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How Can Markets for Ecosystem Services Benefit the Poor?

Maryanne Grieg-Gran, IIED and Joshua Bishop, IUCN

The world has begun to recognise that it needs the Amazon and other tropical forests. The time has come to start paying for them.[1]

1. INTRODUCTION

There is growing interest in market-based approaches to conserving ecosystem services.[2] In both developed and developing countries a range of measures have been introduced. The basic concept is to create positive economic incentives for

1. The Economist, July 24th 2004.
2. See for example: Daily, G.C. and Ellison, K. (2002). *The New Economy of Nature and the Marketplace: The Quest to Make Conservation Profitable*. Island Press: Washington, D.C. Gutman, P. (ed.) (2003). *From Goodwill to Payments for Environmental Services: A Survey of Financing Options for Sustainable Natural Resource Management in Developing Countries*. Danida and WWF: Washington, D.C. Johnson, N., White, A. and Perrot-Maître, D. (2001). *Developing Markets for Water Services from Forests: Issues and Lessons for Innovators*. Forest Trends with World Resources Institute and the Katoomba Group: Washington, D.C. Mantua, U., Merlo, M., Sekot, W. and Welcker, B. (2001). *Recreational and Environmental Markets for Forest Enterprises: A New Approach Towards Marketability of Public Goods*. CABI Publishing: Wallingford. Swingland, I. (Ed.) (2002). *Capturing Carbon and Conserving Biodiversity: The Market Approach*. Earthscan: London. Different authors use various terms to describe efforts to create positive incentives to encourage the supply of ecosystem services, including: market-based instruments (MBIs), payments for ecosystem services, markets for environmental services, rewards for ecological services, and so on.

land managers to behave in ways that increase, or at least maintain, certain environmental functions. These include, among others:

- The sequestration of carbon in biomass or soils;
- The provision of habitat for endangered species;
- The protection and maintenance of landscapes that people find attractive (such as cloud forest in Costa Rica, the veld in Southern Africa or the patchwork of hedgerows, cropland and woodland typical of southern England); and
- A catch-all category of 'watershed protection' which involves various hydrological functions related to the quality, quantity or timing of fresh water flows from upstream areas to downstream users.

While the primary goal of these market initiatives has been environmental, there is growing interest in their potential to meet development objectives as well

Some schemes are recent and experimental, such as the BushTender pilot scheme covering 3000 hectares in the State of Victoria, Australia, under which private land owners are paid to provide habitat conservation services to state agencies.[3] Other schemes are relatively well-established, such as the Payment for Environmental Services (PES) scheme in Costa Rica, which has been in operation for over eight years.[4]

While the primary goal of these market initiatives has been environmental, there is growing interest in their potential to meet development objectives as well.[5] The commitment to the United Nations Millennium Development Goals (MDGs) raises the question as to whether these new markets for

3. Stoneham, G., Chaudhri, V., Ha, A. and Strappazzon, L. (2003). 'Auctions for conservation contracts: an empirical examination of Victoria's BushTender trial,' *Australian Journal of Agricultural and Resource Economics,* 47(4): 477-500.
4. Rojas, M., and Aylward, B. (2003). *What are we learning from experiences with markets for environmental services in Costa Rica? A review and critique of the literature.* Markets for Environmental Services No. 2. IIED, London. Snider, A.G., Pattanayak, S.K., Sills, E.O. and Schuler, J.L. (2003). 'Policy Innovations for Private Forest Management and Conservation in Costa Rica,' *Journal of Forestry* (July/August): 18-23.
5. Landell-Mills, N., and Porras, I. (2002). *Silver Bullet or Fool's Gold? A Global Review of Markets for Forest Environmental Services and Their Impacts on the Poor.* IIED, London. Pagiola, S., Bishop J., and Landell-Mills, N. (eds.) (2002). *Selling Forest Environmental Services Market-based Mechanisms for Conservation and Development.* London: Earthscan Publications Ltd. Scherr, S.J., White, A. and Kaimowitz, D. (2001). *Making Markets Work for Forest Communities.* Forest Trends: Washington, D.C. Shilling, J.D. and Osha, J. (2004). *Paying for Environmental Stewardship: Using Markets and Common-Pool Property to Reduce Rural Poverty while Enhancing Conservation.* Technical Paper, Economic Change, Poverty and The Environment. Macroeconomics for Sustainable Development Program Office, WWF: Washington, D.C.

ecosystem services can also help reduce poverty. In this respect, the most obvious benefit of market initiatives is the potential to bring new sources of cash income to previously marginalised communities. But just as the formulation of the MDGs reflects a view that poverty is multi-dimensional, so it is important to look beyond cash income and consider how market initiatives affect other dimensions of poverty. For example, the improvement of natural resource management resulting from the use of such mechanisms may bring benefits in the form of improved nutrition for those who depend on wild foods. Similarly, the urban poor may benefit from improved access to safe drinking water and reduced risk of floods, as a result of payments for watershed protection upstream.

At the same time, there are also concerns that markets for ecosystem services may be harmful to the poor, for example by restricting their access to natural resources on which they depend for their livelihoods or by exposing them to the risks of market change. Much depends on how the initiatives are designed and the context in which they are introduced.

This paper explores the various ways in which markets for ecosystem services could contribute to the MDGs, as well as the possible pitfalls. Drawing on some recent case studies it considers the experience of specific initiatives.

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2. MARKET-BASED MECHANISMS FOR ECOSYSTEM SERVICES

The forms of, and participants in, systems of economic incentives for ecosystem services are extremely varied. One of the most prominent is *direct payments for environmental services*.[6] These are made usually by governments but sometimes also by NGOs, to farmers and other private land-owners, in an attempt to encourage certain 'conservation-oriented' land use practices. In Costa Rica, for example, the government has since 1996 paid landowners enrolled in a scheme designed to reward the provision of environmental

6. Ferraro, P.J. and Kiss, A. (2002). 'Direct Payments to Conserve Biodiversity,' *Science* 298, 29 November: 1718-1719.

services associated with forest protection, forest management and reforestation (Box 4.1). This scheme has provided a model for other countries to follow.

Box 4.1: Payments for forest environmental services in Costa Rica

The Fondo Nacional de Financiamiento Forestal (FONAFIFO) pays forest owners and protected areas in Costa Rica for reforestation, forest management and forest conservation under 10-15 year contracts. FONAFIFO acts as an intermediary between forest owners and buyers of various ecosystem services, including carbon sequestration, watershed protection, scenic beauty and biodiversity conservation. As of the end of 2001, almost 4500 contracts had been written covering over 250,000 hectares, at a cost of US$50 million, with pending applications for another 800,000 hectares. Funds for the scheme are derived from a national fuel tax, supplemented by contributions from private companies.

Sources: Pagiola et al (2003). *op.cit.*
Snider et al (2003). *op.cit.*
Miranda, M., Porras, I., T., and Moreno, M. (2003). 'The social impacts of payments for environmental services in Costa Rica. A quantitative field survey and analysis of the Virilla Watershed.' *Markets for Environmental Services*, No. 1. IIED, London.

A variation on this theme is the *purchase or leasing* of land, or of resources on the land, from either public or private owners, for the purpose of conservation or sustainable use. For example, NGO buyers are actively engaged in rural land markets to acquire threatened habitat, purchasing development rights from private land owners, or competing with timber companies to secure long-term concessions on publicly-owned forest land.[7] In Bolivia, a consortium of international NGOs including the Nature Conservancy, private energy companies and the government bought out timber concession holders in order to extend the Noel Kempff Mercado park.[8]

There is also a proliferation of voluntary *eco-labelling and certification* schemes, which again seek to encourage environmentally-friendly resource management practices, from organic cotton farming to sustainable timber production to turtle-friendly fishing. In such cases there is often a hope that consumers will be willing to pay a little more for certifiably 'sustainable' products and services, and that enough of this premium will be left over after deducting

7. Hardner, J. and Rice, R. (2002). 'Rethinking green consumerism,' *Scientific American*, 287: 89-95
8. May, P.H., Boyd, E., Veiga, F., and Chang, M. (2004). 'Local sustainable development effects of carbon projects in Brazil and Bolivia. A view from the field.' *Markets for Environmental Series No. 5*. IIED, London.

the costs of certification itself to allow certified suppliers to cover their production costs, which are often higher than the costs of conventional, 'unsustainable' practices.[9] An example is the *Café Practices* scheme developed by Starbucks Coffee and Conservation International, which seeks to reward social and environmental best practice throughout the supply chain. Under this scheme, points are awarded to coffee bean producers according to 27 criteria of sustainable production; based on their scores, suppliers receive premium prices for their coffee.[10]

A third category of incentives for ecosystem services involves the creation, by government, of *new rights and responsibilities* affecting the use of natural resources. One recent example is the commitment by many governments to reduce or mitigate emissions of greenhouse gases. This has led to new national legislation assigning emission reduction targets to industry, as well as the purchase by polluters of carbon credits from forestry operators and others.[11] The Clean Development Mechanism (CDM) of the Kyoto Protocol allows companies in developed countries to offset their carbon emissions through investments in projects in developing countries, which both reduce net greenhouse gas emissions and contribute to sustainable development objectives of the host country (Box 4.2).

Box 4.2: Trade in carbon sequestration services

The prospect of the Kyoto Protocol coming into force has led to the emergence of diverse carbon sequestration projects in developing countries. Some large companies have bought land to establish plantations. For example, the vehicle manufacturer Peugeot bought land in Mato Grosso, Brazil, to establish native species plantations. Companies have also set up new organisations to promote the establishment of forest plantations. FACE, for example, is an organisation backed by Dutch utilities that has initiated the PROFAFOR programme in Ecuador, under which private landowners and communities receive funding for establishing plantations in exchange for ceding the carbon rights to FACE.

Sources: May *et al.* (2004). *op.cit.*
Albán M., and Argüello, M. (2004). 'Un análisis de los impactos socials y económicos de los proyectos de fijación de carbono en el Ecuador. El caso de PROFAFOR-FACE'. Markets for Environmental Services No. 7 IIED, London.

9. Eba'a Atyi, R. and Simula, M. (2002). *Forest Certification: Pending Challenges for Tropical Timber*. Background Paper. ITTO: Yokohama.
10. Millard, E. (2004). Creating Market Incentives for Farmers to Adopt Best Practices. Presentation to the Ecoagriculture Conference, Nairobi, 27 September – 1 October 2004. Conservation International: Washington, D.C.
11. Lecocq, F. (2004). 'State and Trends of the Carbon Market 2004'. World Bank: Washington, D.C.

Chapter 3 explores further the links between conservation activities and climate change.

Other examples of this approach include wetland and conservation banking in the United States (Box 4.3), trade in forest conservation obligations in Brazil,[12] and an emerging market in groundwater salinity credits in Australia.[13] What these initiatives have in common is the possibility of trade, namely the buying and selling of

Box 4.3: Habitat banking in the United States

In the U.S. public agencies and private firms are required to avoid, minimise or mitigate adverse impacts on certain types of habitat. This requirement is imposed as a pre-condition for the issuance of permits authorising land development. The obligation to protect habitat is mandated at a Federal level by the 1972 Clean Water Act, which includes provisions to protect wetlands and aquatic resources, and the 1973 Endangered Species Act, as well as by relevant state and local laws. This legal framework has stimulated the emergence of environmental entrepreneurs ('mitigation bankers'), who sell habitat offsets to land developers. Purchases of wetland offsets alone cover more than 50,000 hectares.

Sources: Clark, D. and Downes, D. (1995). 'What Price Biodiversity? Economics and Biodiversity Conservation in the United States,' reprinted in *Journal of Environmental Law and Litigation*, 9(11), 1997. National Research Council. (2001). *Compensating for Wetland Losses under the Clean Water Act.* Committee on Mitigating Wetland Losses, Board on Environmental Studies and Toxicology, Water Science and Technology Board, Division on Earth and Life Studies, National Research Council. National Academy Press: Washington, D.C. Wilkinson, J. and Kennedy, C. (2002). *Banks and Fees: The Status of Off-site Wetland Mitigation in the United States.* Environmental Law Institute: Washington, D.C.

environmental obligations to meet government mandates. Without a trading mechanism, of course (or another financial incentive such as a tax credit), there is only the legal obligation to comply with the mandate. This may be sufficient to achieve public environmental goals, assuming that enforcement is effective, but it does not provide any positive incentive to provide environmental benefits and is likely to result in higher costs of compliance.

3. IMPACTS OF MARKETS FOR ECOSYSTEM SERVICES ON THE POOR

Markets for ecosystem services are not primarily intended to reduce poverty but rather to generate new funding for, and

12. Chomitz, K.M., Thomas, T.S. and Brandão, A.S. (2003). *Creating Markets for Habitat Conservation when Habitats are Heterogenous,* Paper presentation to the 4th BioEcon conference on Economic Analysis of Policies for Biodiversity Conservation, 28-29 August 2003, Venice.
13. van Bueren, M. (2001). *Emerging Markets for Environmental Services: Implications and Opportunities for Resource Management in Australia.* Publication No. 01/162, Rural Industries Research and Development Corporation: Barton and Kingston.

reduce the costs of achieving, conservation goals. Not surprisingly, the proponents of such schemes rarely target the poorest of the poor when they seek to identify potential sellers or buyers of ecosystem services. There is also a practical constraint that in order to benefit directly from the sale of ecosystem services, suppliers are normally required to own land or at least have recognised rights over natural resources. Landless agricultural labourers, for example, who are often among the poorest people in any rural economy, are not likely to be able to supply ecosystem services. They may, however, be affected by markets for ecosystem services in the following ways:

- As buyers/users of ecosystem services;
- As employees of operations producing ecosystem services;
- As users of natural resources affected by a market initiative; or
- Through more indirect effects e.g. the impacts of changing land use on food prices, rural wages or the multiplier effects of local purchases.

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Attention has focused on those directly involved in selling ecosystem services, partly because such people are more visible. Less is known about impacts on people *not* participating in market-based initiatives (and why), or about impacts on the poor as users of ecosystem services. While these other channels may be important, due to lack of evidence we devote more emphasis in this chapter to the impacts on the poor as potential suppliers of environmental services.

3.1 The Potential for Participation of Poor People in Ecosystem Service Markets

The most visible impact of market initiatives is their effect on cash incomes. In Pimampiro in Ecuador, for example, the local government pays a small group of farmers, whose land is in the headwaters of the town water supply system, to protect their forests. While the payments may not seem

substantial, at just US$1 per hectare per year, they constitute on average 30 per cent of household income, enabling the farmers to pay school fees and health care amongst other necessities.[14]

Payments for ecosystem services can also contribute to poverty reduction by reducing risk through diversification of livelihood options. For example, payments for carbon sequestration can cover a part of the establishment costs of a tree plantation, while income from timber sales provides a new source of income. Thus in Huetar Norte, Costa Rica, payments for ecosystem services have led to a diversification of activities at the farm level. The effect of this, together with the previous forest subsidy scheme has been to transform an area which was, until the middle of the last century, a cattle ranching region to one where forestry represents a significant proportion of land use.[15] Similarly communities participating in the PROFAFOR scheme in Ecuador see forestry as a useful means of diversification and a hedge against wide fluctuations in livestock prices.[16]

While the formalisation of land tenure may simply coincide with a market for ecosystem services, rather than resulting from it, and while market schemes are likely to target areas where land rights are already clear, the fact remains that a payment system is facilitated by secure property rights

Land tenure

Other aspects of market initiatives may be equally, or even more, important for poverty reduction than the payments themselves. Much depends on the measures that accompany a payment system. One of the most important by-products of payment for ecosystem services is the formalisation of land tenure. Selling carbon or watershed protection services without clear title to land is more difficult, as buyers lack security that the sellers will be able to provide the desired services for the duration of the contract. While the formalisation of land tenure may simply coincide with a market for ecosystem services, rather than resulting from it, and while market schemes are likely to target areas where land rights are already clear, the fact remains that a payment system is facilitated by secure property rights. In

14. Echavarría M., Vogel, J., Albán M., and Meneses, F. (2004). 'The impacts of payments for watershed services in Ecuador. Emerging lessons from Pimampiro and Cuenca'. *Markets for Environmental Services* No. 4, IIED, London.
15. Miranda, M., Porras, I., T., and Moreno, M. (forthcoming). *The Social Effects of Carbon Markets in Costa Rica. A Case Study of the Huetar Norte Region*. IIED, London.
16. Albán M., and Argüello, M. (2004). *op.cit.*

some circumstances the introduction of a payment scheme has given an impetus to the formalisation of land tenure. In Ecuador, for example, plantations established under the PROFAFOR initiative for the sale of carbon services are believed by the communities concerned to have made their land tenure more secure, a consequence of contracts drawn up between the communities and the implementing agency.[17]

Capacity building and social capital

Capacity building is also important, both as a product of market initiatives but also as a contributing factor to their success. In Pimampiro, farmers received assistance for soil conservation, organic farming and forest management, helping them to increase agricultural productivity.[18] In Huetar Norte, participants in the carbon service payment scheme derive some satisfaction from their newly acquired expertise in forestry, although they have acquired this largely through learning-by-doing with only limited external assistance.[19]

Capacity building is important, both as a product of market initiatives but also as a contributing factor to their success

Strengthening local social organisations is often a specific component of payment schemes, either because buyers seek to reduce transaction costs by dealing with a small group of supplier representatives rather than numerous individuals, or because the promoters of payment schemes have understood the importance of this aspect for facilitating access to the schemes and for community development more generally. Improvements in social organisation can bring benefits for other aspects of local livelihoods, for example in the marketing of conventional cash crops. In Huetar Norte, participants believe that the payment scheme has encouraged the creation and strengthening of community associations. The agricultural association of Sarapiqui (CACSA), which groups together 150 small producers, became involved in the scheme and has developed additional agriculture and livestock projects to diversify activities and improve productivity. In San

17. Albán and Argüello (2004). *op.cit.*
18. Echavarría *et al.* (2004). *op.cit.*
19. Miranda *et al* (forthcoming). *op.cit.*

Carlos, another canton in the region, a wood development association was set up, initially to secure training and extension activities for forest producers/participants in the payment scheme. It is now promoting the creation of a co-operative to enable producers to secure better terms for their timber sales.[20] In Ecuador, a community involved in the PROFAFOR-FACE carbon sequestration scheme has developed a separate community credit mechanism.[21]

Environmental benefits

Improvement of environmental quality as a result of the introduction of ecosystem service payments could bring benefits for the poor, in terms of improved access to resources, increased productivity or reduced risk. However, as most schemes are relatively recent, there is little firm evidence of environmental improvements, let alone evidence of impacts on particular groups. Nevertheless, initial perceptions of participants in some initiatives suggest positive effects. In Huetar Norte, participants in the scheme believe that the recovery of forest landscapes in the area has improved soils and promoted tourism.[22] In the case of the PROFAFOR scheme in Ecuador, communities note increased wildlife and the beneficial effects of plantations as windbreaks. On the other hand, in one of the five communities surveyed there was a belief that water quality had been affected adversely.[23]

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Impacts on non-participants

Benefits for those not directly involved as sellers of environmental services are not well-documented, partly because these groups are less visible, more numerous and more dispersed. The main benefit noted in existing case studies is employment. In the Virilla watershed in Costa Rica, for example, the PES scheme has provided occasional employment for labourers to carry out forest protection activities. However, it is not clear whether there would have been more employment if the land had been used for cattle

21. Miranda *et al.* (forthcoming). *op.cit.*
22. Albán and Argüello (2004). *op.cit.*
23. Miranda *et al.* (forthcoming). *op.cit.*
24. Albán and Argüello (2004). *op.cit.*

ranching. Clearer indications of the employment benefits of market initiatives are provided by some carbon projects in Brazil. The Peugeot project in Mato Grosso state, for instance, is planting native tree species in a 2000 hectare area formerly used for cattle ranching; this change in land use requires more workers from the local community than cattle ranching.[25] Local labour requirements are expected to diminish over time, as the trees are established, but are still expected to be higher than for cattle ranching.[26] In some cases the impacts on labour demand may be indirect. In Huetar Norte, the stimulus to the wood processing industry from the PES scheme has contributed to employment generation in a range of wood-related activities, such as sawmills and furniture manufacture.[27] While such evidence is encouraging, other case studies suggest negative impacts on rural employment (see below).

3.2 Drawbacks and Constraints to Participation by the Poor

There are several reasons why the poor may find it difficult to participate directly as providers of ecosystem services. Where payments are made to rural land-owners, for example, the poor may be excluded because they lack clear legal title to land. In Costa Rica, participants in the PES scheme are required to have officially recognised land title documents. Where markets require certification of production processes, the poor may find their operations are too small to support the fixed costs of getting certified. In other cases, poor producers may simply lack access to the capital, information and expertise needed to engage in markets for ecosystem services (or indeed in most other markets). In short, markets for ecosystem services may have some of the same 'anti-poor' characteristics as markets for timber, which are capital-, technology- and skill-intensive, involve large economies of scale, aim at specialised consumer markets, and require long-term investment.[28]

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25. Miranda *et al.* (forthcoming). *op.cit.*
26. May *et al.* (2004). *op.cit.*
27. Miranda *et al.* (forthcoming). *op.cit.*
28. Sunderlin, W.D., Angelsen, A. and Wunder, S. (2003). 'Forests and Poverty Alleviation' in FAO, *State of the World's Forests* pp 61-73. Food and Agriculture Organisation, Rome.

Barriers to participation

Most existing case studies have focused on participants in PES schemes. As a result, it is not easy to identify constraints to participation. A recent study of the Virilla Watershed in Costa Rica, however, surveyed some non-participants, finding that their main concerns related to the rules of the system, in particular restrictions on using forests as temporary shelter for cattle and uncertainty over future legal changes.[29] In Huetar Norte, other rules affecting the access of poorer landowners were highlighted, including: the ineligibility of beneficiaries of land reform programmes to participate in the PES scheme, even though their land might be most suitable for forestry; the risk of being excluded from other public benefits, such as housing credit, once they join the PES scheme; and the ineligibility (until recently) of forestry activities for lending under the National Bank System for Financing. The latter restrictions have since been lifted as forestry is increasingly recognised as a potentially responsible and productive activity.

In Costa Rica, there are limits on the maximum size of private landholdings that qualify for PES but virtually no minimum size, with plots as small as one hectare for reforestation and two hectares for forest protection eligible under the scheme

Targeting small-scale producers

Some market-based schemes have made special attempts to target smallholder farmers even when it would be more cost-effective to deal with large private landowners. In 2002, the PROFAFOR scheme in Ecuador reported that nearly 30 per cent of its contracts in the highland region were with communities of smallholders, accounting for 40 per cent of the total area covered by the scheme.[30] In Costa Rica, there are limits on the maximum size of private landholdings that qualify for PES but virtually no minimum size, with plots as small as one hectare for reforestation and two hectares for forest protection eligible under the scheme.[31] In spite of such attempts to favour smallholders, evidence from the Virilla watershed shows that landowners receiving payments were relatively wealthy, with an average income of US$22,000 per year. Moreover, over 80 per cent of the total value of payments went to larger properties,

30. Miranda *et al.* (2003). *op.cit.*
32. Albán and Argüello (2004). *op.cit.*
31. Rojas and Aylward (2003). *op.cit.*

with more than 70 hectares enrolled in the scheme.[32]

Reducing the costs of participation

Even where small landowners and communities are able to access market schemes, the payments received may be swamped by the costs involved. These costs are of two types: the transaction costs of applying to the scheme and the costs of changing land management practices to meet the requirements of the scheme. Transaction costs can be considerable and are likely to be proportionately greater for smallholders. In Costa Rica, participants in the PES scheme have an option of using an intermediary organisation to deal with the application process, although in return they must hand over 12-18 per cent of the payments they receive. In the Virilla watershed, 80 per cent of participants were using intermediaries.[33] Where participants make the application themselves, it may require several trips to the national capital to obtain the necessary documents, as in the case of the PROFAFOR scheme in Ecuador. More significantly in the case of the Costa Rica, any land to be enrolled in the PES scheme must remain idle while the application is processed. The time lag from submitting an application to receipt of PES payments can take up to 12 months, a very large disincentive for the poorest landowners.

Little is known about the opportunity costs of meeting the land management requirements of market initiatives, and whether participants are better off financially. The assumption is that if landowners freely choose to enter a scheme, they must perceive net financial benefits from doing so. However, this calculation can be quite complex, particularly when a new and unfamiliar form of land use is involved, such as forestry. In both the Huetar Norte scheme in Costa Rica and the PROFAFOR scheme in Ecuador, poor quality soils and limited access to markets implies that agriculture and livestock options are limited. However, the main financial benefit from entering the payment scheme is

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32. Miranda *et al.* (2003). *op.cit.*
33. *ibid.*

expected from timber sales and these will not take place for a number of years.

Minimising employment losses

Among the many indirect linkages between markets for ecosystem services and the poor is the impact on rural employment. On the supply side, land use activities that produce ecosystem services, which may be pure conservation or environmentally-friendly production practices, may be more or less labour intensive than alternative uses of natural resources. The danger, of course, is that a shift to more conservation-oriented land use will reduce demand for unskilled or low-skilled labour, depressing rural wages and exacerbating rural unemployment. This appears to be one impact of the Noel Kempff Mercado Climate Action project in Bolivia, where The Nature Conservancy and a consortium of US companies, together with the Bolivian Government, bought out logging concession owners in order to extend a national park. For surrounding communities the termination of the logging concessions resulted in significant job losses. A specific aim of the project was to create other employment opportunities to offset the jobs lost in logging. This was achieved in two of the three communities neighbouring the park, with community members being employed as park guards, tourist guides or assistants for carbon monitoring.[34] However, employment losses were still perceived by the local communities as problematic.[35]

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Rural infrastructure and public services

Markets for ecosystem services may have impacts on the development of rural infrastructure that affect the poor. For example, they are unlikely to require, and may actually discourage, the construction of roads in rural areas, in contrast to logging, mining and other uses of forest resources which typically require road access. While this implies less risk of agricultural encroachment or hunting, it

34. Asquith, N.M., Vargas Rios, M.T., and Smith, J. (2002). 'Can forest-protection carbon projects improve rural livelihoods? Analysis of the Noel Kempff Mercado Climate Action Project, Bolivia.' *Mitigation and Adaptation Strategies for Global Change* 7 :323-337
35. May *et al.* (2004). *op.cit.*

also means that local populations will not enjoy the benefits that roads bring, such as improved access to markets and social services. In the case of the Noel Kempff project in Bolivia, for example, public roads deteriorated after the termination of the logging concessions and transport costs for local communities consequently increased.[36] In Huetar Norte, a different problem has emerged. In this case the increase in wood processing has led to intensified use of roads and deterioration in their quality. This affects participants in the scheme as well as agricultural producers in the region who are not enrolled.[37]

Access to land and other resources

Another risk of markets for ecosystem services is that changes in land use or production practices, or increased protection of natural resources, may exclude or reduce access by the poor to natural resources on which they have traditionally relied, such as non-timber forest products. In the case of Noel Kempff some community members were initially concerned about restrictions on hunting due to the expansion of the national park. This also reflected weaknesses in communication and consultation in the early stages of the initiative.

Changes in land use or production practices, or increased protection of natural resources, may exclude or reduce access by the poor to natural resources on which they have traditionally relied, such as non-timber forest products

A related risk concerns the impact of market schemes on patterns of land ownership. Where there are large scale economies in the production of ecosystem services (as appears to be the case for carbon), new markets may lead to greater concentration of land ownership or the exclusion of existing small-scale land users. This concern appears to be valid for some carbon projects in Brazil, partly because of the rules of the CDM. These restrict eligibility for carbon credits to land that was deforested before 1990 and may stimulate land purchases by companies seeking carbon credits. For example, the Plantar project in Minas Gerais generates carbon credits through reforestation with eucalyptus and by continuing to use charcoal in pig iron production rather than switching to coke. A recent case

36. May *et al.* (2004). *op.cit.*
37. Miranda *et al.* (forthcoming). *op.cit.*

study found that the company preferred to carry out reforestation on its own land rather than encouraging local farmers to get involved in reforestation and the sale of carbon credits. The view expressed by company officials was that their approach – which minimised costs – was more likely to meet the requirements of investors (in this case, the prototype carbon fund of the World Bank).

Ecosystem service consumers and poverty

The poor are not only potential suppliers of ecosystem services but also consumers. If a new payment scheme involves transfers from beneficiaries or users of ecosystem services to providers, some relatively poor users might end up paying money they can ill-afford to some relatively well-off providers. The extent of such regressive transfers will depend on the share of ecosystem services in the overall consumption basket of the poor, and on the availability of substitutes. This issue is probably most relevant to watershed services, where buyers are likely to be local farmers or urban users of water. There might be concern, for example, if payments for watershed protection led to significantly higher prices for irrigation water used by farmers. In practice, however, this is likely to be a smaller problem than the risk that the same farmers might lose their water use rights due to rising demand from urban and industrial water users.

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Little empirical evidence is available to assess the significance of this risk. In the Pimampiro payment scheme in Ecuador, payments were financed through a 20 per cent increase in the water tariff for town residents. The price increase however, coincided with an improvement in the water supply system resulting from infrastructure investments. As a result, water users in the town accepted the increase. For most other ecosystem services, it seems likely that the impact of payment schemes on the costs of life's basic necessities will be modest.

4. CONCLUSIONS AND WAYS FORWARD

With respect to the impacts of market-based incentives for ecosystem services on the poor, we can take some comfort

from an overall increase in transfers from richer segments of the economy to less affluent segments. On the other hand, there is reason to worry that the truly poor may find themselves unable to participate as suppliers of ecosystem services, displaced from their jobs, and cut off from natural resources that they previously exploited (either sustainably or otherwise).

Despite efforts by a number of researchers to examine the poverty impacts of market mechanisms, the empirical evidence is still patchy, mainly due to the relative novelty of most schemes. In particular, more information is needed on the indirect effects of such schemes on those who are not involved as sellers of environmental services, as well as the long-term financial returns to suppliers, which will determine whether poorer landowners continue to be willing participants in payment initiatives.

Extra care must be taken to ensure that poverty is not exacerbated by such initiatives and, if possible, to assist the poor to participate actively as suppliers

There is no evidence to suggest that market-based schemes should be rejected on social equity grounds. However, it is also clear that extra care must be taken to ensure that poverty is not exacerbated by such initiatives and, if possible, to assist the poor to participate actively as suppliers. From the existing limited evidence, some preliminary recommendations can be made for enhancing the contribution of market schemes to the achievement of the MDGs.

The first priority is to facilitate access by small landholders to existing or new payment schemes. This requires scheme administrators and proponents to:

- Reconsider rules relating to tenure and size of landholdings so that those with informal tenure or very small areas of land can participate. This may also mean introducing contracts for shorter periods.
- Reconsider land and resource use restrictions – find ways of reconciling buyer preferences with the concerns of small landholders and local knowledge of the impact of land and resource use practices.

- Encourage the participation of small landholders in the supply of environment services (carbon sequestration in particular) through partnerships and outgrower arrangements with companies.
- Reduce transaction costs for small landholders by encouraging group applications or simplifying requirements and procedures.
- Improve co-ordination with land reform processes to ensure that the provision of environmental services is promoted as one of a number of land use options for land beneficiaries.

Another challenge is to ensure that once small landholders join a market initiative they are able to sustain their involvement and derive net benefits on a long-term basis. The main requirements here are for:

- Improved information to participants about the options open to them and the financial and land use implications of the scheme.
- Capacity building to ensure that participants are able to carry out any new activities involved. This will help to minimise early mistakes and losses which poorer households and communities are less able to support.

Finally, the successful experience of recent market initiatives must be seen in context. Some schemes have benefited small landholders financially or have contributed to poverty reduction in other ways, for example by accelerating the process of land titling or strengthening local organisations. The number of people affected by such schemes, however, remains very small relative to the numbers of people living in poverty. Existing initiatives show the possibilities but a major challenge will be to spread and scale them up – an issue addressed in Chapter 8.