
Challenges to establishing markets for watershed services: Learning from country diagnostics



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Developing markets for watershed protection services and improved livelihoods

Based on evidence from a range of field sites the IIED project, 'Developing markets for watershed services and improved livelihoods' is generating debate on the potential role of markets for watershed services. Under this subset of markets for environmental services, downstream users of water compensate upstream land managers for activities that influence the quantity and quality of downstream water. The project purpose is to increase understanding of the potential role of market mechanisms in promoting the provision of watershed services for improving livelihoods in developing countries.

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Table of contents

Acronyms and abbreviations	4
Executive summary	5
1. Introduction.....	6
2. What the diagnostics suggest about the potential of markets: a quick overview.....	8
3. Why market-based incentives might be useful.....	12
4. What is already in place: a closer look at existing market-based approaches	13
5. Markets and livelihoods.....	16
6. Some big challenges to constructing markets that improve watershed services and livelihoods.....	17
7. And few dangers to watch out for.....	19
8. Directions that show the greatest potential (and could provide lessons across all Project countries)	20
8.1 Expanding rights approaches	20
8.2 Management contracts	20
8.3 Direct downstream to upstream transactions involving commercial users	20
8.4 Watershed protection measures that also provide livelihood benefits	21
9. Implications for next steps.....	22
References	23
Appendix 1. Summaries of main findings of diagnostic studies	24
Appendix 2. Additional information needs: what the diagnostics did not reveal.....	28

Acronyms and abbreviations

CAMP	Catchment management and poverty alleviation
CMA	Catchment Management Agencies
CSIR	Council for Scientific and Industrial Research
DFID	Department for International Development
IIED	International Institute for Environment and Development
JFM	Joint forest management
NIE	New Institutional Economics
PRISMA	Programa Salvadoreño de Investigación sobre Desarrollo y Medio Ambiente
PSA	Costa Rica programme on payments for environmental services
PSDAL-LP3ES	Institute for Social and Economic Research, Education & Information (Indonesia)
SA	South Africa
WTP	Willingness to pay

Executive summary

This paper synthesises a set of diagnostic studies carried out by the International Institute for Environment and Development (IIED) and local partners in 2001-2002 to explore the potential of market-based approaches for watershed protection. The studies responded to concerns raised in earlier work by IIED that markets for watershed services were being promoted without adequate consideration of their costs and benefits. Studies carried out for four countries or regions – the Caribbean, India, Indonesia and South Africa – included an assessment of key watershed management issues and needs; potential market actors; the policy and institutional context; and interest in and demand for market-based approaches.

Despite revealing a wide diversity in institutional and ecological contexts, the diagnostics painted a generally consistent picture of watershed management issues and responses across countries. The lack of mechanisms for watershed management actors (whether states, communities, or individuals), to recover their costs directly from the beneficiaries of their actions was notable in all countries. Nonetheless, many financial and other incentives do exist to encourage good watershed practices, and with most of these the state or community institutions play a major role.

The studies found little evidence of the existence of, or demand for, market-based mechanisms, either by governments or potential “buyers” of watershed services. However, they did uncover a number of needs that market-like incentives might help meet. These included: improving management efficiency by giving priority to prevention rather than clean-up; conserving scarce resources, particularly water, by putting a price on their use; reducing inequity in the allocation of watershed services; building personal and community responsibility by giving economic value to watershed protection; and creating new livelihood options for those providing watershed protection services.

The diagnostics illustrate the complexity of addressing livelihood issues through market-based approaches, particularly in terms of providing market opportunities for the poor, while at the same time protecting them from exploitation from more powerful “buyers” and “sellers” of watershed services. The equitable allocation of water where it is scarce is also a concern in some countries. The technical challenges to creating markets are also substantial given the lack of clarity on issues such as the appropriate land uses to support desired watershed services; who the buyers and sellers of watershed services actually are; and how payments can be captured and reinvested into good management. In this context, there is the danger that markets could actually hurt rather than help watershed protection measures and the livelihoods of the poor. They could skew decisions about trade-offs, undermine existing management institutions, be captured by privileged elites, widen capacity gaps, or create cumbersome and costly new institutions.

Any further exploration of economic instruments for watershed protection should seek to answer the question of whether payments for watershed services can be constructed in ways that decrease rather than increase risk and vulnerability for the poor; assure security of access by local people, including the poor, to watershed resources and services upon which they depend; reinforce rather than undermine existing state, traditional, community, and private systems of management; and complement rather than compete with new government institutions, structures, and fee systems coming out of water sector reform processes.

1. Introduction

In 2002, the International Institute for Environment and Development (IIED) responded to growing interest in the use of market-based approaches to environmental management by publishing a comprehensive desk review on the use of markets for forest environmental services worldwide (Landell-Mills and Porras 2002). Alongside a review of cases relating to carbon storage, biodiversity protection and landscape amenity, the study identified sixty-one cases in which markets have been developed to protect and improve the services provided by watersheds, such as water quality and flood and erosion control. While these cases seemed to point to a new way of approaching watershed management, the study – noting the limited and sometimes biased literature on the subject – raised concerns about moving too quickly to embrace watershed service markets:

‘For the most part, studies offer superficial reviews of economic, social and environmental benefits with virtually no assessment of costs. Moreover, the literature fails to convince us that markets offer the optimal way of achieving improved watersheds. The lack of attention to equity impacts of emerging payment schemes raises a number of concerns.’ (Landell-Mills and Porras 2002: p.152)

To begin finding answers to the questions raised by the study, IIED, with funding from the UK Department for International Development, commissioned a set of diagnostic studies in four countries and regions – India, Indonesia, South Africa and the Caribbean¹ – where markets for watershed services were not yet widely used but appeared to have significant potential. The Project concept note reflected the desk study’s concerns regarding effectiveness, equity, and impacts on the poor:

‘Market-based approaches appear to offer cost-effective means of linking demand for watershed protection services to potential sources of supply. However, it is by no means clear that markets for watershed protection are more efficient in practice than alternative approaches. It is likewise unclear whether and how markets for watershed protection can contribute to securing other environmental and land use values, and to poverty reduction. Little is known about how governments and others should intervene to ensure markets achieve such aims. If policy-makers and programme co-ordinators are to maximise and ensure the equitable distribution of benefits, more needs to be learned about the evolution of market-based approaches to watershed management, their institutional and informational pre-requisites, and their costs and benefits to different stakeholder groups. Key design issues for the introduction of market-based approaches include the allocation of rights to watershed benefits, how to avoid perverse incentives, and how to ensure that such approaches contribute to improvements in the livelihoods of poorer groups both up and downstream.’ (Developing Markets for Watershed Protection Services concept note, July 2001)

The diagnostics were the first phase of an action-learning process, in which “best bet” opportunities for the use of market-based approaches are being identified and tested in each of the Project countries. The studies thus focused on assessing key watershed management issues and needs, potential market actors (beneficiaries and providers of watershed services), the policy and institutional context, and interest in and demand for market-based approaches. This approach was rather different from other examinations of markets for environmental services, which focused either on deriving guidance from economic theory

¹ The India diagnostic included a national overview and more detailed studies of two states, Himachal Pradesh and Madhya Pradesh. The Indonesian study looked in detail at one area, the Segara River Basin. The South African diagnostic provided a national overview. The Caribbean study consisted of brief diagnostics of four islands: Grenada, Jamaica, St. Lucia and Trinidad.

(e.g., Aylward 1999; Johnson *et al.* 2001; Pagiola and Platais 2002) or drawing lessons from actual cases (e.g., Perrot-Maître and Davis 2001; Landell-Mills and Porras 2002). The diagnostics instead used real life contexts to examine how markets might usefully be inserted into complex and multi-level management, institutional and policy structures. They thus provide a valuable baseline from which to evaluate the effectiveness of future watershed markets in these countries in achieving environmental and livelihood objectives, one that is likely to be particularly important given the very small number of existing studies² on the ecological and distributional impacts of payments for watershed services.

The diagnostics were carried out by local partners³ during 2001 and 2002, and the results were documented in a series of discussion papers (Geoghegan *et al.* 2003; King *et al.* 2003; Munawir *et al.* 2003; Sengupta *et al.* 2003), whose main findings are summarised in Appendix 1. This working paper synthesises and analyses these findings, with particular attention to what they tell us about crafting market-based tools in ways that both protect and improve watershed services and provide equitable livelihood benefits. This analysis will provide guidance and support to the action-learning pilot projects now underway in each Project country.

² See Zbinden and Lee (2005) on Costa Rica, and Kerr (2002) on India.

³ Small teams in each of the project countries were led by: Caribbean Natural Resources Institute (Caribbean), Winrock International India (India), PSDAL-LP3ES [Institute for Social and Economic Research, Education & Information] (Indonesia) and CSIR Environmentek (South Africa).

2. What the diagnostics suggest about the potential of markets: a quick overview

Despite the tremendous diversity of the countries studied, the pictures painted of watershed management issues were surprisingly similar, reflecting the globalisation of watershed management approaches, as well as increasing pressure on watersheds and resulting impacts on water resources throughout the world.

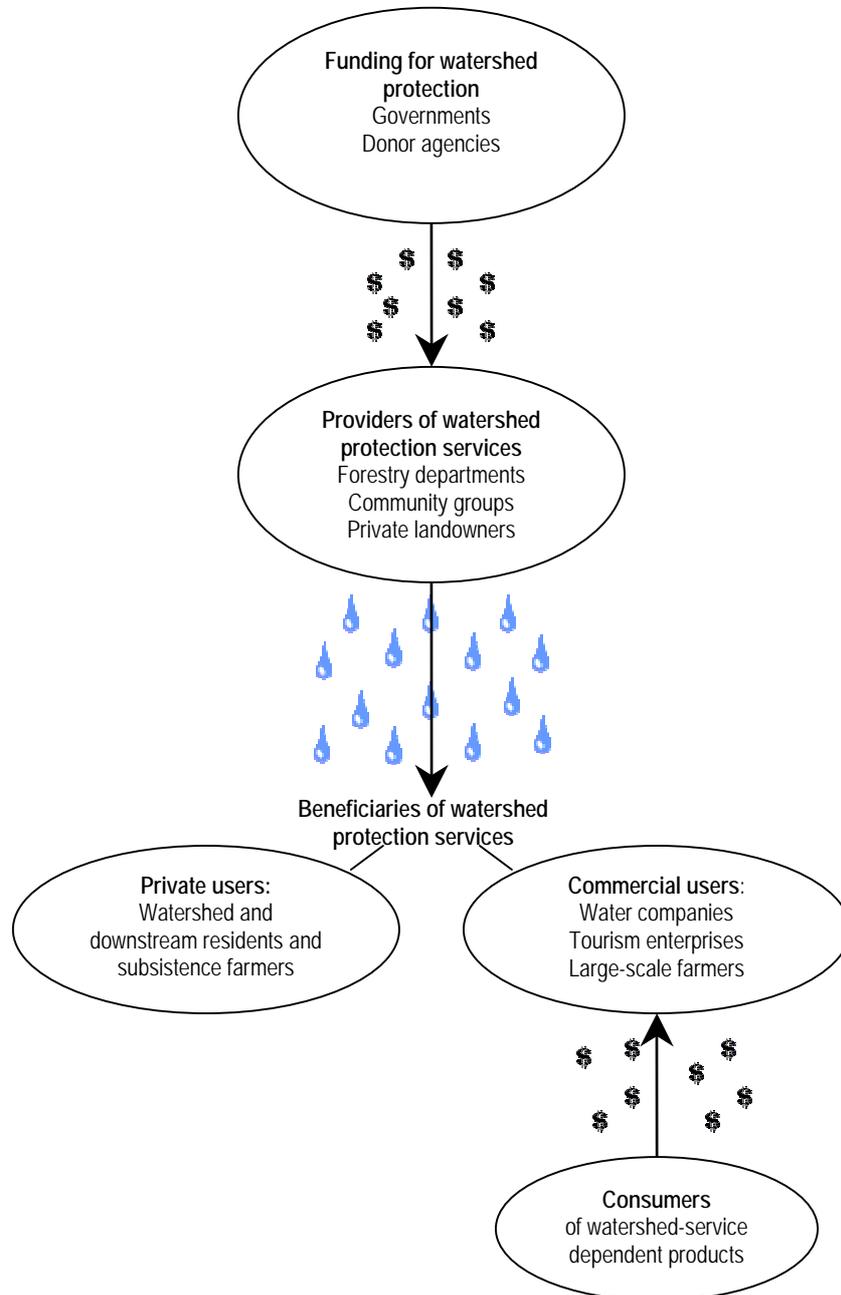
- A. ***Global trends in watershed management are creating new categories of watershed service “providers”.*** In all the countries studied, state-led systems of protection and regulation are giving way to more decentralised ones that emphasise community-based and co-management approaches. These approaches reflect increasing recognition that dependence on watershed areas and the services they provide can motivate stakeholders to take management action if given the authority, space and resources to do so. Every study uncovered new institutional actors, some self-organised, others organised with the involvement of state agencies, and others representing new decentralised levels of formal authority, who are taking management action at the local level. These groups often have names such as Water Catchment Groups (St. Lucia), Water User Associations (Indonesia), and Catchment Management Agencies (South Africa). They are motivated by a desire to optimise the quality and quantity of their own water supplies, and protect their land and crops from impacts such as erosion and flooding. Their main interventions include protection of local water catchment areas and community education and outreach. They are considered important management partners, are provided with training and technical support from state agencies, and are sometimes given the authority to levy fees for the services they provide.
- B. ***But the links between these providers and downstream beneficiaries are generally non-existent or weak.*** Figure 1 provides a highly simplified and summarised graphic presentation of the linkages between upstream watershed protection services and their downstream benefits that were mapped out in each of the diagnostics. As the diagram indicates, most of these mapping exercises revealed a disconnect between the “flow” of watershed services, from funders to providers to beneficiaries, and the financial flows that were generated from the services.

As the diagram indicates, the costs of watershed management are most often borne by the state (and thus indirectly by all citizens) through budget appropriations to management agencies such as forestry departments, or by bilateral and multilateral donor agencies (and thus indirectly by the taxpayers of donor countries) through technical assistance projects. There were also cases in India and Indonesia in which costs were partially borne by the physically closest beneficiaries: people living in the watershed who are charged fees for protection of their water supplies. Direct payments by downstream beneficiaries to upstream service providers were localised exceptions to a general lack of attention to the ways in which upstream activities can impact on the flow of watershed services downstream. In particular, the diagnostics did not find any serious initiatives to recover watershed management costs through water rates. This is surprising and somewhat disturbing, given that water is increasingly being managed as a commodity rather than a basic service in virtually all the countries studied⁴. The general

⁴ Support for water rate reform is driven by at least two streams of reasoning. The World Bank and other multilaterals argue that public management of water resources has been highly inefficient, particularly in developing countries, resulting in cost overruns and poor service. They therefore support privatisation of the water sector as a way to reduce overall costs and improve supplies and service. Many conservation organisations also support water rate reform (though not necessarily privatisation) in order to reduce waste and assure more equitable allocation of what is generally perceived as an increasingly scarce resource.

situation, in this wide diversity of countries, is thus that while market-like transactions are occurring, they are grossly distorted and rarely involve the direct providers and beneficiaries of these services.

Figure 1: Summary of diagnostic mappings of watershed services and financial flows



C. Market-like mechanisms are widely used, but generally not recognised as such.

Nonetheless, a surprisingly wide range of mechanisms to motivate improved practices both within and downstream of watersheds through financial incentives was found in most countries. Whether these incentives are in fact markets in the economic sense is subject to debate. Natural resource managers tend to see human motivation and response to incentives in different ways than economists do, and often do not think of these mechanisms in market terms. Wunder and Vargas (2005) take exception to the use of the word “markets” for these mechanisms on economic grounds:

'Instead of true markets, what we usually find in the real world – both in developed but especially in developing countries – are bilateral, mutually negotiated agreements between ecosystem service users and providers. Usually, these agreements make both parties (as well as the natural resource base) better off.'

Landell-Mills and Porras (2002), on the other hand, place markets for ecosystem services within the framework of New Institutional Economics (NIE), which is based on the understanding that markets are rarely freely negotiated transactions between buyers and sellers, but are shaped and controlled by a range of other actors, such as the state, that set the rules under which the transactions occur. Most of the economic incentives for watershed protection discussed here thus do not remotely resemble the economist's classical conception of free or "true" markets. The word market is used in this paper in its broadest possible NIE sense, as any financial transaction between a "supplier" of a service and a second party or parties willing to pay for the service being provided. Some of the market-like mechanisms that the diagnostics uncovered, but that were rarely perceived as such by local stakeholders, included:

- Provision of free tree seedlings to watershed farmers and landowners;
- Tax credits for planting trees in watersheds or for water conservation actions;
- Grant payments to community groups for local watershed management activities;
- Water metering and rate schedules that encourage conservation.

D. ***As watershed services decline, inequity in their allocation increases.*** In every country studied, declining watershed services are hurting the poor the most. In the Caribbean, water in poor rural communities is often rationed during the dry season, while hotels, urban residents, and large farmers are given priority. In India, poor rural farmers disproportionately suffer the effects of erosion caused by deforestation on steep hillsides, and regulatory measures to protect critically fragile watershed areas cut off access of the poorest to forest resources on which they depend. In Indonesia, poor downstream residents have been severely affected by decreased water availability as a result of upstream erosion. And in South Africa, a country that has long faced chronic water scarcity, the historical inequity was so severe that the Constitution makes specific provision for the right of all citizens to a sufficient supply of water. Given this context, it is not enough for economic incentives to be socially neutral; they will have to be constructed in ways that are deliberately weighted in favour of less advantaged groups.

E. ***Despite so many similarities, substantial differences require individually tailored responses.*** While there are many lessons that can be shared across the countries studied, and by extension other parts of the world, contexts often differ in significant ways, pointing to the uselessness of packaged approaches and over-generalised solutions. In particular, the diagnostics highlight:

- *Varied ecological requirements:* In India, Indonesia, and the Caribbean, reduced water availability is often associated with a loss of flow regulation as a result of hillside deforestation, and tree planting is one of the most common measures used to improve watershed services. In South Africa, on the other hand, plantation forestry has long been a major competitor for scarce water resources, and afforestation is now classified as a 'stream flow reduction activity'.

- *Diversity in local institutions:* In Indonesia many rural communities continue to employ traditional watershed management practices, whereas in the Caribbean, South Africa and to a lesser extent India, decades of centralised, exclusionary management largely eliminated such practices, and the concept of community participation in management has had to be re-introduced.
- *Differences in technical resources and capacities:* Some of the countries studied are better equipped than others to develop well-crafted economic incentives that zero in on specific watershed management problems. South Africa has extremely comprehensive hydrology data based on years of study, whereas the small islands of the Caribbean have only the results of intermittent research projects, often accessible only by consulting the original reports. India and Indonesia also have limited and scattered information. The countries thus face quite different challenges and risks in deciding what activities to encourage or discourage through the use of market mechanisms.
- *Uneven levels of policy and institutional preparedness:* While all of the diagnostics indicated some recent progress in improving the policy and legislative environment for water and watershed management, in some countries, notably Indonesia and South Africa, the institutional structures for implementing reforms are not yet in place or are still evolving, and some key institutions exist only on paper. In India, on the other hand, reforms aimed at decentralising watershed management to the community level have been operationalised in some parts of the country, while at the macro level, a number of mechanisms, albeit regulatory rather than market-based, already exist for transferring some of the costs of watershed management to users. In the Caribbean, aside from Jamaica where a high-level National Integrated Watershed Management Council has been established to co-ordinate the activities of the main watershed actors, policy and institutional frameworks are less well advanced.

3. Why market-based incentives might be useful

One of the main questions that informants in each country were asked was whether they saw a role for market-based approaches. Despite the limited experiences and a certain scepticism about the use of economic tools for natural resource management, the general consensus appeared to be that market-like incentives might be a way to address some problems that other approaches had failed to solve. Most diagnostics identified the following niches that such incentives might fill:

- *Improve management efficiency:* This is often the first argument made for the introduction of markets for watershed services. Throughout the developing world, the task of management is increasing while the funding available to manage is decreasing, and management interventions tend to occur only after damage has been done. Trends towards decentralisation and community-based management are at least partly an effort to reduce the clean-up costs borne by the state by increasing local investment in prevention. But while these initiatives often have positive management results, they tend to simply shift costs rather than reducing them, as well as creating new levels of administration. Many managers therefore see mechanisms that charge beneficiaries for watershed services as a way of increasing efficiency and improving overall welfare through less costly preventive management.
- *Conserve scarce resources:* Market pricing can be a tool for controlling the use of scarce watershed resources and encouraging support for watershed management. There is a sense that if the price people pay for water increases, their demand for improved watershed protection could increase as well, forcing governments to give greater attention to watersheds.
- *Reduce inequity by controlling free riders:* Watershed services in the countries studied often disproportionately benefit those most able to pay for them, including hydroelectric companies, large irrigation farmers, and resort hotels. Individual and community watershed management efforts can involve substantial costs for the service providers, many of whom may be poor, without any compensation from those who are benefiting. In other cases, subsidisation of the cost of water allows the wealthy to squander it while those without pipe-borne water must make do with limited supplies. The poor are the ones most hurt by these inequities.
- *Build personal and community responsibility:* The diagnostics made it clear that simply discussing the idea of market transactions can help build awareness of upstream/downstream linkages and the need for good watershed management. A few actual cases might be even better tools for increasing awareness and understanding.
- *Create new livelihood opportunities:* Watershed service “markets” may offer new economic options for those in a position to provide services, some of whom are poor rural people who have been hurt by watershed degradation and by management interventions that may have restricted their access to resources and thus limited their options.
- *Create incentives for improved watershed management in specific locations and situations:* The diagnostics indicate that the existing tool box of watershed management approaches, including regulation, community management, and education and extension, generally remain relevant and useful. There are however situations in which these approaches may be unfeasible or ineffective. In some of these cases, economic incentives may be of value.

4. What is already in place: a closer look at existing market-based approaches

As mentioned earlier, some economic instruments already exist or are under consideration in the countries studied. The majority fall within the following categories (see also Table 1):

- A. **State incentives for improved practices:** Several countries offer free or subsidised tree seedlings to watershed landowners. In Jamaica, private land managed for forest conservation can receive an exemption from property tax upon submission and acceptance of a forest management plan. In Trinidad, the government waives duties on equipment imported for reforestation. South Africa is planning a system of tax rebates for proper stream flow and land management in water catchment areas, but this had not been put in place at the time of the diagnostic.
- B. **Taxes and levies:** In India, watershed management has been decentralised over the past ten years. Communities and individuals are mandated to contribute towards the costs of watershed treatment activities that benefit them. These contributions are paid into a community watershed development fund for post-project maintenance. In Himachal Pradesh, the Forestry Department imposes a number of regulatory fees on commercial users of forest resources in order to discourage bad watershed practices and pay for their mitigation. In Indonesia, the government is moving towards imposing a water tax on farmers to help support the irrigation management costs of Water User Associations. In South Africa, the government intends to provide an income stream for local Catchment Management Agencies through a new water resource management charge on water rates. These approaches both assure a constant stream of funds and that the beneficiaries pay for the services received. Because the government collects and distributes the taxes and fees, however, transaction costs are high. They can also be problematic from a poverty perspective if the fees constrain the livelihood options of the poor.
- C. **Water pricing:** As a result of sectoral reform, some countries, including South Africa and St. Lucia, are moving towards “true value” water pricing in order to put an end to state subsidisation. Although there has been discussion on incorporating the costs of watershed management into these new pricing structures, the contribution of watershed management to the supply and quality of water has not been quantified anywhere, and it appears that, at least at this time, true value pricing is aimed more at eliminating state subsidies on distribution and treatment, encouraging conservation and efficiency, and assuring a level of equity where water is scarce, than on recovering upstream management costs from downstream beneficiaries.
- D. **Third party payments:** Community groups providing watershed services in the Caribbean have been indirectly compensated for their efforts through grants from local funding agencies. While these payments provide an incentive for community efforts, their intermittent nature can equally serve as a disincentive when no funds are available, and they do nothing to address the issue of downstream free riding.
- E. **Tradable rights:** In India, there have been a small number of local-level approaches that included the provision of tradable water rights in exchange for good watershed management practices. While these have been touted as major success stories, they have not proven to be widely replicable or sustainable, and their success seems to have depended substantially on injections of external funding, local social structures and land ownership patterns.

F. Direct payments from watershed protection beneficiaries to service providers:

Ongoing direct payment systems were found only in Indonesia, where the involvement of government and international agencies in watershed management appears weakest. The payments are made by downstream commercial operations to upstream communities for environmental protection. The payments take the form, and are perceived as, voluntary contributions rather than market transactions, but nonetheless acknowledge the link between upstream land management and the quality of the goods and services marketed by these companies. These were perhaps the most “advanced” market-like incentives uncovered in any of the diagnostics. There were also examples from India of past “one off” well-targeted contributions by downstream beneficiaries to upstream management measures that provided adequate benefits to sustain good watershed practices over the long term. See Box 1 for a more detailed description of these cases.

Box 1: Downstream to upstream payment mechanisms, examples from Indonesia and India

In the village of Bentek in the Segara River Basin in Indonesia, two downstream commercial interests have initiated voluntary contribution programmes with upstream community groups in support of local watershed management efforts. A drinking water bottler and recreational rafting company, both heavily dependent on maintaining good downstream water quality and quantity, make payments to support forest guards, community development, and traditional rules and rituals that underpin Bentek’s communal systems of forest protection. While the programmes are voluntary, the companies have entered into formal agreements with the recipients to continue the payments on an annual basis (Munawir *et al.* 2003).

The India diagnostic uncovered a case in Himachal Pradesh in which three villages made a voluntary transaction to improve management of a critical catchment area in order to improve water supplies. The downstream villages of Suan and Ropri provided labour to replant degraded commons land belonging to another village, Bhodi, within the catchment, and to transfer the government payment for this work to the Bhodi Village Common Fund to support continued management. Following the restoration of the area, the Bhodi villagers were able to increase their income from the collection and sale of grasses, and continued to manage the land without need for further payments from the downstream communities (Senaupta *et al.* 2003).

In summary, the landscape the diagnostics describe is one in which:

- Incentive mechanisms are widely used in watershed management, take many forms, and can contribute to improved watershed services.
- Far from being largely open market transactions between private parties, the state and local authorities are major actors in many of these mechanisms.
- Management objectives and policy and institutional contexts, rather than market principles, are the major considerations in structuring the mechanisms.
- Direct monetary payments to service providers play only a very limited role in motivating and sustaining the mechanisms being used.
- Contributions from downstream beneficiaries to upstream watershed service providers, where they exist, are not based on established market values and are often indirect.

Table 1: Market-based mechanisms identified in country diagnostics

Category	Type/description	Where found
State incentives	Free or subsidised tree seedling programmes for private planters	Caribbean, South Africa
	Tax concessions for watershed protection actions and inputs	Caribbean
Taxes and levies	Taxes and levies for projects diverting forest land to other uses	India, Indonesia
	Levies on community members for costs of protecting water catchments	India
Water pricing	Water metering and rate scheduling to encourage conservation	Caribbean, South Africa
	Water allocations and licensing requirements for commercial users to encourage conservation	South Africa
	Incorporation of costs of watershed management in water rates	Under discussion in Caribbean, South Africa
Third party payments	Grants for community watershed improvement projects	India, Caribbean
Tradable rights	Allocation of tradable water rights for protection of communal water resources	India
Direct beneficiary to provider payments	Contributions of downstream watershed service-dependant businesses to upstream communities and groups to maintain traditional management practices	Indonesia
	Contributions by downstream communities to upstream communities to maintain traditional practices and good relations	Indonesia
	Offer of security of tenure for squatter groups protecting downstream assets of landowner through good watershed practices	Caribbean
	Investment by downstream municipalities in upstream watershed improvements	India

5. Markets and livelihoods

All the diagnostics echoed and reinforced the concerns expressed in some of the literature (e.g., Kerr 2002, Landell-Mills and Porras 2002, Rosa *et al.* 2003, Zbinden and Lee 2005) on the impacts of market-based approaches on livelihoods, particularly of the poor. The constraints to establishing market-based approaches that include a livelihood and equity dimension are often deeply embedded; however the studies also revealed situations in which market-like approaches have benefited marginalised groups.

Virtually every study noted similar obstinate structural constraints to pro-poor market approaches, including the link between markets and property rights, the need to equitably provide water to all, and power imbalances among service providers and consumers.

- A. **Land tenure and rights to resources.** Most of the more common watershed service markets provide compensation for good land use practices, but tend to be based on land ownership or tenure, thus excluding poor landless watershed service providers. Mechanisms based on tax or other legal frameworks also do not reach those who rent land, have customary rights, or share rights to common lands. For example, the South Africa diagnostic notes: 'Current inequities based on historical structures prevent many people from having access to and participating in value addition activities based on natural resources' (King *et al.*, 2003: p.37). In a handful of communities in India, this problem has been addressed by providing individual and tradable water rights to all residents in exchange for protecting common watershed lands, providing the landless with a commodity that could be sold to others in the community.
- B. **Equity in the provision of water.** Several countries are struggling with the complexities of rationalising the cost of water in ways that do not hurt the poor. Until these issues are sorted out, it is unlikely that full-cost pricing initiatives will begin to incorporate watershed protection in addition to storage, treatment, and delivery. For example, South Africa, where the trade-off between cost recovery and equity has been given particular attention both in the country's Constitution and its new Water Act, is beginning with a system that will cover only fixed and operating costs and moving incrementally to one that covers the full costs of water production and management (King *et al.* 2003: p.16).
- C. **Allocation of costs and benefits.** Some studies noted the difficulties of constructing markets in ways that assure that poorer and politically weaker service providers get a fair price from wealthier, more powerful downstream beneficiaries. As the Indian diagnostic notes, the powerful are already receiving a disproportionate share of benefits and have little incentive or compulsion to pay more: 'Many instances of watershed protection have faced serious problems with regard to equity, with benefits of forest protection going mainly to rich landowners, and costs being borne mainly by the poorer and landless forest-dependent communities.' (Sengupta *et al.* 2003: p.1). The India diagnostic further suggests that while approaches that compensate communities collectively could facilitate participation of poorer groups, they could also create free-riding based on power dynamics within the community, with the more disadvantaged expected to bear more of the costs in order to get an equal share of the benefits. In Indonesia, poor downstream farmers are worried about the move, driven by more prosperous upstream communities and downstream commercial users, towards marketisation of watershed services that they are now receiving free of charge.

6. Some big challenges to constructing markets that improve watershed services and livelihoods

Despite the widespread, albeit diffused, use of economic instruments that the diagnostics uncovered, a purposeful incorporation of market-based approaches into existing watershed management systems would require confronting and overcoming a number of structural, institutional, policy and cultural issues. In addition to the challenges discussed above of creating market opportunities for improved livelihoods, the most significant challenges of constructing markets for watershed protection services include:

- A. **Lack of demand:** With a few isolated exceptions where market-like structures have spontaneously established themselves, watershed protection service providers and beneficiaries are not demanding the creation of markets in any of the countries, and the push to explore and develop markets is coming from the outside, particularly from international donor agencies. It is not yet clear to what extent the main stakeholders will accept and embrace these imported concepts. Contrary to the conclusion of Landell Mills and Porras (2002: p.10) that 'market development is attractive to governments since it enables governments to transfer a large share of environmental service provision to non-governmental actors,' there is no evidence from the diagnostics that government agencies are prepared to trust markets to effectively protect watersheds.
- B. **Gaps in hydrological knowledge:** Although in most countries there is widespread consensus on the kinds of land use that support improved watershed services of different types, only in South Africa is there a substantial body of scientific evidence on these relationships. In some countries there is therefore the danger of creating mechanisms that incentivise the wrong behaviours and diminish rather than enhance watershed services. This is not an easy obstacle to overcome, given that the cost of gathering good hydrological evidence with which to quantify the value of watershed protection services is beyond the means of potential "sellers" of watershed services, or even of many developing country governments. Limited hydrological knowledge also makes it impossible to explore markets for "bundled" services that meet a range of needs, such as for example water quality, flow regulation and landscape beauty (Landell-Mills and Porras 2002).
- C. **Uncertainty regarding sellers:** Because of this limited knowledge and its uneven dissemination, there are often widely differing perceptions about who the providers of watershed management services are, and who they should be. State management agencies such as forestry departments may dismiss the contribution of private or community actors, while those who suffer the effects of poor watershed management demand that the state deal with the problem. It can therefore be unclear to a potential "buyer" of watershed protection who has the authority and right to sell the desired service or bundle of services: is it an upstream land owner, a village council, or the national forest management agency? This confusion is illustrated in the Indonesia study, which reports that the drinking water company in Segara River basin (Box 1) makes upstream payments to both a village council and community groups.
- D. **Reluctance of potential buyers:** On the other side of the transaction, many potential "buyers" have been receiving services without cost, or refuse to accept paying a cost, and resist the establishment of markets. These reluctant buyers can be placed into three broad categories:
 1. The politically powerful, for example the water, hydropower and tourism sectors, who can extract concessions from the state.

2. Those who see watershed services, particularly water, as a benefit the state has an obligation to provide. Many feel that water costs are already too high as a result of inefficiency and wastage, and would not accept higher rates in order to pay for watershed management. These perceptions were noted in some diagnostics as being major constraints to moving towards full water pricing.
3. The government itself, which may be one of the main beneficiaries of improved watershed services, since it carries the costs of mitigation of reduced services (for example, siltation of reservoirs or flood damage), but which does not incorporate such costs into its national accounting, and often succeeds in passing them on to donor agencies.

There are also problems related to the non-excludability of most watershed services. It may be difficult, for example, to single out commercial users for payments for services such as flood and erosion control or biodiversity protection, which will also benefit groups that do not pay.

- E. **Lack of pricing information:** While beneficiaries of watershed services are theoretically infinite, upstream watershed service providers are in most cases effectively monopolists, since property rights will preclude others from entering a specific upstream market. Given these conditions, prices are unlikely to establish themselves freely, and since, as noted by Rosa *et al.* (2003: p.56), 'each of the stakeholders values the benefits of environmental services based on their particular conditions and goals,' as well as their perceptions of their rights to those services, considerable negotiation is likely to be needed. This will mean the involvement of intermediaries to mediate conflicts, and the creation of new institutions.
- F. **High transaction costs:** Market efficiency does not extend beyond the market itself. For markets to be incorporated into existing management and policy frameworks, they will also need to meet wider watershed management, equity and livelihood objectives. This is likely to require substantial investment in regulation, fiscal accountability, capacity-building and oversight, as well as the construction of new market institutions.
- G. **Dangers of competition:** If potential sellers and buyers do emerge, it is not clear how they could be absorbed into market systems as contributors to improving watershed protection services, rather than as competitors as in more traditional market systems. Heavily regulated monopolistic markets rather than freer, more competitive, markets may emerge in many cases.
- H. **Knowing when markets are not appropriate:** The diagnostics point to numerous contexts in which markets may not be appropriate. Often major users of watershed services in these countries, especially land managers and farmers, are also watershed service providers, and thus already motivated to practice good watershed management. When they do not, the problems tend not to be a lack of markets, but a lack of information on correct practices, poorly defined property rights that reduce the incentive for improved land use, or a market-related disincentive (for example, when good watershed practices increase the cost or reduce the output of agricultural production). In other cases, the downstream benefits of watershed services (such as flood or sedimentation control) are so dispersed and difficult to apportion that their value cannot be captured without prohibitive transaction costs and substantial free-riding. Markets would also be inappropriate when other management approaches are already in place and working effectively.

7. And few dangers to watch out for

Because there is so little experience with market-based approaches, even those situations in which they appear most promising present some dangers. Several of these were flagged in the diagnostics.

- A. **Markets can skew decisions about trade-offs.** Managing for improved watershed services often requires making decisions about which services to emphasise, and these decisions sometimes involve a trade-off with other services. In South Africa, for example, managers struggle with the trade-off between afforestation for production of forest goods, and tree clearing for increased water supply. Markets create the danger that these trade-offs will be determined on purely market grounds rather than on their importance to livelihoods or local and national needs.
- B. **Markets can undermine existing management institutions.** Several of the studies raised concerns that markets could undermine community practices and initiatives based on co-operation, self-help, or traditional values: ‘...an important issue to consider and research further is whether it is desirable to replace collective action transactions that are currently based on principles of informality, goodwill and reciprocity with more formalised market-based arrangements’ (Sengupta *et al.* 2003: p.3). In several countries, the state has put substantial resources into establishing or strengthening these approaches, with positive results. The studies widely dispute assertions in the literature that non-market approaches have failed because ‘land users typically receive no compensation for the environmental services that they generate for others [and] as a result, they have little incentive to provide these services.’ (Pagiola *et al.* 2004: p.238). On the contrary, the diagnostics indicate that while recent co-management and community initiatives have been typically under-funded, they have nonetheless made substantial achievements. Inserting market arrangements into these systems could destroy the fabric that holds them together.
- C. **Market opportunities can be captured by privileged elites.** Success itself may be a danger to markets structured to improve livelihoods and equity, since successful markets attract capital, which is largely held, not by poor local people, but by the wealthy, commercial interests, and the state. Especially in water scarce contexts, this carries a particular danger of increasing inequity by awarding the largest share of water to the highest bidders.
- D. **Rapid introduction of markets can widen capacity gaps.** The rapid pace of change in laws and institutions governing the water sector in the countries studied means that management capacity will be limited in the short to medium term. Agencies responsible for managing water resources will need to ask if this is the right time to be introducing market approaches to watershed services, or whether it should wait until the dust settles on water sector reform.
- E. **Markets may be too big a tool for the job.** The India diagnostic points to an interesting case in which a one-time (non-financial) payment from a downstream community was adequate to change practices in an upstream village over the long term (see Box 1). This implies that even in situations where payments are effective incentives, markets may be more than is required to induce desired changes in behaviour. Imposing markets in these cases may simply create inefficiencies and potential for inequity, and introduce new institutions with unknown consequences.

8. Directions that show the greatest potential (and could provide lessons across all Project countries)

Given these challenges and dangers to watch for, the diagnostics nonetheless all make interesting suggestions for further exploration of market-based approaches, several of which are included in Table 2 below. The most promising include the following:

8.1 Expanding rights approaches

From a livelihoods perspective, the biggest concern about market-based approaches is that they provide few obvious entry points for the poor. Ownership of the commodity or service being sold is generally a prerequisite for establishment of markets; this could leave out the poor who lack ownership of land or technical resources and skills that could be used for watershed improvement. It could also lead to privatisation of common property resources upon which the poor rely. This problem might in some cases be addressed by taking a rights-based, or “expanding rights” approach, which allocates to watershed stakeholders basic rights that can be translated into “marketable” commodities or services (Rosa *et al.* 2003: p.9). This approach has worked in those cases in India where equal and tradable water rights were allocated to all members of a community regardless of land ownership or level of water consumption. A case from Trinidad reported in the Caribbean study suggests that providing security of land tenure can be another way in which expanding rights can create an incentive to improve watershed practices.

Other rights that could potentially compensate the poor for good watershed behaviours could include rights to harvest forest products or to plant and harvest trees within forest reserves or communal lands, or to exclude others from such activities. In employing such approaches, it will be important to assure that the expanded rights for the poor are in place and that these rights have an accepted value before any compensation mechanisms are actually established.

8.2 Management contracts

Contractual arrangements with local villages or community groups for specific watershed management services were found in virtually every country studied: water catchment groups and local forest management committees in the Caribbean, village councils in India and Indonesia, and the Working for Water Programme in South Africa. The “buyers” of these services range widely from downstream beneficiaries to governments to donor agencies. These approaches appear to have much potential, particularly given trends towards decentralisation and co-management, but building local capacity is a long-term process: the South Africa study estimates that the Catchment Management Agencies now being established will take up to 20 years to be fully operational.

8.3 Direct downstream to upstream transactions involving commercial users

Commercial beneficiaries of watershed protection services, such as the water and rafting companies in Indonesia (see Box 1), may be more likely than other beneficiaries to take direct action to maintain watershed services rather than rely on the government to provide them. They are also characterised in many of the diagnostics as particularly appropriate targets of market-based approaches, since they sometimes receive a disproportionate share of the benefits of watershed services, and make profits on those services. The India diagnostic identifies such mechanisms as having the highest potential for pilot testing, and the Caribbean study also identifies opportunities for “reef to ridge” transactions. But these

mechanisms involve two potential dangers: they can create perverse incentives to manipulate the quality of the watershed services being supplied in order to keep payments coming and prices high; and they can skew decisions on trade offs between different types of services, thereby hurting other beneficiary groups.

8.4 Watershed protection measures that also provide livelihood benefits

'Producers and communities manage the ecosystems they control with an eye toward ensuring their basic needs like food, fuel-wood, and water (Level 1); earning an income...(Level 2); and the pursuit of new alternatives...(Level 3)' (Rosa *et al.* 2003: p.52). As is well illustrated in the India diagnostic, some measures for improving watershed services can produce "embedded markets" for local people: these can include reforestation projects based on harvestable fuel-wood species, erosion control works that increase water supplies, or development of craft markets involving forest products as an incentive to maintain forest areas. Such livelihood perspectives can be usefully incorporated into the design of watershed service markets.

Table 2: Some of the mechanisms suggested in the diagnostics for pilot testing

Type of market incentive	Suggested activity	Country or region
Expanding rights approach	Security of tenure for squatters who provide agreed watershed services	Caribbean
	Further investigation of the requirements for effective expansion of water rights to landless watershed service providers	India
Management contracts	Contractual arrangements between state agencies or water companies and community groups to manage catchment areas	Caribbean
Downstream to upstream direct transactions	Formalised payment mechanisms between downstream commercial beneficiaries and upstream communities	Indonesia, India
	Voluntary tourism donation programmes for upstream community watershed management initiatives	Caribbean
	Reduction in water bills for farmers who adopt good land use practices	Caribbean
Measures based on providing livelihood benefits	Licenses to local groups for forest access, use and management	Indonesia
	Subsidised seedlings and technical support for growing species that maintain vegetative cover and provide cash crops	Indonesia, Caribbean
	"Branding" or certification schemes for products grown or created in watersheds using good land use practices	Caribbean

9. Implications for next steps

One of the most important findings of the diagnostics was that examining watershed management issues and needs through a market lens can be useful in revealing previously un-noted inefficiencies and dysfunctionalities, as well as pointing to potential new approaches. Despite some shortcomings (see Appendix 2), all the diagnostics were successful in stimulating new ideas and ways of thinking about incentives for improved watershed protection. In spite of the enthusiasm the diagnostics generated for exploring market-based approaches further, there is no evidence in the countries studied of widespread support for markets replacing, or even supplementing, natural resource management as the predominant organisational framework for watershed protection. Further steps to explore market-based approaches through action-learning in the diagnostic countries might most usefully aim to seek answers to the question of whether payments for watershed services be constructed in ways that:

- Decrease rather than increase risk and vulnerability for the poor;
- Assure security of access by local people, including the poor, to watershed resources and services upon which they depend;
- Reinforce rather than undermine existing state, traditional, community, and private systems of management;
- Complement rather than compete with new government institutions, structures and fee systems coming out of water sector reform processes.

Finally, the diagnostics remind us that a substantial level of public consultation and involvement of formal management agencies, as well as an adequate period of time for fully testing approaches and developing necessary institutions, policies and capacity, will be indispensable in assuring that market-based mechanisms contribute to national and local watershed management objectives and to equitable flows of watershed services. These costs will need to be provided by governments and donor agencies or built into the mechanisms that are developed.

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Appendix 1. Summaries of main findings of diagnostic studies

Conditions for introducing payment-based approaches	Caribbean	India	Indonesia	South Africa
Main watershed issues potentially benefiting from new approaches	Inadequate protection of key catchments resulting in contamination and deforestation; poor agricultural practices resulting in erosion and pollution and increasing risks of landslides and flooding; poor sanitation practices; dry season water shortages.	Human pressures on forest resources resulting in degradation, soil erosion, and siltation of dams and lakes; increasing poverty from reduced watershed services, especially flow regulation and soil fertility; need to maintain flows to meet water consumption and hydroelectricity demands.	Deforestation of erosion-prone catchment areas for commercial timber; reduced water quality as a result of heavy industry; human pressures on forest resources; decreased water availability especially in dry season.	Water scarcity and inequities in allocation; pollution from industry and mining.
Main stakeholder groups demanding watershed services	Water consumers and suppliers; tourism sector (coastal and river water quality); farmers and urban residents (landslides and erosion).	Farmers and communities in watersheds (water supply and quality), hydroelectric sector (supply and flow regulation).	Downstream water-dependent industries (water flow and quality).	Because of scarcity and inequitable allocation, demand, particularly for water supply and quantity, is widespread.
Interest and willingness of key watershed management actors to consider payment-based approaches	Interest in new incentives, including financial ones; reluctance to trust management decisions to markets.	Low levels of knowledge; historical political aversion to marketisation of public services slowly beginning to change.	Some downstream stakeholders have initiated payments; government policy apparently neutral on payment-based approaches.	Apparently high within government as a means to address scarcity and equity issues, but perception of a lack of consensus among policy-makers.
Information on hydrological requirements for improved watershed services	Level of information quite limited and varying between countries; what information exists scattered between agencies and not easily available to managers.	Very limited.	Very limited.	Detailed and accessible.

Challenges to Establishing Markets for Watershed Services: Learning from Country Diagnostics

Conditions for introducing payment-based approaches	Caribbean	India	Indonesia	South Africa
Information on appropriate land uses to support hydrological requirements	Varies by country; what exists is not always easily accessible by managers.	Little detailed information, but a basic awareness of good land use practices fairly widespread.	Little information; a general perception that many aspects of water quantity and quality, e.g., floods or dry season flows, "comes from God" and will not be affected by land use changes.	Good data and expertise except for information on traditional land use practices.
Information on economic value of watershed services and costs of maintaining them	Virtually none available; identified as a need.	Not mentioned in diagnostic.	Not mentioned in diagnostic.	Little or no information; identified as a need.
Policies, legislation and institutions enabling of economic incentives	Water sector reform processes underway in some countries; improved policy and institutional frameworks for watershed management being introduced in all countries. Some legal mechanisms for economic incentives, e.g., tax incentives.	Policy environment structured around whole watershed and joint forest management (JFM) community-based approaches; watershed development funds established at village level; several regulatory user payment systems in place.	Decentralisation of forest management; communal ownership of forests implies opportunities for village-level rather than individual provision of services.	National Water Act of 1998 establishes policy framework for economic instruments; decentralised Catchment Management Agencies provide institutional structure. But CMA is still new and expected to take 10-20 years to become fully operational.
Awareness of upstream and downstream actors of requirements for protecting watershed services	Despite some effective education programmes, awareness generally perceived as poor.	Upstream awareness generally good; downstream awareness generally poor.	Good local awareness in project site both upstream and downstream.	Awareness limited, education inadequate.

Challenges to Establishing Markets for Watershed Services: Learning from Country Diagnostics

Conditions for introducing payment-based approaches	Caribbean	India	Indonesia	South Africa
Organisation of watershed service providers and willingness to contribute to improved services	While not widespread, examples of organisation of communities and groups to improve services in most countries; also evidence of good soil and water conservation farming practices.	JFM policies have created thousands of village-level watershed user groups taking a management role.	Critical need identified for structures to bring actors together to negotiate rights and responsibilities.	Geography and hydrology of SA make distinction between providers and consumers less clear than in other countries, but examples of willingness to trade exist.
Organisation of watershed service consumers and willingness to pay (WTP) for improved services	No concrete data, but perception that WTP is constrained by feeling that watershed services are public goods, and policy guidance generally treating them as such.	Large and small scale consumers now contributing through regulatory payments, but WTP without regulation thought to be low for all groups. Village institutions provide structure for reaching rural consumers.	Locally, some commercial users have demonstrated WTP through voluntary payments. Nationally, need identified for structures to bring actors together to negotiate rights and responsibilities.	
Existence of, or tangible suggestions for, incentives for improved land use/watershed behaviour	Incentives key tool for improved land use. Existing incentives, e.g., free seedling programmes, tax concessions in most countries; numerous others being tested or under consideration.	Existing and proposed incentives mainly based on improving income of rural people through rehabilitation of degraded land including village common land.	Emphasis on agroforestry plantations that can provide income incentive while protecting critical watershed services.	Some ongoing projects (e.g., DFID's Water and Forestry Support Programme and University of Newcastle's CAMP project) working on this.
Understanding of livelihood dimensions of watershed service provision and allocation (who would stand to gain or lose from changes in land use and the creation of market-like systems?)	In some countries, poverty and lack of tenure seen as constraints to market participation; in others, need for new livelihood options seen as possible basis for incentives for new forms of land use.	Livelihood and equity considerations central to existing watershed policies; some positive past cases of markets that benefited poorest groups but also good understanding of dangers to poor.	Large-scale commercial operations threaten rural livelihoods dependent on common lands and traditional management; payment schemes could support these communal systems.	Economic incentives seen as tools for addressing social inequity and providing new opportunities for the poor; policy guidance and national consensus give priority to meeting basic needs and improving livelihoods of poor.

Challenges to Establishing Markets for Watershed Services: Learning from Country Diagnostics

Conditions for introducing payment-based approaches	Caribbean	India	Indonesia	South Africa
Structures to support learning about and testing payments	Some ongoing projects to which action-learning could be linked; watershed management bodies in some countries for co-ordination.	A number of past and current examples that have been studied; considerable experience in related sectors (e.g., informal water markets).	Some community organisations to collaborate with in action-learning.	Several ongoing projects and initiatives to which action-learning could be linked.

Appendix 2. Additional information needs: what the diagnostics did not reveal

As a first effort at understanding specific contexts in which market-like instruments might be considered as tools for watershed management, the IIED country diagnostics uncovered a considerable amount of information. With the benefit of hindsight, however, it is possible to also see some of the information that they failed to capture, and that would be needed for a full evaluation of the potential of market-based approaches.

- None of the diagnostics presents a full or convincing argument that conventional land use has failed. They also do not include specific and detailed suggestions of how farmers and other watershed actors might contribute to improved watershed services through changed behaviours that take account of the complexities of current land use patterns and the livelihood strategies they support. They therefore do not provide much guidance on the land use changes that market-based approaches could encourage.
- Similarly, they do not provide a deep analysis of the hydrological complexities and trade-offs involved in managing for the provision of watershed services. What effects do management regimes that aim to optimise one service have on other services? We cannot assume that these will always be positive.
- The diagnostics provide very little information on the economics of land use. It is critical to understand the net economic benefits from current land use patterns, including taxes and subsidies, in order to assess the magnitude of incentives required or the likelihood of their effectiveness in changing behaviours.
- Finally, they do not provide enough information on the policy environment to be able to fully assess whether, and under what conditions, payments for watershed protection services are legally possible.