Global Habitat Protection: Limitations of Development Interventions and a Role for Conservation Performance Payments

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Abstract: *Conservation biologists, policy makers, and citizens have identified the protection of native ecosystems in low-income nations as a global social objective. Among the more popular initiatives toward this objective is the use of development interventions in the peripheral areas of endangered ecosystems. Such interventions indirectly provide desirable ecosystem services by redirecting labor and capital away from activities that degrade ecosystems (e.g., agricultural intensification) and by encouraging commercial activities that supply ecosystem services as joint products (e.g., ecotourism). I examined the economics of such interventions and the available empirical evidence and concluded that development interventions are hindered by (1) the indirect and ambiguous conservation incentives that they generate, (2) the complexity of their implementation, and (3) their lack of conformity with the temporal and spatial dimensions of ecosystem conservation objectives. In contrast, paying individuals or communities directly for conservation performance may be a simpler and more effective approach. In recent years there has been widespread experimentation with contracting approaches to ecosystem conservation. Conservation contracting can (1) reduce the set of critical parameters that practitioners must affect to achieve conservation goals, (2) permit more precise targeting and more rapid adaptation over time, and (3) strengthen the links between individual well-being, individual actions, and habitat conservation, thus creating a local stake in ecosystem protection. In situations where performance payments are unlikely to work, indirect development interventions are also unlikely to work. Thus, despite the potential barriers to developing a system of conservation contracts in low-income nations, my analysis suggests that performance payments have the potential to improve the way in which ecosystems are conserved in these nations.*

Protección Global del Hábitat: Limitantes para el Desarrollo de Intervenciones y el Papel de los Pagos por la Ejecución de Actividades de Conservación

Resumen: *Los biólogos conservacionistas, los legisladores y los ciudadanos han identificado la protección de ecosistemas en naciones con bajos ingresos como un objetivo social global. Entre las iniciativas más populares para alcanzar este objetivo se encuentra el uso de intervenciones para el desarrollo en áreas periféricas de ecosistemas en peligro. Estas intervenciones proveen servicios deseables del ecosistema indirectamente al re-direccionar actividades y capital lejos de las actividades que degradan el ecosistema (por ejemplo, intensificación agrícola) y alentando actividades comerciales que provean servicios del ecosistema como los productos de coyuntura (por ejemplo, ecoturismo). Examiné la economía de estas intervenciones los y las evidencias empíricas disponibles y concluí que las intervenciones de desarrollo son entorpecidas por (1) incentivos indirectos y ambiguos que generan; (2) la complejidad de su implementación y (3) la carencia de concordancia con las dimensiones temporales y espaciales de los objetivos de conservación del ecosistema. En contraste, el pago directo a individuos o comunidades por la ejecución de la conservación podría ser una estrategia más simple y más efectiva. En años recientes, ha habido amplia experimentación con las estrategias de contratación para la conservación de ecosistemas. Los contratos para conservación pueden (1) reducir el conjunto de parámetros críticos que los practicantes deben afectar para alcanzar las metas de conservación; (2)*

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permitir el establecimiento de metas más precisas; y (3) fortalecer los vínculos entre el bienestar individual, las acciones individuales y la conservación del hábitat, creando asi un interés local en la protección del ecosistema. En situaciones donde los pagos por rendimiento no son viables de funcionar, las intervenciones de desarrollo indirecto probablemente tampoco funcionen. Por ello, a pesar de las barreras potenciales al desarrollo de desarrollar un sistema de contratos de conservación en naciones de bajos recursos, mi análisis sugiere que los pagos por rendimiento tienen el potencial para mejorar la forma en la que los ecosistemas son conservados en estas naciones.

Introduction

Imagine that you live in a house that needs no air conditioning because the trees on your neighbor's property provide shade to cool your home. Recently, however, a new person moved into your neighbor's house. He wants to cut down the trees because he has installed solar panels to reduce his electricity bills. Cutting down the trees will increase the efficiency of the panels but will require you to install air conditioning and pay much higher electricity bills. Your uncle suggests a plan for ensuring that your neighbor's trees remain standing. He suggests that you create alternative employment and investment opportunities in which your neighbor's returns to labor and capital are so high that he will not want to invest time or money in cutting down his trees.

You may, however, decide that it is easier, and probably cheaper, to simply offer your neighbor an annual payment to leave the trees standing. The payment would have to be large enough to compensate your neighbor for the foregone reductions in his electrical bills, but it would probably be far less than the cost of occupying your neighbor's resources in other activities. Moreover, the probability that the trees will remain standing is higher.

Paying your neighbor to leave his trees standing because they provide a valuable service would strike few people as misguided. In low-income nations, however, citizens and governments interested in habitat and biodiversity conservation have adopted your uncle's less direct and more complex approach. Rather than make explicit payments, they use field-based project and policy interventions to transform local and regional economies in ways that encourage individuals to invest in activities that do not lead to habitat or biodiversity loss. They propose, in effect, to guide the economic development process toward paths that are compatible with ecosystem protection.

The premise underlying these interventions is sound: if residents near a threatened ecosystem are the principal agents of change, their behavior must change to protect the ecosystem. Even if residents are not the principal agents of change, they are often in the best position to protect the ecosystem, so influencing their behavior is important. Problems arise, however, when one examines the links between ecosystem conservation and the myriad interventions proposed by conservation practitioners (e.g., agroforestry, ecotourism). I explored the logical problems associated with using development initiatives to address the loss of intact ecosystems (habitat) and the concomitant loss of biodiversity. I introduce a more direct approach that depends on explicit payments tied to conservation results.

The purpose of this paper is to draw attention to and generate discussion about a system of direct payments for achieving ecosystem conservation objectives in low-income nations. I emphasize the positive aspects of direct payments but do not ignore problems associated with such systems. I hope this paper can serve as a foundation for examining direct-payment systems more thoroughly.

Development Interventions for Ecosystem Conservation

I focus on field-based interventions, such as technology transfers, that target individuals living near an ecosystem. Broader policy interventions, however, are clearly important in low-income countries. Ecosystem degradation is often stimulated by road building in remote areas, by direct and indirect subsidies for production activities, and by policies that encourage farmers to clear land to avoid taxes or gain property rights. Changes in these policies are thus necessary for ecosystem conservation but are unlikely to be sufficient. In the best cases, broad policy changes will reduce pressures on ecosystems by slowing conversion but they are unlikely to remove all of the incentives directed to individuals for converting habitat to other uses. Habitat conservation will typically require more precise, field-level incentives.

There are three principal problems associated with using development interventions to protect ecosystems. First, given the complexity of development interventions and the temporal and spatial scales at which conservation objectives must be achieved, field practitioners are forced to spread their resources over myriad tasks that often have no effect on conservation-related household behavior. Second, when practitioners do manage to have an effect, it is often an undesirable effect from a conservation perspective. Third, even if practitioners generate a desirable effect, they often have

difficulty sustaining it because the effect depends on market conditions that change frequently.

Barriers to Change

Experience with development interventions over the last four decades indicates that simply raising standards of living and encouraging economic growth is a major undertaking in many countries (World Bank 1988; Porter et al. 1991). Advocates of development-based conservation interventions propose a much more difficult task. They propose, in effect, to guide or control the development process so that specific behavioral changes will occur and precise conservation objectives will be achieved. They are attempting not only to effect change but to control the precise evolution of the change.

Reviews of development projects have faulted many interventions for being too complex and too diffusely targeted to have any effect on local conditions and behaviors (e.g., Hirschman 1967:22–27; 1966 *Korry Report* cited in Copson et al. 1986; World Bank 1988; Fox 1996). A general lesson has emerged: one must keep the intervention focused and flexible and composed of a small set of tasks with a medium to high likelihood of success.

Development-based conservation interventions, however, often exhibit the exact opposite characteristics. For example, the annual work plans for five integrated conservation and development projects in Madagascar listed on average 40 key activities, not including administrative tasks (Conservation International 1995; Projet Parc National Ranomafana 1995; Volunteers in Technical Assistance et al. 1995; World Wildlife Fund 1995; Conservation International et al. 1996). Moreover, many of the tasks listed, such as intensify agriculture or develop community institutions, were likely to involve many subtasks in order to be successful.

Given the immediacy of conservation objectives and donor demands, practitioners must also achieve results quickly. Development interventions, however, rarely produce significant transformations of economies and individual behavior in the short term. New technologies, markets, and attitudes take many years to develop and slowly work their way through societies.

To reconcile the short-term immediacy of habitat conservation objectives with the slow pace of social change, conservation practitioners resort to two approaches, often in combination. The first is to regulate by force in the short term, while waiting for changes in resource use incentives to materialize. But successful development interventions depend on trust and cooperation between residents and outside technicians, and trust is difficult to engender in the presence of repressive force. The second approach involves spending large amounts of money and resources to introduce new technologies, infrastructure, and attitudes quickly. The history of development interventions in low-income nations speaks for itself: attempts to introduce multiple and simultaneous changes in technology, institutions, and attitudes typically fail (World Bank 1988; Porter et al. 1991).

The fundamental tension between the time frames of conservation and development objectives is further exacerbated by differences between the appropriate spatial scales at which conservation objectives and development interventions are realized. Ecosystems are often large and encompass many biological and cultural zones. Thus the effort to conserve them must be accomplished at a landscape scale. Development initiatives are context-specific, however, and often best begun on a small scale (Bunch 1982) or with a narrowly defined focus (World Bank 1988). When practitioners quickly introduce new technologies, markets, and attitudes at large scales, they spread their resources thinly over a large territory, thereby diluting or misdirecting their impact.

Barriers to Desirable Change

Even if conservation practitioners are able to effect change in a local economy, their interventions may not alter the incentives that prompt rural residents to degrade habitat. Rather than serving as substitutes for ecosystem-degrading activities, the new technologies and employment opportunities introduced are often complements (Ferraro et al. 1997) to these destructive activities. In other words, residents adopt the new technologies or employment opportunities (e.g., animal husbandry) but continue to engage in activities that threaten ecosystems (e.g., hunting).

Moreover, the new technologies or employment opportunities can exacerbate habitat loss. For example, contrary to the dominant hypothesis of many conservation and development projects, agricultural intensification will not necessarily take pressure off native ecosystems. In fact, some studies suggest the opposite: decreases in input prices (Ozorio de Almeida & Campari 1995; Lewandrowski et al. 1997) and increases in productivity (Wiersum 1986; Kaimowitz & Angelsen 1998; Angelsen 1999; A. D. Foster, J. Behrman, M. Rosenzweig, unpublished data) in low-income nations are associated with increases in the area of land under cultivation. Recent reviews point out that the relationship between intensification and ecosystem protection in low-income nations is indeterminate (Kaimowitz & Angelsen 1998; Lee et al. 2000).

Successful agricultural development interventions raise household incomes. More income permits farmers to purchase more labor and capital with which to further expand their activities. The needs of most people are not finite, particularly those of poor farmers. If farmers can be better off by expanding new or old technologies into intact ecosystems, they will do so. An increase in the returns to agriculture can therefore be equivalent to an increase in the opportunity costs of conservation. In such cases, conflicts between local residents and conservation practitioners will grow with increases in agricultural productivity.

Successful agricultural development interventions in rural areas typically also require improvements in transportation and market infrastructure, but a review of deforestation analyses (Kaimowitz & Angelsen 1998) found that many studies link deforestation to the proximity and quality of transport routes and markets. Better infrastructure can make pro-conservation activities more profitable, but it can also make other activities more profitable as well.

The introduction of better infrastructure and new livelihood opportunities also tends to encourage immigration into a region. Thus, even if a labor-absorbing development strategy is implemented to promote habitat conservation, the pool of labor may simply expand and render the strategy ineffective. Unless current residents have a direct incentive and the ability to protect the ecosystem from conversion, the entire agricultural sector near the ecosystem will expand. This phenomenon has been noted in case studies and general equilibrium analyses (e.g., Jones 1989; Elahl & Khushalani 1990; Coxhead & Jayasuriya 1994; Ferraro et al. 1997; Oates 1999).

A paradox seems to exist. Stagnation in the agricultural sector can put pressure on forests as farmers extensify their production and the landless migrate to the forest margins. On the other hand, agricultural profitability threatens forests by increasing incentives to clear land for cultivation. The paradox is resolved by recognizing that, at the most fundamental level, the profitability of agriculture, no matter how marginal, drives habitat conversion. Therefore, only the profitability of conservation can arrest it.

To increase the profitability of protecting ecosystems, practitioners have turned to another popular approach: market-based initiatives, such as selective timber logging or nontimber forest-product extraction, that raise the local value of intact ecosystems and thereby maintain ecosystem services as joint products. But experience to date with such initiatives indicates that success is likely only under limited conditions (Campbell et al. 1999; Salafsky et al. 1999). The task of turning remote rural residents into eco-entrepreneurs is complex, and most projects yield too few benefits for too few people to compete with activities that lead to habitat conversion (Browder 1992; Richards 1993; Lawrence et al. 1995; Smith 1996). Attempts to increase the benefits from ecosystem use often lead to the degradation or simplification of the ecosystem (Freese 1997). Even low-intensity, subsistence activities (Redford 1992) or commercial activities (Howard et al. 1996; Peres 1999) can lead to the same outcome. Moreover, the scientific data required to determine appropriate extraction levels may be expensive to gather (Freese 1997). Other authors have also noted problems related to the sustainability of extractive initiatives (Tewari & Campbell 1996; Barrett & Arcese 1998) and the inefficiencies of subsidies that are often required to make eco-activities profitable (Simpson & Sedjo 1996).

Despite the theoretical appeal of interventions oriented toward increasing the local value of intact ecosystems, the practical implementations to date have many shortcomings: they often fail to match the benefits generated by ecosystem conversion, they can lead to undesirable ecosystem simplification, and they require significant resources to implement, monitor, and sustain.

Barriers to Sustaining Desirable Change

Even if practitioners overcome the problems outlined above, an important obstacle remains: how to maintain the created system of incentives for habitat protection. Development-based conservation approaches appear to assume implicitly that one can intervene in an area, transform the local or regional economy, exit, and then watch as the transformed system rolls along in perpetuity. But societies, their economies, and their environments are never static. Prices change, roads degrade, new pests develop, and new information arrives. Development-based initiatives will therefore inevitably require repeated intervention over time. In the long term, such approaches are likely to be extremely expensive, even if they are successful in the short term.

Conservation Performance Payments

Development interventions will not make ecosystem protection optimal for rural residents in many areas of the world. As we argued above, the links that development interventions create between individual well-being and habitat conservation are often vague and indirect, or simply nonexistent. Thus conservation practitioners find it difficult to create an appropriate set of incentives and maintain them over time.

Despite the difficulties in using development interventions to promote habitat protection, conservation practitioners should not abandon attempts to change field-level incentives. As Laarman (1995) argues, the challenge is to test and ultimately implement interventions superior to our current efforts, not to discard the principles of intervention. Ideal interventions should have the following characteristics:

(1) be relatively simple in the sense that they allow practitioners to focus their energy on a few activities with high probabilities of success;
(2) achieve conservation objectives in the short and the long term;
(3) achieve conservation objectives at the scale of ecosystems;
(4) provide clear, direct incentives for residents to actively protect habitat;
(5) deter immigration; and
(6) reduce the social and political conflicts over resource allocation that often endanger ecosystem survival.

To design an intervention possessing these six characteristics, practitioners may consider an international habitat reserve program (IHRP). An IHRP is a system of institutional arrangements that facilitates conservation contracting between international or national actors and individuals or groups that supply ecosystem services. The contracts specify that the outside agents will make periodic performance payments to local actors if a targeted ecosystem remains intact or if target levels of wildlife are found in the ecosystem.

The notion of compensating people for their role in maintaining resources of global value is not new (Barbier & Rauscher 1995; Swanson 1995; Simpson & Sedjo 1996), but direct compensation schemes for individuals living near threatened ecosystems are rare because of serious obstacles to designing an effective scheme (Simpson & Sedjo 1996; Ferraro & Kramer 1997). Practitioners must deal with strategic behavior by recipients, the complexity of institutional design, conflicts over property rights, and potentially high costs of implementation. Practitioners can, however, learn from existing initiatives that pay individuals or groups for conservation performance (i.e., conservation contracts).

The best-known conservation payment initiatives are the agricultural land-diversion programs of high-income nations. In these programs, government agencies provide financial incentives to farmers to keep land out of agricultural production or shift it to alternative uses, thereby reducing the supply of agricultural commodities and augmenting the supply of environmental services. In Europe, 14 nations spent an estimated $11 billion (1993–1997) to divert well over 20 million ha into long-term set-aside and forestry contracts (OECD 1997). In the United States, the Conservation Reserve Program spends about $1.5 billion annually on contracts for 12–15 million ha, an area twice the size of all national and state wildlife refuges in the lower 48 states (Clark & Downes 1999).

These conservation contracting programs account for only a small percentage of agricultural support budgets, but they are among the fastest growing payments to farmers in high-income nations (OECD 1997). Their dramatic growth is due partly to their popularity among various stakeholders and to the opportunities they afford for flexible targeting and adjustment to local conditions (OECD 1997). Moreover, payments for enhancing the supply of environmental goods and services are likely to be one of the few government payments to rural farmers that global trade organizations, such as the World Trade Organization, will countenance (Potter & Ervin 1999).

Nongovernmental organizations (NGOs) have also developed innovative direct-payment approaches. The Delta Waterfowl Foundation, for example, has an "adopt-a-pothole" program that pays prairie farmers who protect nesting areas for ducks (Delta Waterfowl Foundation 2000). The Defenders of Wildlife (2000) reward landowners for occupied wolf dens on their property.

Although rare outside of high-income countries, direct-payment systems can also be found in the tropics. In the last 4 years, Costa Ricans have created institutional mechanisms through which local, national, and international beneficiaries of ecosystem services compensate those who protect ecosystems (Castro et al. 1998; Calvo & Navarrete 1999). Costa Rica's 1996 Forestry Law (no. 7575) explicitly recognizes four ecosystem services: carbon fixation and sequestration, hydrological services, biodiversity protection, and scenic beauty. The law gives landowners the opportunity to be compensated for the provision of these services.

Costa Rican practitioners have identified sources of financing and have developed rules for allocating available funds. Funds are allocated through the National Forestry Financial Fund (FONAFIFO), which works directly with landowners and indirectly through third-party intermediaries (e.g., NGOs). The FONAFIFO raises money from international donors and national sources, such as a fuel tax and payments made by hydroelectric plants. The FONAFIFO then distributes the money through contractual arrangements with private individuals and groups.

The FONAFIFO establishes contracts for three land-use categories: reforestation, sustainable forest management, and forest preservation. The most common contract is for forest preservation. Each category is associated with a fixed annual payment per hectare. Regional conservation agents and third-party NGOs identify potential participants based on regional conservation priorities. They often target land buffers around protected areas. Landowners who are awarded contracts receive annual payments if they comply with the contract.

Costa Rica's environmental services payment program is new, but appears to be having some success. On a June 1999 trip, I observed excess demand for conservation contracts among landowners and support for the program from many sectors. Serious issues remain, however, including minimizing transaction costs, designing and targeting contracts, and developing appropriate institutional rules and roles.

In large part, the design of a direct-payment initiative depends on field conditions and conservation objectives. In one region, targeted lands may already be in private hands. In another region, the lands may be publicly owned, but a fraction of the total land will be ceded to local residents, as individuals or as groups. For some ecosystems, a payment for preventing deforestation may be sufficient. In others, bonuses may be paid if periodic surveys indicate the presence of target levels of wildlife. In areas where wildlife are agricultural pests or injurious to humans, payments in compensation for damage may also be required (e.g., predator compensation funds of Defenders of Wildlife and the World Wildlife Fund). Despite the details that must be addressed, conservation-performance payments offer clear advantages over the use of less-direct development interventions.

Program Simplicity and Appropriate Scales

With direct payments, practitioners can focus their scarce resources on two key tasks: the design of appropriate institutions and payment schemes. With a smaller set of parameters to influence, practitioners are more likely to achieve their conservation objectives. Furthermore, they can be confident that if a contract is struck, the conservation effect will be positive.

With regard to spatial scale, performance payments are amenable to a landscape approach. For large areas that include different agroeconomic zones, the complexity of using development-based interventions to promote habitat conservation is substantial. Practitioners must tailor supporting institutions, infrastructure, and appropriate technologies to each zone. Using a contract approach, practitioners need only focus on variations in institutional arrangements across zones. Because performance payments can be targeted more precisely than development interventions, practitioners can also be more confident that their interventions will have an effect on the areas targeted for conservation (e.g., corridors) rather than elsewhere. A study of land-diversion programs (OECD 1997:48) noted that in the European Union, "Implementation is based on national and regional plans and offers opportunities for flexible targeting and adjustment to local conditions."

Performance payments are also amenable to the short time period during which conservation objectives must be met. As soon as the money and the institutions are ready, payments can be made, thus quickly establishing the link between conservation and the well-being of residents. Practitioners can sustain this link with appropriate financial and institutional design (e.g., endowments). If conditions change dramatically, practitioners can adapt and reorient by adjusting payment levels, target areas, or institutions.

Clear Conservation Incentives

With payments conditional on conservation results, the connection between conservation expenditures and objectives is unambiguous to both recipients and donors. Recipients face a clear choice: protect a parcel of land and receive payments or clear the parcel and forgo the payments. Donors may find conceptualizing and observing the effects of their expenditures easier than with development-based interventions. Funds may therefore be more forthcoming (Simpson & Sedjo 1996).

The explicit connection between payments and conservation objectives also sends a clear signal to residents that ecologically valuable land is economically valuable. In contrast, current conservation efforts often send a signal to residents that they should preemptively clear land lest it be regulated or expropriated. In the Costa Rican payment program, some observers believe that farmers without contracts are forgoing clearing forest in the hope that they may secure a contract in the future (F. Tattenbach, personal communication).

By virtue of the direct link between payments and conservation objectives, performance payments create incentives for local residents to have an active stake in protecting ecosystems. In contrast, many indirect development-based approaches (e.g., agricultural intensification) encourage passive conservation by local residents. Residents do not make a deliberate choice to protect an ecosystem; the targeted ecosystem is simply not used in productive activities and thus is not degraded. Without active local involvement in conservation, however, many ecosystems will remain open-access resources under continuous threat of conversion.

Increasing evidence indicates that private and common lands are often managed better than government lands for ecological services (Laarman 1995). This outcome is especially likely when local institutions coordinate monitoring and enforcement efforts. Of course, an important problem with private control of ecosystems is the divergence between private and social values. With performance payments, however, private agents capture social values attributed to the ecosystem and thus private and social objectives can coincide.

Although they provide clear benefits to residents, performance payments provide fewer incentives for immigration than do more diffuse development interventions. Newcomers cannot capture a share of the benefits by simply arriving in a region; they must hold a conservation contract. Contracts also eliminate the open-access character of many ecosystems by effectively allocating the land to use by local residents (i.e., for conservation). There are anecdotal examples of indigenous people gaining property rights over formerly public lands after which immigration was curtailed (Mbanefo & de Boerr 1993; Laarman 1995).

Rights and Responsibilities

In the context of performance payments, residents are cast as providers of valuable services. Their role is changed from adversary to collaborator. This change not only helps to avoid the ethical dilemma of denying poor or indigenous people the ability to earn a livelihood, but it also improves conservation enforcement by creating "citizen guards" who have an active interest in protecting ecosystems. Casting residents as collaborators can also render conservation education more effective. Residents are not told what they are doing wrong, but rather what they are doing right.

At the national and international levels, conservation contracts encourage the beneficiaries of ecosystem conservation to pay for those benefits. In particular, the participation of wealthy nations in the conservation of ecosystems in low-income nations has long been recognized

as a critical component of global biodiversity protection (Article 20[2] of the Convention on Biological Diversity 1992; World Bank 1992). But a controversial aspect of development-based conservation approaches is that much of the financial transfers leave a local area through physical capital purchases and salaries of myriad expatriate and host-country experts. Direct payment initiatives ensure that more of the transfers stay in a region.

Host-country governments are also less likely to perceive performance payments as weakening national sovereignty. Industrialized nations are not pressuring low-income nations to set aside lands for protection, but rather they are engaging in a contractual agreement much like any contract for the supply of a service.

Conservation Contract Design

Although conservation contracts have advantages over less direct development interventions, they are neither easy to implement nor a one-size-fits-all intervention. Practitioners must overcome obstacles inherent in institutional design, property rights, financing, and strategic behavior by potential beneficiaries. The same obstacles, however, often play a central role in the implementation of development-based interventions. Conservation contracting has the advantage of allowing practitioners to focus their energies on overcoming these obstacles.

Institutional Design and Human Capital Investments

To design a payment program, practitioners must identify the institutions that will implement the program. Who will raise the money? Who will distribute the money? What institutions will guarantee the rights to benefits distributed by the system? Will coordination among rural residents be required; if so, how will this be accomplished? How will the legal system be made accessible to rural residents? How will statutory laws and institutions be integrated with traditional ones?

Researchers in a study of agricultural land-diversion programs (OECD 1997:48) note that while the European Union programs are successful by many criteria they "also [require] major technical and administrative expertise on the part of regional and local authorities. The lack of organisational capacity and experience could limit the potential of the programme, especially in countries that have never operated similar schemes before." Practitioners in low-income nations can learn from direct-payment initiatives in the industrialized world and Costa Rica, but the institutional requirements of a direct-payment scheme may be insurmountable in many areas.

Practitioners must also design institutions to ensure that participating rural residents receive their rightful benefits. Institutions must thwart attempts by powerful individuals to divert payments or to use the distribution of benefits as a tool to enhance their power. Experiences in low-income nations and eastern Europe suggest that preventing such outcomes is no easy task. Insofar as conservation contracting adds enforcement eyes to the system, however, direct-payment initiatives may reduce the corruption currently observed in government-controlled natural-resource management. Practitioners can also learn from recent attempts to use NGO advocates and transparent institutions to share with rural residents the revenues from tourism (Peters 1998) and wildlife culling (Muir & Bojö 1994).

Conservation contracting requires periodic payments and monitoring over time. Thus the use of performance payments implies long-lived institutions and financial support. An advantage of development-based interventions is that they seem to require only short-term investments to achieve long-term results. But as a recent World Bank analysis (Wells et al. 1999:26) noted conservation initiatives "based on simplistic ideas of making limited short-term investments in local development and then hoping this will somehow translate into sustainable resource use and less pressure on parks need to be abandoned."

Thus, despite its imposing institutional needs, a system of direct payments has many of the same institutional requirements as development-based interventions. Both require institutions that can monitor ecosystem health, resolve conflict, coordinate individual and institutional behavior, and allocate and enforce rights and responsibilities over time (Brown & Wyckoff-Baird 1992; Wells et al. 1999). Unlike more complex development interventions, however, direct payment initiatives allow practitioners to focus their resources on designing and maintaining the requisite institutions. A narrower focus will not guarantee a better outcome, but past studies of field interventions have suggested that it can help substantially (World Bank 1988; Porter et al. 1991).

Property Rights

Closely related to institutional design is the specification of property rights over the contracted areas. Given differences in conservation objectives and in biophysical, cultural, and socioeconomic characteristics across regions, there is no single correct way to specify property rights. In some areas, individuals may have or may be given full, alienable property rights. In other areas, their rights may be more circumscribed. In one situation, rights may be allocated to individuals, whereas in another case rights will be allocated to groups.

The key task in any conservation initiative is to ensure that those who invest in conservation have clear, enforceable rights to the benefits of their efforts. History demonstrates, however, that allocating (or reallocating) property rights can be an expensive and conflict-ridden process (e.g., Sobhan 1993). Moreover, without strong institutions to enforce rights, conservation contracting will contribute little to ecosystem protection. In rural ar-

eas of low-income nations, legal institutions are weak at best, and the costs of establishing and enforcing property rights may be prohibitive.

Another difficult task for practitioners is the identification of the individuals to whom property rights will be allocated. Rights must be allocated to those who can control the use of the resource. The choice of who will, and who will not, receive the rights to payments, and therefore the rights to exclude others from the resource, is open to political manipulation and can produce conflict. Allocating property rights may be one of the most serious challenges to conservation contracting. Conflict may also derive from situations in which local agents in one area receive contracts while in another area local agents are expected to provide ecosystem services free of charge. Of course, allocating rights and brokering the interests of different stakeholders have also been identified as critical components of development-based conservation projects (Brown & Wyckoff-Baird 1992).

In some countries, the rule of law, both traditional and formal, is weak or nonexistent. In such cases, conservation contracting may be impossible. In the same circumstances, however, traditional development interventions or public ownership of ecosystems are also unlikely to lead to desirable conservation outcomes.

Strategic Behavior and Displacement of Threat

Practitioners must anticipate strategic behavior by people who will attempt to extract maximum benefits from the program. For example, the promise of payments could encourage people to feign interest in converting lands that would not have been converted in the absence of payments. Residents holding contracts may also convert or harvest from substitute ecosystems that would not have been exploited in the absence of contracts. Other potential strategic behaviors include seeking short-term conservation contracts simply to overcome credit constraints and generate cash for making ecosystem-degrading investments. The potential for such behaviors, however, also exists in development-based conservation initiatives.

Residents may also try to exert market power to force conservationists to pay unusually high rents. Practitioners can mitigate the negative consequences of market power through appropriate institutional design (e.g., the Conservation Reserve Program's competitive-bidding system in the United States). Politically powerful citizens may be able to influence the allocation of contracts such that funds are not allocated to areas of high conservation value but rather to those of high political value. Such an outcome, however, is also widespread in the allocation of development investments. A transparent parcel-ranking equation based on objective criteria may help to prevent such an outcome in direct-payment initiatives.

Strategic behavior may also occur in the period prior to project implementation. If there is widespread publicity about conservation payments, wealthier and more knowledgeable individuals may engage in land speculation in the hopes of securing a large portion of the payments. Practitioners may also see an influx of immigrants hoping to be considered "residents" when property rights are allocated, or immigrants who simply do not understand that they need to hold a contract to benefit from the program.

Payment Costs

The notion of paying for people to protect habitat may strike some as an expensive proposition, but many of the regions in which conservation practitioners work are at the margins of the economy where land uses are not very profitable. Analyses of land use around protected areas indicate that residents would accept payments from $28 to $190 per year per ha to forgo the benefits of ecosystem conversion (Ferraro 1994; Shyamsundar & Kramer 1996; Smith & Mourato, unpublished data). In Costa Rica, annual payments of $35 per ha generate excess demand for conservation contracts (Calvo & Navarrete 1999).

Practitioners may also find that they do not need to make payments for an entire targeted ecosystem to achieve their objectives. They need include only "just enough" of the ecosystem to make it unlikely, given current economic conditions, infrastructure, and enforcement levels, that anyone would convert the remaining area to other uses. Thus, in a well-designed system, not only will residents protect contracted lands near their communities, but they will also protect the remaining ecosystem beyond their lands. The area that constitutes "just enough" may change over time, but with performance payments, practitioners can adjust rights and payments to maintain the required incentives.

The maintenance of biodiversity and other ecological services may also be compatible with some uses such as tourism and extraction of forest products. In these cases, payments would have to compensate residents for a subset of the foregone development options, but not for all of them. Unlike indirect investments in eco-enterprise development, however, performance payments achieve conservation objectives regardless of whether or not markets support commercial use of the ecosystem.

The absolute value of performance payments should be evaluated in light of how much money is now being spent on conservation initiatives. Some habitat conservation initiatives have spent up to $1 million per year in small areas. Few, however, have been able to dramatically change local incentives for habitat protection (e.g., Wells et al. 1992; Ferraro et al. 1997; Hackel 1999; Oates 1999; Wells et al. 1999). Considering the likely costs of using development interventions to create and maintain incentives for habitat protection, performance payments may prove very cost-effective over the long term.

With a budget equivalent to the U.S. Conservation Reserve Program in 1996 ($1.8 billion), practitioners could make annual payments on up to 60 million ha. With appropriately targeted payments across the landscape, the actual number of hectares effectively protected could easily be triple or quadruple this amount. To put this area into perspective, consider that, in 1996, 309 million ha were in World Conservation Union protected-area classes I–IV in the Middle East (including 741,000 km^2 in two Saudi Arabian protected areas), South and Southeast Asia, Central and South America, and Africa (Green & Paine 1997:13). The 25 hotspot ecosystems identified by conservationists as global priorities encompass 212 million ha (Mittermeier et al. 1999).

In the case of Madagascar, donors have proposed spending $180 million over 5 years for biodiversity and ecosystem conservation (World Bank 1996). This same amount of money could be used to make annual payments of $35 per ha on over 1 million ha of land. The forests in Malagasy parks and reserves cover just over 1 million ha (Hannah et al. 1998). Properly targeted, the money could also be used to make payments in other ecosystems and lands outside parks.

Performance payments to rural residents would not, of course, be the only costs. Practitioners and payment recipients will incur transaction costs in their efforts to design and administer institutions. For example, the administrative costs for Canada's land-diversion program (Permanent Cover Program) were estimated to be about one-quarter of the payment costs (OECD 1997). Although transaction costs in conservation contracting may be significant, many of the same costs are also incurred in development-based interventions. For example, practitioners must monitor ecosystem health and rule compliance in both interventions.

Benefits and Risks Associated with Cash Payments

When they are successful, development-oriented conservation initiatives can provide local economic benefits as well as conservation results. But performance payments also provide local benefits. In comparing the two approaches, a recent economic analysis (Ferraro & Simpson 2000) suggests that direct payments are more cost-effective conservation measures than indirect development interventions. Thus, local agents could be made better off under appropriately designed payment schemes. Moreover, performance payments benefit poor farmers by improving cash flows and providing a fungible store of wealth. For risk-averse farmers, nonstochastic payments also help to diversify the household portfolio and reduce exposure to risk. In the U.S. Conservation Reserve Program, risk reduction is an important incentive for enrollment (Gustafson 1994).

Cash payments, however, can exacerbate residents' exposure to risk by making them more dependent on markets for meeting their consumption needs. In rural areas, markets are often imperfect, and residents may not be able to transform cash into the resources they need or may be able to do so only at higher prices than anticipated. The same potential problem, however, is prevalent in commercial development interventions. In contrast to development-based interventions, however, direct-payment initiatives do not require households to make significant labor investments and thus permit them to continue production on previously cleared lands or to work off-farm. Conservation payments can thus be viewed as a complement to rather than a substitute for current income.

Financial transfers that are conditional upon stopping or limiting what may have been traditional activities can also lead to a variety of social problems. These problems, which are also prevalent in development-based approaches, become more likely the more an activity is associated with the identity of individuals, and opportunities to engage in the activity outside of contracted lands shrink. Moreover, outside observers may view conservation contracts as payments for simply doing nothing ("welfare stigma"), rather than as provision fees to local residents for ensuring the supply of valuable public services.

Conclusion

The problem of habitat and biodiversity loss is complex, but a complex problem does not always require a complex solution. Conservation practitioners may identify a hundred factors that affect ecosystem use in an area, but they need not design a hundred-pronged intervention to achieve their objectives.

Although most of the tropical world continues to experiment with indirect, hydra-headed development interventions to promote ecosystem conservation, some nations are experimenting with more direct contracting approaches that use performance payments to achieve conservation results. Conservation-contracting initiatives deserve the attention of practitioners and scholars. Although a contracting approach is neither a magic bullet nor an appropriate intervention for every site, it offers advantages to conservation practitioners in low-income countries because it

- reduces the complexity of implementation in diverse local conditions;
- achieves conservation objectives at the scale of ecosystems in both the short and long term;
- permits precise program targeting and rapid adaptation over time;
- strengthens the links between individual well-being, individual actions, and habitat conservation, thus creating a local stake in ecosystem protection;

- changes the role of local residents from adversary to collaborator; and
- encourages beneficiaries of ecosystem services to pay for the services.

An international habitat reserve program (IHRP) that facilitates conservation contracting could be an important component of a four-part global conservation strategy to (1) change policies that encourage inefficient habitat conversion; (2) generate livelihood opportunities in regions far from threatened ecosystems in order to reduce immigration and encourage emigration away from threatened ecosystems; (3) increase the perceived benefits that local, regional, national, and international citizens receive from natural ecosystems; and (4) design institutions to ensure that those who are in the best position to supply valuable ecological services benefit from their efforts.

To implement a conservation contracting initiative in low-income nations, practitioners face substantial obstacles in matters of institutional design, property rights allocation, and strategic behavior by potential beneficiaries. But the implementation of less direct, development-oriented interventions faces similar obstacles. Although there is no guarantee that a direct-payment initiative will succeed, the contrasts between direct and indirect approaches to conservation suggest that performance contracts may be one of the most effective and efficient mechanisms for protecting habitats in low-income nations. Scholars and practitioners would do well to begin experimenting with contracting initiatives in the field.

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