

# Markets for watershed protection services and improved livelihoods in India

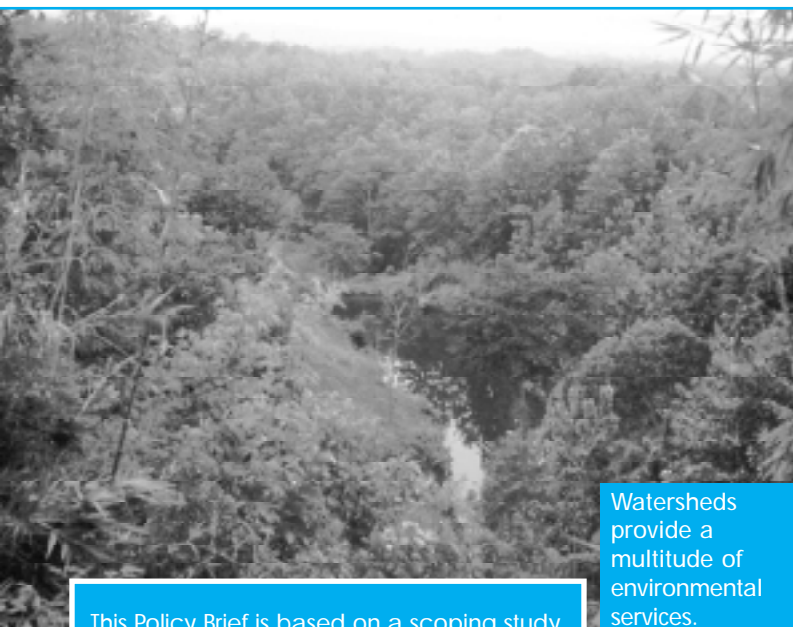


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## A POLICY BRIEF



Watersheds provide a multitude of environmental services.

Natural resources such as forests and water have historically been taken for granted as limitless 'goods'. However, widespread conversion and degradation of forests and other ecosystems due to overexploitation, is posing a challenge for sustaining the health of ecosystems and the services that flow from them. In the forestry sector, this has led to a shift in focus from 'goods' such as timber to 'services' such as biodiversity conservation, landscape beauty and watershed protection. The time has come to strike a balance between the two. But, while goods are generally freely traded, there are no markets for services. Unless resource managers get real payments for their services, they will not have any incentive to maintain the flow of these services. Can markets be developed for watershed services? Can poor people's livelihoods be improved through such markets? These are some questions that must be debated urgently.

This Policy Brief is based on a scoping study on 'Developing Markets for Watershed Protection Services and Improved Livelihoods in India,' which Winrock International India (WII), New Delhi, undertook as part of a larger international study being carried out by the International Institute for Environment and Development (IIED), London. This study takes a preliminary look at the potential and desirability of using market-based approaches to provide watershed protection services in India from the points of view of making benefit-sharing more equitable and improving livelihoods. The two states of Himachal Pradesh and Madhya Pradesh were the focus of this study.

The study did not aim in any way to promote the development of markets for watershed protection services. It intended to explore primarily the potential and limits of a market-based approach, particularly in the context of other existing approaches such as regulation and collective action, and to identify areas where adoption of such an approach can benefit poor people.

### Approaches to natural resource management in India: a brief history

Historically, in India, most traditional resource management systems have been replaced with state-controlled *regulatory approaches*. The ownership, management and control of natural resources have been vested almost entirely in the hands of the government. Until recently, the main approach to forest management was that of *departmental policing* of forests, forbidding local communities of access to them in the classical *fences and fortresses* mode. Similarly, in the case of watershed protection and development activities, it was largely government agencies through the line departments of various ministries, that undertook watershed treatment work. The approach was largely again a top-down manner of working, with little community participation. The emphasis on technical interventions and on

meeting targets of construction and treatment led to poor community mobilisation and social organisation important for sustaining these interventions. This techno-centric, top-down approach towards management achieved little success in halting the rapid degradation of the country's natural resources.

#### From a regulatory to a participatory approach

In order to remedy the above approach, over the last decade a number of policies and guidelines have facilitated a shift in natural resources management from a *regulatory* to a more community-based *collective-action* approach in India. In this new approach, greater control is vested with the local communities over the resources in question, thereby leading

to a greater sense of ownership. The forest policy environment today strongly encourages the participation of local communities in forest management, emphasising collaborative partnerships between the Forest Department and the local people. In the case of watershed development, a set of 'Common Guidelines' were issued in 1994, which called for an integrated and participatory approach to watershed development.

While the shift towards collective action-oriented, participatory approaches has been successful in many respects, there are also cases where the incentives offered have not been sufficient to alter the land use practices of poor forest-dependent communities. Many instances of watershed protection have also faced serious problems with regards to equity, with benefits going mainly to rich landowners, and costs being borne mainly by the poor, landless communities.

Within the participatory approach, evidence suggests that watershed development and forest protection have been much more successful in places where sufficient biophysical and institutional incentives exist or have been provided to the local people to participate in such activities. Furthermore, the commitment of communities to watershed development projects has also been significantly higher wherever the beneficiaries themselves have contributed to the costs of the project activities. Wherever sufficient awareness has been created, and the right incentives provided, people are willing to contribute to the costs of watershed development activities in their locality.

It is being argued and seen in other parts of the world that markets for environmental services are an efficacious tool for the conservation of

natural resources, without compromising on the benefits that have been traditionally derived from them in the nature of goods.

### What are 'markets for environmental services?'

With increasing degradation of the natural resource base leading to a global environmental crisis, there is a growing appreciation of the role of forest-systems in providing not just goods but also vital services. These services are diverse, ranging from carbon sequestration to landscape beauty, and from biodiversity conservation to watershed protection. To sustain the flow of these services, there has been an increasing movement towards putting a value on them and, concomitantly, making payments for this value.

Markets for various forest services are, therefore, generating real payments for forest owners and managers. These in many cases are poor communities. The payments provide them with increased incentives

#### Some examples of markets for forest services are:

- **For forest biodiversity – bio-prospecting**
- **For recreational value – eco-tourism**
- **For carbon sequestration – tradable carbon offsets**

to maintain their forests, thereby, directly improving their livelihoods.

Services provided by forests come under a larger umbrella of 'Environmental Services'. This concept is based on placing imputed values on various environmental services to promote the conservation of natural resources as well as meet livelihood needs in a sustainable way. In order to realise these values in the realm of actual management of resources, the values are defined as commodities,

which are the subject of transactions. Thus, payments based on these values, made and received as an incentive for appropriate management of the natural resource base, constitute what is commonly termed as 'markets for environmental services'.

Like other services, such as forest biodiversity or carbon sequestration, the hydrological functions of land use in the form of watershed protection services have also started receiving significant attention. The value of better access to reliable supplies of clean water and reduced vulnerability to environmental risks such as flooding and landslides are increasingly being appreciated. Globally, there has been development of systems for payment for watershed services in several countries (Box 1).

Cases have also been reported from Costa Rica, Colombia and Ecuador where real payments are being made to upstream communities protecting forests for providing

#### Box 1

##### New Yorkers pay for watershed protection services

A good example of payments for a watershed protection service is from the city of New York. The city gets 90% of its water supply from Catskill and Delaware watersheds, 75% of the area of which constitutes forests. Faced with increasing microbial and phosphorous pollution, the city had two alternatives: either to invest in a filtration plant costing \$6-8 billion (plus annual maintenance of \$300-500 million), or to invest in the improvement of management of watersheds, thereby reducing the pollution at source. The city chose the latter and, by raising money from additional taxes on water bills, decided to invest \$1-1.5 billion in watersheds over a ten-year period.

**Source:** [www.forest-trends.com](http://www.forest-trends.com)

watershed protection services to downstream users. In Ecuador, for instance, a variety of groups have joined hands to establish a fund for the protection of the catchment area above the city of Quito. This fund draws from water consumption fees negotiated with various users, and is invested in catchment protection.

## Markets for watershed protection services in India – a complementary approach?

Today, watershed protection in India is receiving tremendous support for its multiple benefits not only in improving the livelihoods of the rural poor in much of dryland India, but also for the services that accrue to larger downstream beneficiaries in the form of municipal water supplies, regular water flows, flood mitigation and reduction in sediment flow for hydro-power generation. (See Box 2.)

While market-based approaches have been credited in several countries with promoting efficient resource management, it is not clear how they may be best employed to improve the use of water resources and land management in watersheds in India. A major concern relates to the impacts of markets for watershed services on the livelihoods of the marginalised,

### Box 2 Some important watershed services...

- Soil and water conservation/ groundwater recharge
- Provision of drinking and irrigation water
- Control of siltation in dams, reservoirs, etc
- Water quality and quantity regulation
- Flood control
- Landslide control
- Wetland conservation

**Markets for watershed protection services do not always imply a monetary or even tangible transaction between service providers and service receivers. An exploration of the potential for market-like arrangements encompasses all incentive-based arrangements, transactions, payments and compensation systems (monetary or non-monetary) for watershed protection services that are ‘market-like’ in nature and have the potential to develop into more sophisticated mechanisms in the future.**

especially in terms of equitable sharing of benefits and costs.

Given this and learning from experiments from other parts of the world, the potential of *market-based* approaches as alternative, yet complementary, solutions to existing regulatory and collective action approaches for the sustainable management of natural resources has begun to be explored in India.

A preliminary scoping study undertaken in two states in India, Himachal Pradesh (HP) and Madhya Pradesh (MP), revealed that there is a latent potential for the development of such approaches. However, underlying this potential are also several constraints, which would need to be overcome.

## Potential and Constraints

### Market-based mechanisms embedded in collective action

#### *At the micro level: Intra-village transactions*

There are some interesting examples at the micro-scale where *market-like* mechanisms for watershed services have led to improvements in livelihoods and equity. These have been developed within a collective action framework.

### Box 3

## Exploring potential in two Indian states: rationale for selection

### Himachal Pradesh (HP)

- HP constitutes a major natural watershed for the entire North India region;
- Around 66% of the state is legally defined as forest land;
- 90% of HP’s rural population is dependent on forests for its livelihood;
- Well-managed watersheds provide crucial services to downstream states in the form of freshwater supply, prevention of landslides and floods, and control of siltation in dams and reservoirs;
- A good policy window:
  - A draft state water policy, which recognises the need to place mechanisms to sustain watershed services;
  - Guidelines to develop an Environment Policy for the state, recommending the development of appropriate mechanisms to provide sufficient incentives to local communities to participate in forest protection and afforestation;
  - Systems for one-time regulatory payments made for catchment area treatment already in place.



### Madhya Pradesh (MP)

- Major rivers of the state originate in upper watershed regions of the state;
- MP has the largest area of forest land in the country;
- Very high livelihood dependence of rural communities on forests;
- A conducive policy environment:
  - Has the country’s largest watershed development programme – The Rajiv Gandhi Watershed Mission;
  - Significant potential for hydropower projects seen by government of MP;
  - Increased focus on water issues and growing interest of state government in reforms and private sector participation in water resources management.





The case of Sukhomajri through the de-linking of land and water rights is an illustration of market-based mechanisms embedded within collective action processes. (See Box 4.)

The de-linking of land and water rights has, however, been more an exception rather than a rule in watershed development projects in India. Besides Sukhomajri, there are a few other isolated cases, such as in the case of *Pani Panchayats* in Maharashtra, where this has been experimented with. Serious concerns about intra-village equity impacts of the watershed development programmes have been raised all over the country, including



Watershed development and forest protection have been more successful where sufficient incentives have been provided to communities for participation.

MP and HP. While most of the benefits of these projects have gone to rich landowners, a large part of the costs

have been borne by poor marginalised farmers and landless communities who have lost access to common lands as a

#### Box 4

### The Case of Sukhomajri (Haryana state)

The case of Sukhomajri, located in the foothills of the Himalayas along the Shivalik range offers a live example of how *market-like arrangements* can lead to significant equity and livelihood benefits for the poor. Market-like arrangements can be discerned at two levels, as follows:

#### Watershed protection services provided to downstream city of Chandigarh

Watershed development in Sukhomajri originated due to the rapid siltation of Sukhna Lake, which has tremendous recreational value. This problem was traced to the severe degradation of its surrounding catchment area, most acutely in the hills near the village of Sukhomajri. It was realized that no amount of technical soil conservation and watershed development could prevent the flow of silt into Sukhna Lake, unless the villagers could be motivated to give up free grazing and tree biomass collection in the hills. To motivate them to do so, two earthen dams were constructed by the Central Soil and

Water Conservation Research and Training Institute along with the Chandigarh Administration. The villagers of Sukhomajri were able to derive enormous irrigation benefits from the water that accumulated in the dams after the monsoons. This water availability, thus, became an immediate incentive for them to stop grazing in the surrounding hills and initiate watershed protection activities through 'social fencing'. The investment made in these dams could thus be construed as a payment made for watershed services accruing downstream to the city of Chandigarh.

#### Embedded Markets<sup>1</sup>: De-linking land and water rights

Besides social fencing and the ban on free grazing, equitable sharing of resources that accrued as a result of the collective watershed protection work undertaken, became a critical factor in the protection of the catchments of Sukhna Lake. A market-based mechanism was used to achieve this. An ingenious solution was found in order to give everyone in the

village, including the landless and the predominant grazier community, an incentive to participate equally in the protection of the surrounding forests. All households in the village, irrespective of landownership or size of land holdings, were allotted an equal share of the water collected in the dam, in return for stopping grazing in the hills. In the system that subsequently evolved, those not owning lands or with very small holdings, sold their share of the water to larger landowners (who needed water beyond their own entitlement) either for cash, or on a sharecropping basis. Some also used it directly on land rented from larger landowners, thereby gaining a share of the increased agricultural production in the village.

This market-like mechanism de-linked water rights from land rights and allowed the landless and the land-poor to capitalise on their share of the water by selling it to larger landowners. This provided the small landowners/landless with a direct incentive to participate in watershed protection and financially compensated them for loss of access to traditional grazing lands. It also solved inequities in benefit sharing.

<sup>1</sup> The term 'embedded markets' is used here in the sense that transactions are nested within a collective action framework.

result. On the whole, there is very little awareness of the concept of providing appropriate compensation to the landless and land-poor in return for their participation in watershed protection activities, both at the field and policy levels.

Given this, it is hard to dispute the desirability of having such mechanisms on a wider scale. Contrary to the common perception that *markets* and *market-based* approaches are always anti-poor and iniquitous, these village-level mechanisms show how watershed protection activities can be made more equitable to benefit the livelihoods of the poor. Despite the desirability of such mechanisms, there is, however, a need for a certain measure of caution. Given the multiplicity of factors at the village level in India, as well as the specificity of contexts, the practicality of de-linking land and water rights and promoting the trading of these rights needs to be thought through carefully before generalising any such principle at a wider state or country level.

#### **At the meso level: Inter-village transactions**

There are a number of interesting examples of inter-village cooperation with regard to water sharing, watershed protection, grazing rights and more

generally, natural resources management, both traditional and otherwise, which are based on incentive mechanisms that closely resemble market-like arrangements. These are generally perceived to be more equitable and beneficial for livelihoods as compared to alternative ‘state-controlled’ regulatory systems.

Research on existing cases of local exchange-based mechanisms, though conceptually closer to the collective action approach, would yield rich learning for the development of market-based approaches for watershed protection services. (Box 5)

In order to put in place inter-village transactions/payment mechanisms as incentives for watershed protection, a strong awareness needs to be created about upstream-downstream linkages in the minds of the people. This awareness was found in some villages in HP, where people traced the drying up of fresh water springs (*baodies*) to the degradation of forest vegetation upstream. On the whole, however, this kind of linkage is still very weak or absent in the minds of the people. Usually, people are not interested in issues beyond their village unless they are directly affected by them and can ‘see’ the changes/benefits from watershed protection on the ground.

A major constraint in India for putting in place such market-like arrangements is the fragmentation of intra- and inter-village unity along lines of caste, class and political affiliations. This adversely impacts the setting up and smooth functioning of village-level institutions, which would be necessary for any kind of transactions to take place.

It is often difficult to draw the conceptual and definitional boundary, at this level, between what constitutes a collective action mechanism and what a market-based mechanism. Keeping this in mind, a question that arises is how desirable it is to replace collective action arrangements that are traditionally based on goodwill and *quid pro quo* arrangements with market mechanisms. However, as the scarcity of water becomes more acute

#### **Box 5 The traditional kuhl system in HP**

More than 150 years old, the traditional, community irrigation system of *kuhls* (earthen or cemented channels running along a drainage line used to channelise water from upstream to downstream), is an interesting example of embedded markets at the meso level. The *kuhls* have an elaborate system of management with intricately defined upstream-downstream rules, rights and responsibilities that have been negotiated over the years. There exist well-established systems which define precisely how much water is to be released and when, to which downstream village, and to what extent the different downstream villages have to provide free labour for the maintenance of the upstream stretches of the *kuhls*.

Even though these community-managed *kuhls* are in reality more a form of collective action than a market-based mechanism, it is, however, conceptually closer to a market-like system involving formal and informal upstream-downstream transactions rather than to a state-controlled regulatory framework. The working of *kuhls* provides useful insights for developing other related forms of upstream-downstream transactions for watershed services in HP.



People benefitting from a small dam constructed under a watershed development programme.

in the future, there will be a definite need to devise some complementary solutions to the existing approaches to provide incentives for conservation/watershed protection to ensure the sustained flow of services.

### Transactions between larger downstream beneficiaries and upstream service providers

#### *At the macro level*

A significant potential for the development of markets for watershed protection services exists at the macro level between downstream beneficiaries and the upstream watershed protection service providers. Some of the downstream beneficiaries of upstream watershed protection are water supply agencies in urban areas, hydro-electricity projects, and mineral water companies. While the hydro-power sector receives watershed services of water flow regulation and reduced sedimentation in dams and reservoirs, urban centres receive assured water supplies and, in some cases, landslide prevention services.

#### *Hydropower companies as beneficiaries*

In HP, small and large hydropower projects are already making several compensatory payments for forest and watershed protection. These payments are compulsory, mandated by state regulations, stipulated under the Environment Protection Act 1986 and Forest Conservation Act 1980. The amount of money generated through these is substantial. However, these are one-time payments on a per project basis. All these payments go first to the State Treasury, from where they are subsequently reallocated to the relevant line departments, in most cases the Forest Department, for implementation.

Under the existing system there are no direct transactions taking place between the Forest Department and

the respective hydropower projects. Further, there is no proper mechanism to ensure that the payment made by the hydropower project for the treatment of its specific catchment area is actually used for that purpose itself. Further, these payments may or may not accrue to the communities living in and around these catchments. Therefore, the enhancement of livelihoods may be suspect.

Thus, the whole regulatory system governing the payments made by hydropower projects towards watershed protection activities has a number of institutional weaknesses. Furthermore, there is also a need to put in place systems for regulating and monitoring these payments.

Hydropower companies are aware of the linkage between upstream catchment protection and silt inflows in their systems. Hydropower companies incur huge expenses in de-siltation. Control of silt flow and sedimentation, which considerably reduces the life of their projects, can be an essential watershed service for them. However, in order to convert these one-off payments into a more sustained and periodic system, the hydropower sector expressed the need for scientific

validation of the upstream-downstream links that are so far only perceived.

On the whole, the concept that one has to *pay* for upstream watershed protection is still a very new one in the hydropower sector. Had statutory regulations not been in place, it is difficult to say whether the hydropower companies would have made any contribution for upstream watershed protection on their own.

#### *Municipal water supply agencies as beneficiaries*

Besides the hydropower sector, the other significant recipients of watershed protection services are municipal water supply agencies, dependent on upstream catchments for water supply. The potential as well as the desirability of putting in place an adequate payment mechanism in this case is amply illustrated by the example of the city of Bhopal in MP. (See Box 7.)

Although there is tremendous potential for developing market-based mechanisms for the watershed protection services received by the Bhopal Municipal Corporation, there are several practical hurdles that need to be crossed before any such

### **Box 6**

#### **Scientific evidence as a basis for market transactions**

In order to establish markets for watershed services, only perceptions of links between different land uses and services that flow from them are not always enough. Scientific evidence of the link between different land use practices and particular services resulting from these is crucial in order to establish sustained payments for watershed services. Those making payments for watershed services will want sufficient proof that the services that they are paying for are indeed linked to certain land use practices. For instance a popular perception is that forests deliver a range of services

at the watershed level. However, recent research has demonstrated that forest-water linkages are not as straightforward as assumed earlier. A combination of a number of factors such as types of forest (natural or plantation), tree species, vegetation mix, soil composition, and associated management regimes determine the nature and extent of watershed services provided by forests. Providing scientific evidence for watershed services will ensure that market development will contribute to appropriate management practices, which influence the flow of these services.

mechanism can be fructified. The level of awareness of the city regarding the watershed services received is still very limited not only among the general public but also among many policy makers. Further, scientific studies to prove the upstream-downstream linkage, though widely perceived, have not been carried out.

It must be noted, however, that according to a valuation study undertaken on the Bhoj Wetlands, it was found that each household was

willing to pay up to Rs 241 per annum for its conservation, the condition being that it be a voluntary contribution to an independent institution set up for this purpose.

Currently, the water tariffs, as in other parts of the country, are highly subsidised in Bhopal. Removal of subsidies and increasing tariffs is a politically contentious issue in India. There is a need for great positive political will in order to make this happen. Unless accountability in the

public utility system is increased, people would be generally unwilling to pay any extra money to the Bhopal Municipal Corporation.

### Box 7

## Paying for services from the Bhopal water supply catchment

The city of Bhopal, which has over 200,000 households, receives its water from two major sources – the upper lake of the Bhoj Wetlands and the Kolar dam. In recent years, Bhopal has been facing an increasing water crisis with the drying up of the upper lake during summer. This can be attributed to a number of factors, the most important of which is the increased siltation of the lake. This in turn can be traced to increased intensification of agriculture in the catchment area of the lake.

About 30-40 years back, almost the entire catchment of the Bhoj Wetlands comprised forests, which have come under increasing pressure due to a rapidly growing population. With the passage of time, a lot of this forest area has come under agriculture. Though efforts have been made to tackle the problem of siltation and eutrophication of the lake through the Bhoj Wetlands Project, there has not been much concerted effort towards changing the land use practices of poor farmers contributing to much of this problem. This case, therefore, is an interesting scenario from the point of view of developing some incentive-based transaction system between the people who benefit directly from the Upper Lake and

the farmers living in the catchment areas of the lake.

The Kolar dam supplies nearly 60% of the water received by Bhopal. The dam itself receives water from the Kolar river, which originates from a thickly forested catchment, 70 km upstream from the dam. There are about 60-70 villages located in the catchment area of the river exerting significant biotic pressure on these forests. These are largely poor tribal communities dependent on the forests for a variety of livelihood needs in the form of fuelwood, fodder and NTFPs. In order to maintain the watershed protection services in the long run, a system to compensate these communities for protecting these forests needs to be put in place.

The citizens of Bhopal are currently making no payments at all for the watershed protection services that they are receiving from these forests. As of now, water tariffs being charged to different consumers are highly subsidised. There appears to be a willingness on the part of consumers to make additional payments if reliable water supplies can be ensured. This indicates a latent potential for development of markets for watershed protection services.

## Key Findings

### MICRO LEVEL

**De-linking of land and water rights has led to development of 'embedded markets' in some cases. But it is not very common. There is tremendous potential in this for addressing the issue of equity.**

### MESO LEVEL

**Traditional examples of inter-village cooperation exist, which closely resemble market arrangements. Much can be learned from these for developing more sophisticated mechanisms.**

### MACRO LEVEL

**There is significant potential to develop mutually beneficial market-based mechanisms for watershed protection services between poor upstream communities and downstream beneficiaries (such as hydropower and municipal water supply agencies) in the medium to long term.**

- Markets for environmental services are not necessarily anti-poor. Market mechanisms have the potential to promote equity and improved livelihoods;
- Regulatory, participatory and market-based approaches can be complementary and combinations may be better than one approach alone;
- Development of market mechanisms require greater scientific validation of upstream-downstream linkages and appropriate and transparent institutional mechanisms;
- Environmental services traditionally under state control are considered as 'public goods'. However, market-based approaches can often provide more cost-effective and efficient solutions to meet environmental goals by creating incentives for conservation.



## Questions for further research

- How exactly and under what circumstances do intra-village mechanisms such as de-linking of land and water rights work, and what is the role of local institutions that manage these mechanisms?
- How does one draw the conceptual and definitional boundary between what constitutes a collective action mechanism and what constitutes a market mechanism at the micro and meso levels?
- Who should payments be made to, individuals or to a collective village institution? How should these payments be structured?
- How will the off-site downstream buyers of watershed services know what they are paying for? How will they measure the benefits? There is a need to develop suitable measurable indicators and a monitoring system.
- What happens to transaction costs? How should these be calculated and taken into account? Under what conditions will complementing collective action transactions, which are based on principles of goodwill and reciprocity with more market-like arrangements, provide incremental benefits?

This work is being taken forward under a three-year action research programme, researched collaboratively by WII and IIED.

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