothing. One obvious cause of differences in priorities between beneficiaries and planners is where planners implement a long-term watershed management plan in which **the size and timing of benefits** varies significantly between individual measures, e.g. between gully plugging and contour bunding. From a poor beneficiary perspective, short gestation periods and larger returns are obviously a priority. Beneficiary involvement is needed especially where environmental objectives requires use of physical conservation measures with longer gestation periods; this is to help ensure that their longer-term maintenance needs are provided for and complementary land use patterns are adopted.

**E Institutional Arrangements** There is clear emphasis, in project documentation, on developing institutional arrangements for project implementation which involve beneficiary participation. But effective participation requires prior investments in human resource development. This is needed both to orient project staff towards more integrative bottom-up planning and to encourage development of beneficiary fora at village-level which can organise debate leading to decisions about priorities. In this particular project area, as in many other environmentally fragile ecosystems, the history of outside involvement is one of exploitation and appropriation of the natural resource base of the target population. Participatory approaches are therefore a fundamental starting strategy if beneficiary confidence and hence effective participation in project activities is to be achieved.

**F Flexibility in Project Targets** One issue that emerges very clearly from the preceding points is the need to plan specific conservation measures with beneficiaries.

This implies that annual targets for physical measures should be formulated after human resource development activities have provided an appropriate institutional basis for participatory planning. The further implication is that, initially, attainment targets must be set in terms of human resource development rather than physical targets. This may require a degree of imagination in determining appropriate monitoring procedures but, essentially, it involves further movement away from blue print planning towards process planning. Also, to succeed in human resource development the project management requires flexibility in order to be able to respond to the diversity of expressed beneficiary needs. Through responses to such needs, project management is better able to establish rapport with beneficiaries.

**G Environment Target Orientation V an Integrated Approach** Several of the issues raised above cast doubt on an assumption of complementarity between environmental objectives and the poverty-alleviation goal. Rather, they suggest that there are trade-offs and that resource economics are much more complex than the underlying project logic recognises. To understand how project proposals on alternative resource use patterns, especially land and water, relate to sustainable livelihood strategies of beneficiaries requires an holistic approach. Individual beneficiaries must be confident that alternative resource use proposals do meet their sustainable livelihood needs. This requires a direct planning focus on their livelihood strategies rather than an indirect one via the linkages of: prevention of resource degradation to improved land use to higher cash incomes to improved food entitlement. Effective intervention requires secure entitlement to food as the point of departure for project planning.

**H Food Security** Current land use patterns are very much determined by food security needs. The complex land use patterns in current practice are driven by subjective assessment of the best strategy for food self-sufficiency or as close to that as is physically possible. In general, this involves cultivation of annual food crops on slopland. Through the project the slopland will be converted into perennial crop land. The sales proceeds from these perennial crops will, in theory, provide the income to buy food in the market. There is the short-term problem of the gestation period before perennial crops produce a marketable yield. There is also the longer-term problem of adequate development of the market — both for

selling perennials and buying food. Unless beneficiaries are convinced that the market will provide an acceptable substitute for self-provisioning there is no likelihood of the project approach to slopland development being widely diffused. At present, the market is not adequate.

Summarising and drawing together the main conclusions, currently there is a trade-off between pursuit of livelihood and environmental sustainability. Strategies are available through the project to change this situation and make pursuit of livelihood and environmental sustainability complementary to each other. However, there is a short-term cost in a reduced farm income during the transitional period. For poor households the size of this transitional reduction may be unacceptably high. For a project team pushing adoption of the strategy the key move is to determine what extra resources are needed to allow the transition and, critically, how they should be utilised. Some form of food entitlement guarantee, at a minimum, is required. The guarantee must be sustained long enough to ensure genuine adoption of the new strategy. For it to be 'genuine' a commitment to the strategy at both village and household-level is required; before benefits from the new land use patterns have materialised such commitment is unlikely. Beneficiary participation in planning implementation of the strategy, in helping to specify food entitlement guarantees and in developing commitment to the new 'sustainable' land use patterns is a fundamental requirement. But it is a requirement that much environmentalism as currently practised undermines during both project design and implementation.

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