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Contents

Key messages

1. Incentive for Watershed Security

Watersheds are the appropriate units for water management
A watershed is the area of land that feeds water into a river, through the process of precipitation draining through the landscape, into tributaries and into the main river channel. Watersheds are also called 'catchments', 'drainage basins' or 'river basins'.

Watershed services benefit people and nature
The various components that make up the landscape within a watershed – for example forests, grasslands, cultivated areas, riparian areas and wetlands – form groups of ecosystems. These ecosystems provide 'watershed services'. These are defined as the benefits obtained from the ecosystems within a watershed that support downstream water users, including ecosystems.

Payment for watershed services is an important innovation in water management
Watershed services are key in creating water security for downstream water users. Providing incentives by paying land and water managers to maintain watershed services is an innovative way of strengthening water security. A wide variety of cases now exist around the world from which one can draw lessons of the do's and don'ts relating to payment schemes for watershed services.

2. Valuing and Managing Watershed Services

Linking upstream land and water use and downstream benefits
For a payment scheme to succeed and endure, the actions and change brought about by upstream land and water managers should result in identifiable benefits for downstream water users. Therefore, clear cause-and-effect relationships between upstream land and water use practices and the provision of watershed services for downstream users needs to be identified. The degree to which this is possible varies considerably from case to case.

Using indicators and targets to define service baselines and track progress
Watershed services are controlled by an 'optimal mix and intensity' of land and water use in

locations will be targeted for specified interventions. It also helps to narrow down the group of stakeholders to be involved in the scheme and the mechanisms to be used. It further creates transparency and trust amongst stakeholders in the scheme.

Build a case for investment through valuation of watershed services

of permits among water users. With a *cer ifica ion or eco-labelling scheme*

Preface

Water as a good, a service or a right, is more and more frequently put forward as a major challenge in our globalised world. We are putting our water resources under increasing pressure and we need to address how we deal with this extra stress on our environment. When we add our desire for social equity, economic yield and environmental accountability – the problem becomes extremely complex.

To pay or to compensate for environmental services – how to do this and who has to do it – is not yet fully incorporated into the present models of water management. Today we urgently need new and innovative ideas, tools and ways of working to finance the protection of our water resources. We need to obtain positive, sustainable results which guarantee effective, environmental management of water supplies.

This guide attempts to define a roadmap for the creation of economic mechanisms and tools that relate development to conservation, agricultural and industrial production, and the increasing urbanization of our landscapes.

The search for integrated water resources management is dependant upon the integration of all water users and their needs. This requires their active participation in decision-making based on the co-responsibility and shared aims for the use of resources. Involvement of stakeholders is a fundamental prerequisite and crucial for successfully implementing a payment scheme which finances responsible water management. We hope that this publication is a useful guide for those considering payment schemes. We all need to become involved in such an Endeavour, not only in defining the problems but also in implementing the solutions.

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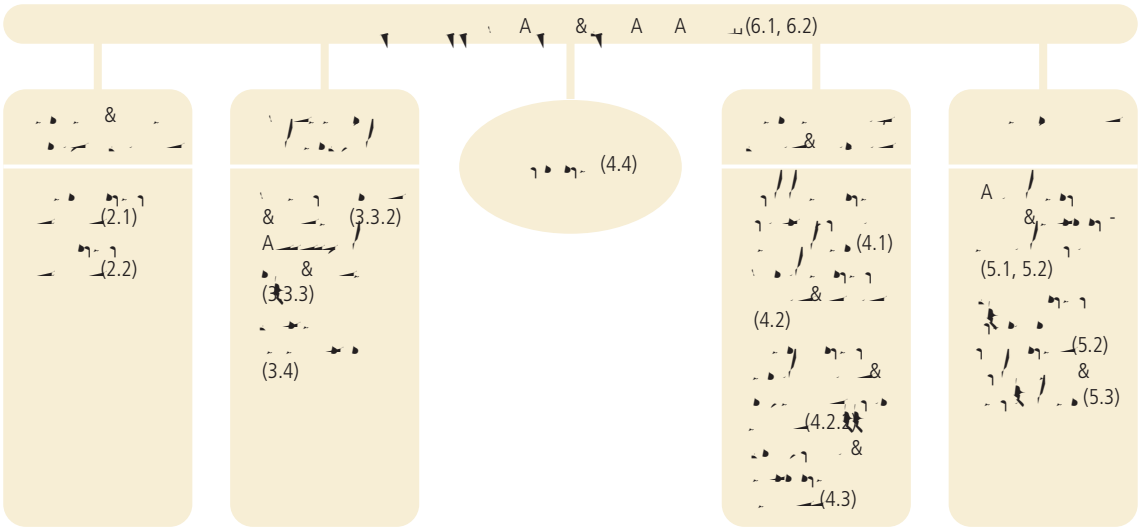
that are critical for water security. Over the last decades, a range of pilot schemes have been developed. Often these have used different 'banners' such as Payment for Ecosystem Services (PES), water banks, water trading schemes or water subsidies. Increasingly, information is now available about the do's and don'ts of setting-up and managing these schemes.

PAY responds to the demand for more synthesised, practical information on establishing and running payment schemes for watershed services. This demand is expressed by potential buyers and sellers of watershed services, as well intermediaries who often facilitate the setting-up and running of payment schemes. The aim of PAY is to assist these parties in designing schemes that are effective, efficient, sustainable and equitable. PAY provides an overview of the various components that must be brought together to establish a payment scheme for watershed services. A number of critical issues are addressed in the various chapters, as summarised in Figure 1.2.

Figure 1.2: Components that must be brought together during development of a payment scheme for watershed services. Numbering refers to Sections in Chapters 2-6 discussing each component.



First of all, PAY clarifies what watershed services are, how to measure them and how to put a value on them. It also explains why it is vital to establish a clear causal link between improving or avoiding degradation of a watershed service and direct outcomes related to water security. Without this link, a payment scheme is unlikely to galvanise wide support from potential buyers.

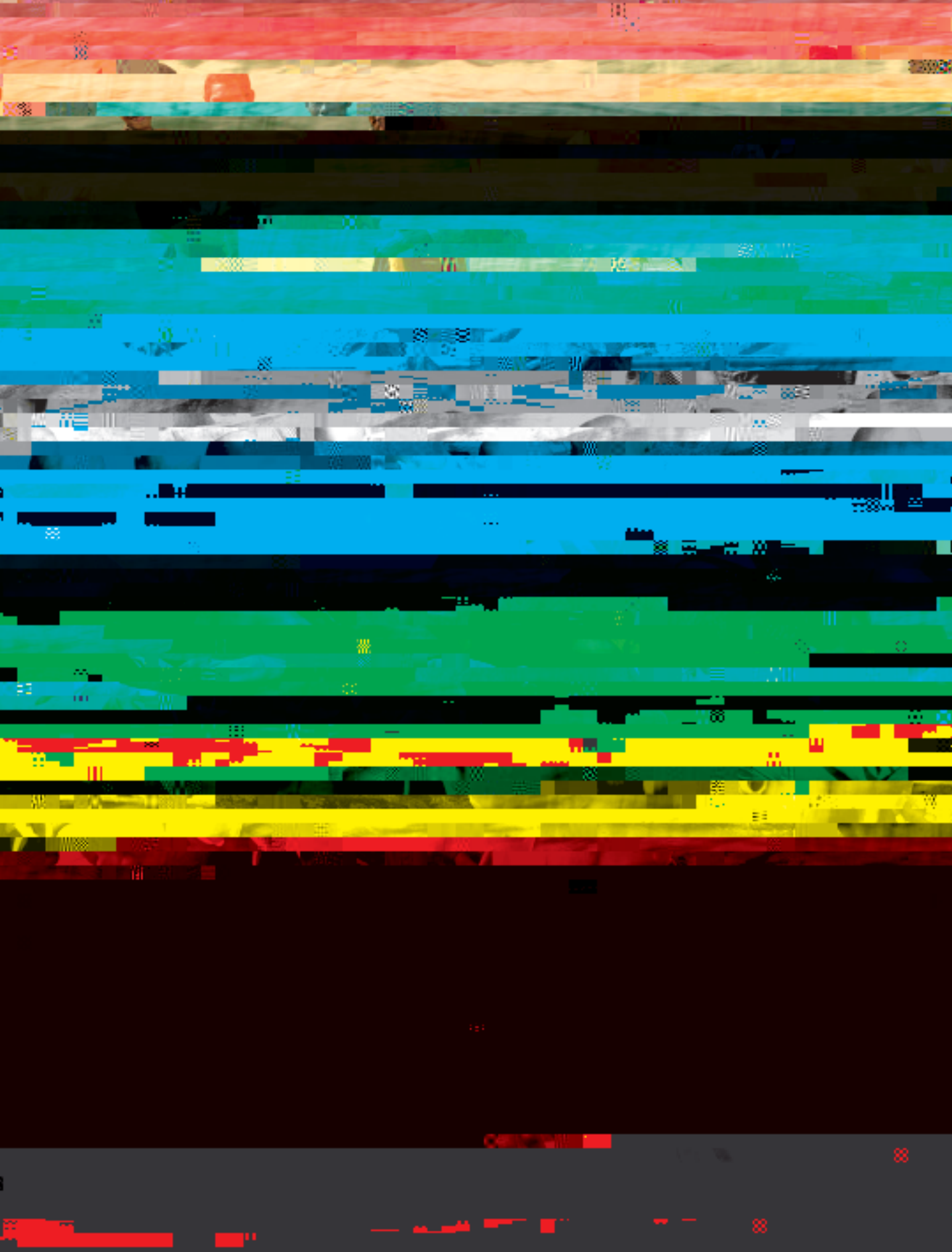
Secondly, PAY distinguishes a range of payment schemes for watershed services. Understanding the various mechanisms, their pros and cons as well as their 'basic mechanics', is important for selecting a specific approach for a particular situation. It further explains the viewpoints of both buyers and sellers of watershed services. Finding a bridge between these two perspectives is crucial for establishing a payment scheme.

Following this, PAY defines how to bring buyers and sellers together. Understanding the policy, institutional and legal context is critical in this regard. PAY explains how, based on sound stakeholder analysis, the right selection of stakeholders can be made from the start of developing a scheme.

PAYMENT FOR WATERSHED SERVICES IS AN IMPORTANT INNOVATION IN WATER MANAGEMENT.

PAY then defines the range of policy and legal issues involved in establishing and running a payment scheme for watershed services. Key ingredients of payment schemes are effective institutions and a reliable contract law or clear customary law. These should be enabled by good governance, effective capacities for governance of transactions and credible enforcement. PAY shows how the clarification of rights, agreement of obligations among parties, establishment of contractual arrangements and mechanisms for ensuring compliance and enforcement all form part of a successful scheme.

Finally, PAY explains what is needed to keep a payment scheme together over longer periods of time. Monitoring, evaluating, learning and updating the scheme are all critical parts of the sustainability of a successful scheme.



of the watershed to meet the demand for services? Capacity for service provision depends on biotic and abiotic characteristics of the mix of ecosystems in the watershed. Different ecosystems in the watershed (e.g. forests, grasslands, rivers) provide different combinations of services, in different amounts and at different times of the year.

DIFFERENT ECOSYSTEMS PROVIDE DIFFERENT COMBINATIONS OF SERVICES.

The challenge for managers who have to decide on the optimal mix and intensity of land use in watersheds is to define and quantify indicators to track the delivery of watershed services (see Table 2.1). For example, the capacity of the watershed to provide fish can be measured by maximum sustainable harvest levels, the capacity to deliver water throughout the dry season can be tracked by hydrological parameters and the attractiveness for recreational use can be monitored by the willingness to pay of visitors or potential visitors. It is important to remember, though, that most functions and processes in ecosystems are inter-linked. Thus, to be meaningful, indicators of sustainable use of watershed services need to provide information on both the status and the dynamic interaction between ecosystem components (e.g. land cover) and processes (e.g. water flow).

In preparing the development of a payment scheme for watershed services, sources of appropriate indicators and data need to be identified. The data needs to be acquired and organised into formats useful for the planning, negotiation and monitoring of payment schemes. The type of data required is determined by the criteria chosen for allocating payments and monitoring impacts. Where the availability or quality of data is inadequate, design of the payment scheme will have to include plans for new or improved data collection on a limited set of key indicators and targets.

Relating land use and management to watershed services

Having measures of sustainable-use levels for watershed services does not, however, provide enough information to create a payment scheme. Clear targets need to be set for maintaining or improving critical indicators. Once defined, these targets provide a simplified description of the desired state of the watershed. The payment scheme can then be designed to either maintain or restore the target level for a particular indicator.

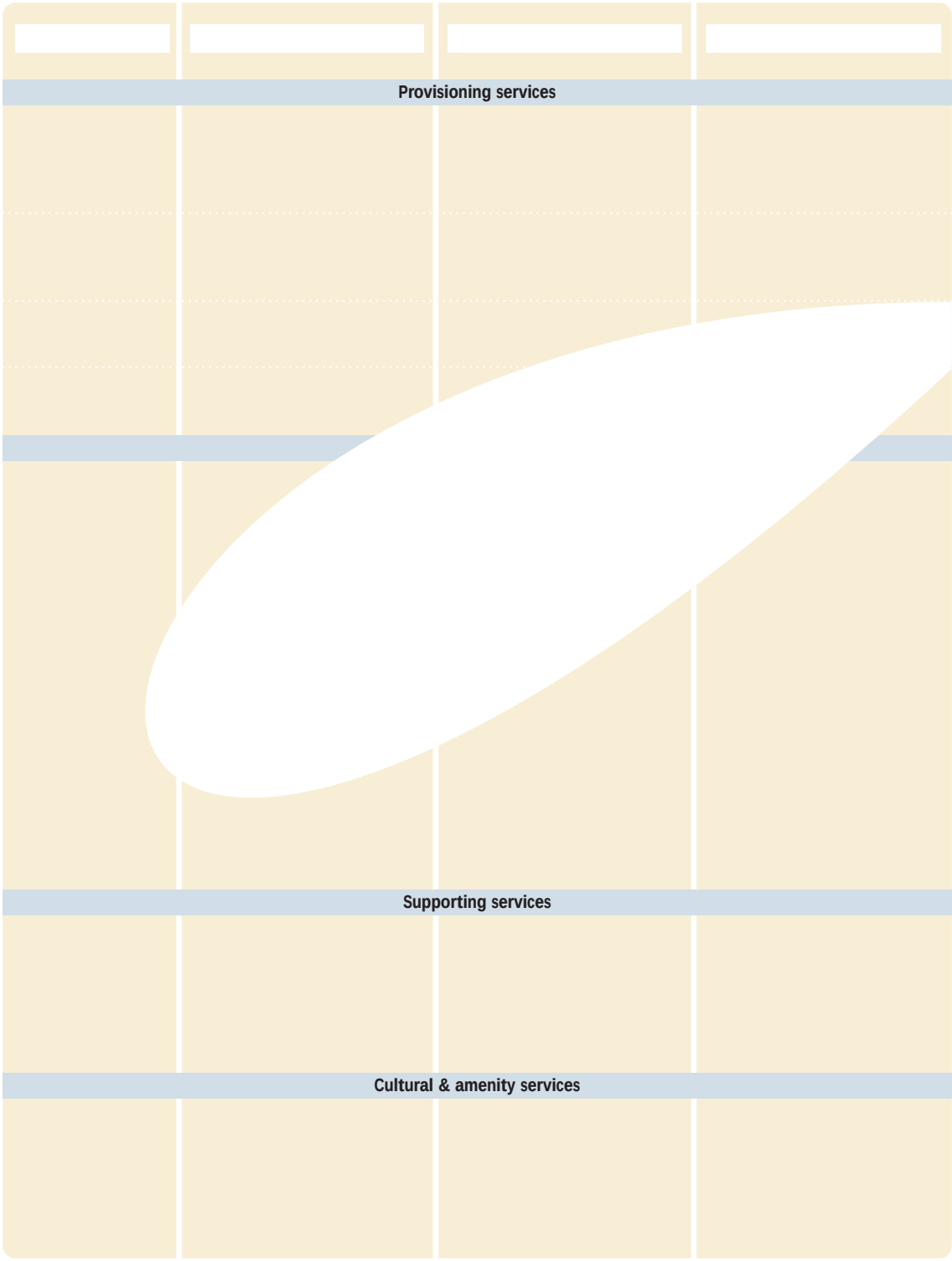
TARGETS ARE A SIMPLIFIED DESCRIPTION OF THE DESIRED STATE OF THE WATERSHED.

To create a payment scheme, there are four key questions:

- What should be invested in?
- Where should investments be made?
- How much should be invested?
- Who should be investing?

Answers to the last two questions are discussed in Chapters 3 and 4, respectively. To decide what to invest in and where, knowledge is needed about how the quantity, quality, timing and duration of watershed services responds to changes in the type of land cover, land use and management regi8e2 Where sho.d use and

Table 2.1: Watershed services and examples of indicators of the state of services and sustainable use levels



Case 1: Salinity credits used to finance upstream reforestation in the Murray-Darling Basin, Australia [4]

Wide p ead land clea ing fo ag ic l al de elopmen in he M a -Da ling Ba in ha ca ed alini a ion of oil and i iga ion a e in man a ea , e l ing in e e e lo of ag ic l al p od c i i . Clea ing na al ege a ion mean ha le a e i an fe ed o he a mo phe e, ca ing he a e able o i e and depo i mine al al in he oil and face a e . D land alini e el affec 40% of p i a e land manage in Ne So h Wale , and aline a e i e ima ed o affec 15% of i iga ed land, i h a f he 70 o 80% of i iga ed land h ea ened.

In 1999 S a e Fo e of Ne So h Wale (a go e nmen agenc), en e ed in o a 'Pilo Salini Con ol Ag eemen ' i h Macq a ie Ri e Food and Fib e (MRFF), an a ocia ion of 600 fa me in he Macq a ie Ri e a e hed. The ag eemen p o ide financing fo ee plan ing a a co -effec i e a eg fo e

Box 2.1: The impacts of forests on watershed services

The e i a idel -held and pe i en idea ha e aining fo e co e i al a a good hing and defo e a ion al a a c e fo a e hed managemen . Thi a mp ion lead , ho e. e o managemen deci ion ha do no al a o k o a e pec ed. In ome i a ion he eal impac of affo e a ion o fo e emo al can be a he diffe en . Fo e ample:

- ¶ L came a a g ea p i e o fo e e in Fiji hen i a di co e ed ha plan ing fa -g o ing e o ic pine ee o boo imbe and pape p lp p od c ion f om o he i e ma ginall p od c i e, fi e-clima g a - land mo e han hal ed d ea on eamflo . Wa e ec i fo n me o . illage i a ed do n- eam f om he fo e e a e a nin en ionall jeopa di ed a a e l .
- ¶ Plan ing e o ic ee in b-h mid pa of So h Af ica i no longe con ide ed a me el po i i e ac beca e of hei de imen al effec on a e a ailabili . A ' a e a ' i no being cha ged if ch income-gene a ing ac i i ie a e likel o ed ce eamflo .
- ¶ Mon ane clo d fo e a e kno n fo hei e high a e p od c ion capaci , hich ha been adi ion- all a c ibed o ipping of a e h he fo e canop f om f eq en fog l a fea ed he efo e ha clea ing of clo d fo e o ld ca e eamflo o dimini h. Recen e idence f om Co a Rica ha ho n, ho e e ha he o e all h d ological impac of clo d fo e con e ion a clo e o ne al, beca e ed ced clo d ipping a mo e o le balanced b he lo e a e e of g a land.

O e coming a mp ion abo fo e h d olog ho ld no , ho e e , dic a e deci ion abo ho fo e a e ed in a e hed managemen . E idence of he ela ion hip be een mon ane clo d fo e and eamflo , fo e ample, ho ld no be aken o mean ha c ing clo d fo e ha no ad e e impac . E o ion and land lide incidence can be e pec ed o inc ea e af e con e ion, and n me o a e and endemic pecie o ld be lo l i c i icall impo ance he efo e o incl de all ele an a e hed e ice hen a e ing he impac of change in land co e , no j he effec of fo e on eamflo .

2.1.2 Who are the service providers and who are the beneficiaries?

Watershed services are provided by land and water managers upstream whose decisions, either individually or collectively, impact on flow regimes and the quality and quantity of water available downstream. The beneficiaries of watershed services are those downstream whose

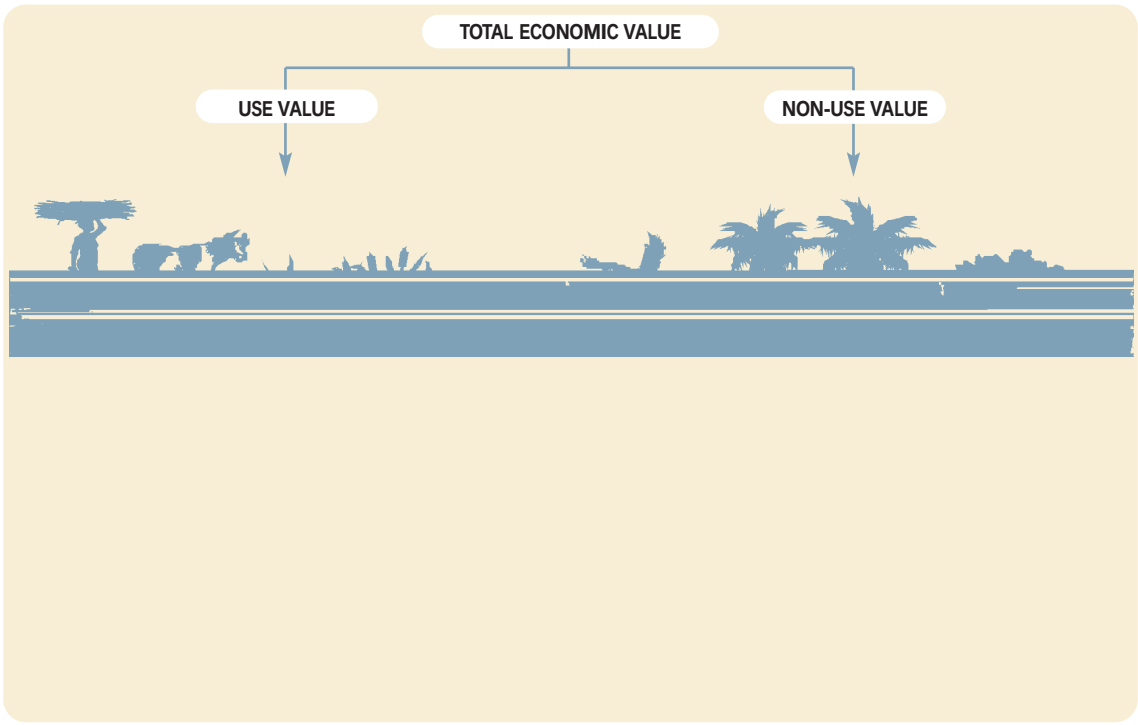
s^irbpê^kaê_bkbcfqpê^qêpq^hbê t ebkê t ^qboêpbosf`bpê^obêf j m^`qbaê_vê`e^kdbêfkê^ê t ^qbopeba+êQlê_bq*
qboê r kabopq^kaêqebêb`lkl j f`ês^irbê lcê t ^qbopebaêpbosf`bp)ê^êo^kdbê lcê j bqe lapê`^kê_bê rpba+⁴ Qeb
fkc lo j ^qf lkêabofsbaêco l j êp r `eês^ir^qf lkê lcê t ^qbopebaêpbosf`bpêebimpêq lêabqbo j fkbêqebêqo r bê`lpqp
^kaê_bkbcfqpê lcês^of l rpêi^ka*rpbpê^kaêqo^ab*lccpêfks lisbaêfkêab`fafkdê_bq t bbkêqeb j +ê J^hfkd
s^irbpêc loê t ^qbopebaêpbosf`bpêbumif`fqê^ip lêebimpêq lê j lqfs^qbêmb lmibêq lê`lkpfaboêqebpbêpbosf`bpêfk
ab`fpf lkê j ^hfkdêfkêķ Å kkumifk

- *Option value*, which is the value attached to maintaining the possibility of obtaining benefits from ecosystem goods and services at a later date, including from ecosystem services that appear to have a low value now, but could have a much higher value in future because of new information or knowledge.

Non-use values, on the other hand, derive from the benefits the environment may provide that do not involve using it in any way, whether directly or indirectly, and comprise:

- *Existence value*, which is the value people derive from the knowledge that something exists, even if they never plan to use it. Thus people place value on the existence of blue whales or pandas, even if they have never seen one and probably never will, as demonstrated by the sense of loss people would feel if they ever became extinct.
- *Bequest value*, which is the value derived from the desire to pass on ecosystems to future generations.

Figure 2.1: The Total Economic Value of ecosystems[9]



Investment decisions for development projects in intact watersheds have conventionally focused only on direct-use values and ignored the other components of TEV. As a result, there are many instances where development has ultimately led to the need for restoration of watersheds and watershed services at high cost. In the Netherlands for example, where there is a long tradition of draining wetlands, dikes have been the preferred choice for managing water and preventing flooding. With the protection offered by these dikes, infrastructure, agriculture, housing and industry are now concentrated in former wetlands, and the cost of flooding in these areas is therefore very high. However, as the cost of restoring lost wetlands is much less

than the cost of the infrastructure needed to avoid floods, a programme of river restoration has commenced and includes broadening floodplains, (re)creating water retention areas in natural depressions and (re)opening secondary channels of rivers.[10]

PAYMENT SCHEMES NEED TO RELATE TO THE CHANGES IN THE BENEFITS FROM SERVICES.

Another example of using valuation of watershed services in planning investment decisions comes from New York City (Case 2). New options for investment in infrastructure for water filtration resulted from better understanding of indirect use values of the watersheds supplying water to the city.

Case 2: Sustainable water management in the Catskill and Delaware watersheds, USA[11]

The Ca kill and Dela a e a e hed p o ide Ne Yo k Ci ' 9 million e iden i h 90% of hei

or restore. If these values are low, payment may not be justified and a payment scheme may not be an appropriate incentive for sustainable management of watershed services. Awareness of the value of watershed services (Table 2.3) – and the justification for creating incentives – is needed to build understanding and support for payment schemes.

Table 2.3: Estimates of economic values of watershed services[13]

2.2.2 Methods to determine monetary values

There are a variety of approaches used for assessing and quantifying the economic value of watershed services. There is no best method. The choice depends on the context, types of ecosystem services taken into account and funding available for the assessment. However, selecting the approach most suited to a particular assessment should be based on knowledge of the characteristics, strengths and limitations of each method. Detailed explanations of the methods and practical case studies are provided in the WANI toolkit VALUE.[14]

It is also important to consider the scale at which studies are done. Valuation studies undertaken at a small scale (e.g. a small sub-catchment) may underestimate watershed values on a larger scale (e.g. the entire basin), as not all of the downstream effects are considered. However, the larger the scale, the more difficult is the task of assessing the value of watershed services.[15]

The Total Economic Value of ecosystems is a very useful instrument for raising awareness of the importance of ecosystems to human society and for increasing the acceptability of payment schemes. However, to design payment schemes, it is knowledge of the change in benefits to stakeholder groups resulting from changes in watershed services that must guide establishment of appropriate levels of compensation.

2.3 Moving from valuation to setting-up a payment scheme

2.3.1 Distinguishing valuations from prices

Valuation of ecosystem services is an important tool in the process of developing payment schemes. Valuations are used to demonstrate the contribution of watershed services to the local and national economy and how payment schemes can be economically beneficial to stakeholders. They help to increase awareness of the existing benefits that water-related ecosystems provide to people, and thus build support among local stakeholders and politicians for the establishment of payment schemes. They also enable a comparison of the economics of payment schemes with other alternatives.

However, valuations do not determine the prices paid by beneficiaries of watershed services to service providers. As in any transaction between contracting parties, prices paid for watershed services under payment schemes are the subject of negotiations guided by the interests and preferences of the beneficiaries and service providers.

PRICES PAID FOR WATERSHED SERVICES ARE THE SUBJECT OF NEGOTIATIONS.

For downstream beneficiaries, the price they are willing to pay will be measured against the added cost that would result from a detrimental change in the watershed services supplied from upstream. This is the marginal cost downstream of watershed degradation – resulting from loss of benefits or the cost of replacing benefits – and it will not be worthwhile for beneficiaries to pay a price for watershed services that is any higher. For example, dam operators would not pay more to maintain flows in a river than the income they would lose if flows were reduced. Similarly, water utilities would not in principle have an incentive to protect a wetland from destruction if it was cheaper to obtain the same water purification benefits by building a filtration plant.

The price upstream service providers are willing to accept is determined by either the added costs they must bear to increase service provision, or the income they must forego – the opportunity cost – if they elect to give up management practices or changes in land use that degrade watershed services. For example, re-vegetating and excluding cattle from streambanks can help to reduce erosion and downstream sedimentation of waterways, but will increase costs for ranchers upstream, because of re-vegetation works and the need for fencing. A payment scheme

offering a price that is lower than these costs will not be attractive to ranchers. Similarly, a payment scheme aiming to provide an incentive for landowners to retain forest on sloping land will have to offer a price that replaces income that would otherwise have been obtained from converting forest to pasture or cropping.

2.3.2 The ingredients of payment schemes

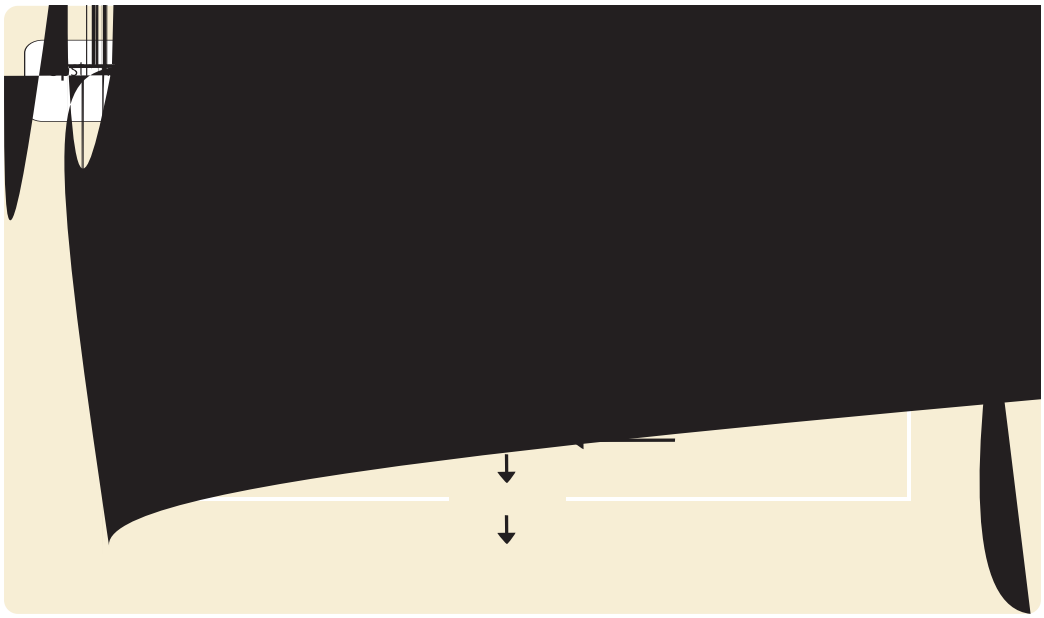
The basic elements of a payment scheme for watershed services are summarised schematically in Figure 2.2. Here, upstream land-use and management practices are related – through a series of steps and using an array of information and data – to payments from downstream service buyers to upstream service providers.

These steps begin with activities (or potential activities) by upstream land users that modify hydrological processes controlling water quality, water quantity and the timing of flows. In turn, these impact the watershed services available downstream, which affect the welfare of individuals and communities and the profitability of industries and business. Where impacts on watershed services are negative (e.g. increased pollution) and where regulations do not impose controls on upstream activities, downstream stakeholders then need to think of options for reducing or counteracting the loss of services they face. They can use valuation studies to compare the costs and benefits of alternate means of restoring or maintaining watershed services. They can then identify which potential solutions are most cost effective. If paying upstream stakeholders to either apply desired management practices or prevent detrimental change in land use proves to be a cost-effective option, then the potential service providers upstream need to evaluate the financial profitability of complying. This can be done by comparing the net profits generated by alternative land uses or management practices, taking into account potential payment schemes.

The economic and financial studies undertaken by downstream service buyers and upstream service providers are used to inform and support the design and negotiations of a payment scheme. These studies help to relate the interests and obligations of stakeholders in a payment scheme to real costs and profitability. Negotiation between the contracting parties then determines the price paid by service buyers to compensate service providers. Economic valuation can thus provide justification for investment in watershed services and enable identification of the most profitable options for delivering needed services. However, social perceptions, political views and bargaining power play a crucial role in complex negotiations among stakeholders over the final prices paid for services. Therefore it is critical to disseminate, as widely as possible, available information relating to existing linkages between land use and water-based ecosystem services, valuation studies and the economic efficiency of undertaking a payment scheme. The aim should be to raise awareness and the interest of different stakeholder groups in participating, and to facilitate the decision-making process.

Preliminary costs include studies to identify watershed services and links with land use, stakeholder consultations, economic valuation studies, etc. Transaction costs include attracting buyers and sellers, negotiations, and monitoring of compliance. Transaction costs are often significant, especially when high numbers of stakeholders are involved.

Figure 2.2: Payments link upstream and downstream stakeholders in watershed services.



2.4 Checklist: building a case for payment schemes

Link upstream land and use practices and downstream benefits

- Identify the ecosystem services most relevant to watershed management.
- Establish clear cause-and-effect relationships between land use and the provision of watershed services. Use up-to-date scientific knowledge and, where needed, expert analysis and new data collection.
- Assess trade-offs expected in the watershed because of changes in land-use or management.
- Utilise these relationships and data to select and prioritise locations for intervention.

Use indicators to define baselines and track progress

- Identify indicators for measuring and monitoring watershed services.
- Acquire and organise the data needed to support planning, negotiation and management of a payment scheme.

Understand the needs and capacities of stakeholders

- Identify the major stakeholders in the watershed, including potential buyers and sellers.
- Compare the scale at which watershed services are supplied and the scale of action possible by landholders.

- Undertake analysis of the socio-economic characteristics and interests of stakeholders, to help ensure that payment schemes are appropriate to their needs.

Build a case for investment in watershed management

- Assess the value of watershed services.
- Use information on the values identified to raise awareness of the importance of watershed services and create support for the concept of a payment scheme.

Plan what needs to be done to develop a payment scheme

- Include: a design phase; planning of sustainable financing; negotiation of a fair price between buyers and sellers; establishment of an enabling legal and institutional framework; and processes for building public awareness and leading change.

Chapter 3

Designing a Payment Scheme

Payment for watershed services is about creating incentives that influence choices and behaviours of upstream land and water managers and downstream water users. With the right ingredients, good design and effective agreements, a payment scheme makes restoration or maintenance of watershed services beneficial to all parties. Looking after watershed services

3.1.3 The logic behind payments

In principle, markets help to ensure that choices are economically efficient. Payment schemes for watershed services are considered efficient when buyers pay less than the costs of alternatives, and sellers receive at least as much income as foregone because of compliance with the scheme. This is shown schematically in Figure 3.1. Here the payment made under Scenario C is less than the expected costs downstream caused by loss of services, but ensures that upstream landholders do not lose income. This is the minimum acceptable payment to sellers. In principle, actual payments might include a bigger surplus for sellers, depending on the outcome of negotiations with buyers.

The viewpoint of service buyers: willingness to pay

Figure 3.1 shows that service buyers in a payment scheme must carefully evaluate how much it is worth paying for watershed services. They should not pay more than the cost of losing services or of alternatives. Most valuation studies applied to payment schemes therefore estimate the willingness to pay of service buyers, using survey methods. The maximum willingness to pay is an estimate of the value of the service and can be considered the upper limit for payment under any potential payment scheme. Service buyers must also take into account, however, alternative solutions to loss of services, such as using a filtration plant to increase water quality or building a dike to reduce the risk of flooding. A payment scheme will, in principle, only be attractive to a buyer if the costs of the scheme are lower than the costs of alternative solutions. In the case of poor communities, though, it is important to recognise that willingness to pay may actually be lower than this threshold, because of lack of capacity to pay.

The viewpoint of service u8Tlypay maru IQ/G94gple1aatiu8Tlypay maru IQsid9costs limit fn buyersentFbu

by reforestation of farmland if that is a condition of payment. Care must be taken to also consider profits foregone from potential land uses, as there will be opportunity costs if the payment scheme restricts options for land use. Thus, for example, to be attractive to service sellers, payments must make up for profits foregone because forests can no longer be converted to farmland, or farmland can no longer be developed for housing. The general rule is that payment must be at least equal to the foregone net profit of upstream service sellers.

PAYMENT MUST BE AT LEAST EQUAL TO THE FOREGONE NET PROFIT OF UPSTREAM SERVICE SELLERS.

Room for a deal: acceptance by buyers and sellers

In principle, a payment scheme deal is only possible, where the willingness to pay of downstream buyers is higher than the minimum payment needed by upstream sellers. If this overlap does not exist, then buyers and sellers of services will not be able to agree a price that is acceptable to both parties. In general, with high opportunity costs upstream and a low value for downstream benefits, it will be difficult to establish a payment scheme. However, if the reverse is true and there are low opportunity costs upstream and downstream stakeholders have high willingness to pay, then negotiation of a price that is acceptable to both parties may be possible. Examples of prices paid in payment schemes for watershed services are shown in Table 3.1.

A DEAL IS POSSIBLE, WHERE THE WILLINGNESS TO PAY OF

DECISIONS ARE NOT SOLELY DETERMINED BY FINANCIAL INCENTIVES.

3.2 Types of payment schemes for watershed services

There are several types of market-based instruments for creating incentives for better environmental management. Four can be distinguished as mechanisms for payment for watershed services. These mechanisms are differentiated by the degree of government intervention in administration of the schemes and the characteristics of the buyers and sellers. The four types of schemes are:

1. private payment schemes
2. cap-and-trade schemes, under a regulatory cap or floor
3. certification schemes for environmental goods
4. public payment schemes, including fiscal mechanisms

In practice, many initiatives are a mix of these approaches, adapted to local needs and context. The outlines of each type of scheme that follow are therefore not prescriptions, but are basic frameworks that can be used as starting points for the process of designing payment schemes.

3.2.1 Private payment schemes

Private payment schemes have the lowest level of government intervention. The term ‘private’

Stakeholders involved:

- *Buyers:* Ho ehold e and he p i a e ec o . Wa e e in he ci of He edia pa a *Tarifa Hidrica* o ESPH in hei mon hl a e bill . In addi ion, Flo ida Ice & Fa m, a la ge of d ink, bo led a e and b e ing compan , finance 55% of each con ac in he R o Seg ndo a e hed, fo con e a ion of he ppe a e hed a ea ha ppl a e o hei p od c ion facili ie .
- *Sellers:* P blic (he B a lio Ca illo Na ional Pa k) and p i a e landholde . Pa icipa ing lando ne ecei e a pa men clo e o US$ 110/hec a e/ ea fo p o ec ing fo e a o nd ESPH' a e o ce . Thi amo n ep e en he oppo ni co of land e in he ppe a e hed. In he ca e of he na ional pa k he Mini of En i onmen (MINAE) i paid fo con e a ion and efo e a ion ac i i ie a he a e of US$ 30 ha/ ea .
- *Intermediaries:* ESPH and FONAFIFO (The Na ional Fo e Financing F nd) ac a in e media ie in hi cheme.

Payment scheme type: P i a e an fe pa men and e fee . ESPH collec fee f om con me in hei mon hl ili bill . The mone collec ed i eq i alen o US$ 0.1/m³, half of hich i in e ed in fo e con e a ion and efo e a ion in h ee a e hed in he Cen al Valle of Co a Rica (Rio Seg ndo, Rio Tiba and Rio Ci ela): he o he half of he f nd ai ed a e in e ed in a e inf a c e and e ea ch. The majo p i a e ec o b e , Flo ida Ice & Fa m, pa i ha e of con ac di ec l .

Case 4: Securing aquifers – a private sector payment scheme by Nestlé Waters in France[21]

Vi el (a b idia of Ne l Wa e) i he o ld' la ge bo le of pa al mine al a e l mo impo an a e o ce in F ance a e in hea il -fa med a e hed . R noff of p ien and pe icide i ked con amina ing he aq ife on hich he compan ' b ine depend . The compan de e mined ha p cha ing fa mland, efo e ing en i i e infil a ion one , and financing fa me o b ild mode n facili ie and i ch o o ganic fa ming a in fac mo e co effec i e han b ilding fil a ion plan . The co ad an age e e o ignifican ha pa icipa ing fa me co ld be offe ed e emel p ofi able e m .

Ecosystem services provided: Reduced chemical usage and sustainable land-use management o ain e emel high p ing a e q ali anda d .

Stakeholders involved:

- *Buyers:* Vi el, a bo le of pa al mine al a e . Fo he fi e en ea he compan pen an a e age of US$ 24.5 million ann all .
- *Sellers:* Fa me and lando ne . In compen a ion fo ed ced e of fe ili e and hence ed ced p ofi abili and highe pe cei ed i k fa me e e gi en con ac b Vi el fo p o 30 ea .
- *Intermediaries:* The *government* facili a ed he deal b p o iding a mall amo n of financial aid and a ong legal f ame o k o en e he enfo ceabili of con ac .

Payment scheme type: P i a e ec o pa men cheme. Vi el p cha ed 1500 ha of fa mland fo US$ 9 million, pa ing mo e han he ma ke p ice. U f c igh e e hen g an ed back o he fa me , gi ing hem he legal igh o e and de i e p ofi f om land o ned b Vi el. Fa me ecei e US$ 230 pe hec a e ann all o manage he land ing ainable p ac ice ha en e high a e q ali anda d .

3.2.2 Cap-and-trade schemes

Payment scheme utilised: Cap-and- ade cheme. The fede al go e nmen e p ien anda d nde he Clean Wa e Ac hich limi o al di cha ge f om poin o ce . A ading em a hen imple-men ed a he a e le el o c ea e incen i e o dimini h ni ogen di cha ge , and o can e he ela i e efficienc and fle ibili of ading cheme o e anda di ed indi id al compliance eq i emen .

Stakeholders involved:

- *Buyers:* Con me in he Pacific No h e ho choo e Salmon-Safe p od c and pa a p emi m on op of he no mal e ail p ice o ppo land managemen ha keep i e clean and afe fo ild almon.
- *Sellers:* Fa me and ineg o e .
- *Intermediaries:* Salmon-Safe, ho o e ee he ce ifica ion cheme and ppo he p ice p emi m h o gh ed ca ion and ma ke ing campaign .

Payment scheme type: Ce ifica ion cheme. Pa icipa ing fa me appl ecologicall - ainable ag ic l- al p ac ice ha p o ec a e q ali in i e and almon habi a . The e p ac ice incl de ee plan ing on eambank , g o ing co e c op o ed ce noff, and applica ion of biological con ol me hod fo eed and pe . The e a co a e paid o of he p emi m ha pa icipa ing g o e ecei e fo hei p od c . Ma ke ing of he e p od c , incl ding ine and food , i a i ed b p blic ed ca ion and a a ene campaign b he Salmon-Safe o gani a ion.

3.2.4 Public payment schemes

Public payment schemes have the highest level of involvement by public agencies and, to date, are the most common form of payment scheme for environmental services. Service buyers in public schemes are public authorities such as municipalities or national governments who are typically motivated by the need to provide safe drinking water or regulation of river flows. Mechanisms for payment in these schemes include user fees, land purchase and land easement, which are rights to specific use of land owned by others. Case 7 is an example of a public payment scheme designed to reduce nitrate leaching to drinking water sources.

PUBLIC PAYMENT SCHEMES ARE THE MOST COMMON FORM OF PAYMENT SCHEME.

Case 7: Lowering nitrate levels in water supplies – a public payments scheme in the UK

The Ni a e Sen i i e A ea (NSA) Scheme aimed o ed ce o abili e ni a e le el in ke o ce of p blic a e ppl in he UK. The . pl n a compen a ed cheme p o ided 5- ea di ec pa men f om go e nmen o fa me ho adop ed managemen p ac ice ha ed ced leaching of ni a e f om ag i- c l al land in o . lne able g o nd a e . The cheme a applied o abo 25,000 hec a e ing h ee ca ego ie of ac ion: 1 he *Premium Arable Scheme*, hich ppo ed con e ion of a able land o pa e; 2. *Premium Grass*, ppo ing lo e ing of inp o in en i el -managed g a land; and 3 he *Basic Scheme* fo con in ed a able c opping i h lo ni ogen inp .

Ecosystem services provided: Red ced ni a e leaching in o p blic d inking a e pplie , ignifican l con ib ing o mee ing lo e ni a e concen a ion a ge in o ce of p blic d inking a e in he UK.

Stakeholders involved:

- *Buyers:* Go e nmen . The Mini of Ag ic l e, Fi he ie and Food di ec l compen a ed fa me fo adhe ing o he p og amme' land- e p ac ice .

- *Sellers:* Fa me . Indi id al fa me applied o pa icipa e in he p og amme.
- *Intermediaries:* None. Thi a a di ec p blic pa men cheme.

Payment scheme type: P blic pa men cheme. The go e nmen p o ided financial aid di ec l o fa me . Pa men a e e ba ed on he fa me ' lo of income and co e l ing f om change in ag ic l al p ac ice . A an added incen i e, pa men e e highe han income fo egone and co inc ed b an e ima ed 31%. The majo i of pa icipan a ed ha i ho financial aid he o ld no con in e o fa m ing he managemen p ac ice ppo ed b he cheme beca e of he inc ea ed co and ed ced p ofi abili .

Public payment schemes can also use subsidies and taxes to encourage good environmental management. Subsidies are *posi i e* fiscal instruments used by governments to reward people for carrying out specified activities. Within the Common Agriculture Policy, for example, the EU uses subsidies to support agro-environmental measures. Thus, more water efficient irrigation infrastructure, such as drip irrigation, is subsidised with the aim of reducing groundwater abstraction and protecting aquifers.

Environmental taxes can be used to ensure that some or all of the externality costs of land use are internalised (or priced into) the decision making process. They create direct price signals for producers and/or consumers. They can be both be used as *posi i e* or *nega i e* incentives. Taxes can be *posi i el* used when people are exempted from paying taxes. In the United States, farmers may deduct the costs of soil and water conservation from taxable income, limited annually to 25 percent of gross income from farming. Environmental taxes can be used *nega i el* to discourage consumption or activities that are detrimental to the environment. In most cases, however, the benefits of environmental taxes for the environment are small relative to the size of the problem being addressed. Case 8 is an example of the impacts of applying tax to groundwater abstraction.

Case 8: Managing groundwater extraction – an environmental tax scheme in the Netherlands

In 1995 an en i onmen al a on g o nd a e a in od ced in he Ne he land . The p ima aim of he a a o inc ea e a e en e. The econda aim a o alle ia e he en i onmen al impac of g o nd a e ab ac ion and o enco age lo e a e con mp ion. O e -ab ac ion of g o nd a e a damaging e e ial eco em , b i a cheape o e g o nd a e han face a e. The a on g o nd a e a in ended o di co age e of g o nd a e b making p hi diffe ence in co . Ac al en i onmen al benefi of he a e e lo beca e he a a no high eno gh o make g o nd a e le p ofi able o e han face a e , and e emp ion ed ced i effec i ene . T o ea af e in o- d c ion of he a , a e con mp ion a e ima ed o ha e declined b een 2 and 12%.

Ecosystem services provided: S ainable g o nd a e age and e e ial eco em con e a ion. In hi ca e he g o nd a e e p o ided hi en i onmen al e ice in e pon e o a nega i e incen i e (a a).

Stakeholders involved:

- *Buyers:* The Mini of Ho ing, Spa ial Planning and he En i onmen . The go e nmen 'b ' he e e ice b impo ing a a on ho e ho do no ppl he e ice.

- *Sellers:* G o nd a e e . Fa me ing g o nd a e fo i iga ion, ind ie and con me ili ing g o nd a e ' ppl ' he e e . ice b dec ea ing g o nd a e e/ab ac ion .
- *Intermediaries:* The a a paid h o gh m nicipal a e bill , b a e en iall a di ec pa men f om g o nd a e e o go e nmen .

Payment scheme type: P blic pa men cheme ing a fi cal mechani m. A g o nd a e a a le ied on g o nd a e e , collec ed h o gh ili ie bill .

3.3 Identifying options for payment scheme design

Examples exist from around the world of how market-based mechanisms result in changes in choices and behaviour that benefit the environment. The essential point is to enable and motivate those who benefit from watershed services and to reward those who supply them. Maintaining and restoring these services becomes an internal part of planning and decision making around land and water resources. If well designed and integrated into land-use plans, payment schemes can serve the interests of both those who benefit from ecosystem services and those who manage and supply them. Payment schemes for watershed services are thus an important tool for water resources and river basin management. To be effective, however, they must be designed appropriately and be suited to the goals and specific social, political and economic context in which they will operate. Effective design is critical. What practical steps are needed to identify suitable options for the design of payment schemes for watershed services? Three steps can easily be identified:

- Check that the general pre-conditions for payment schemes are met.
- Clearly define the goals of the scheme.
- Determine which type of payment scheme is most suited to the goals of the scheme and stakeholders involved.

ENABLE AND MOTIVATE THOSE WHO BENEFIT FROM WATERSHED SERVICES AND REWARD THOSE WHO SUPPLY THEM

3.3.1 Pre-conditions for payment schemes

There are a number of pre-conditions that are applicable to all payment schemes. These must be in place before developing a payment scheme. If they are not, then either payment schemes are not a suitable option, or time and resource must first be invested in meeting these benchmarks. Pre-conditions for payment schemes for watershed services include:

- *Need and Urgency:* Watershed services are in decline, or there is a threat to future provision of these services. This condition establishes the need and urgency for action. Then, for any

payment scheme instead of direct statutory or regulatory mechanisms for solving the problem. Relations between local communities and government should be constructive and there must be effective law enforcement. Strong and capable administrative structures should be available to administer the scheme.

- *Suppliers:* Stakeholders are present in the critical positions in the landscape supplying the watershed services that will be targeted by the scheme. They must hold property and/or legal rights to this land. They must be able to exert the controls on land use and management necessary to modify watershed services. Those supplying watershed services must be willing to participate in a payment scheme.
- *Beneficiaries:* Public or private stakeholders who benefit from watershed services are pres-

scheme, larger-scale landholders can out-compete smaller farmers, causing deeper poverty. In Costa Rica, exclusion of the poor from payment schemes has led to the emergence of unofficial,

SCHEMES SHOULD AIM TO ESTABLISH PERMANENCE.

3.3.3. Identifying suitable models for payment schemes

Payment schemes are most likely to succeed if the type of scheme chosen is suited to the stakeholders involved, their motivations and capacities. It is important to verify that the following specific conditions can be met when selecting which type of scheme to use:

- *Pri a e pa men schemes:* Beneficiaries must have a private motivation to pay for watershed services. Government agencies need to be willing and able to accept a minor role in the scheme, through development of regulations or changes in contract law needed to facilitate and enforce agreements.
- *Cap-and- rade schemes:* Governments must be willing to set the cap for the service in question. This is to stimulate demand and reward the most efficient service sellers. Regulations must permit parties to either comply directly with the actions or control measures required or to pay service sellers to do so instead.
- *Cer ifica ion schemes:* Consumers need to express a demand for products that meet higher environmental standards, and be willing to pay a premium price for them. There must be intermediaries able to operate a credible certification service. Governments need to facilitate operation of certification schemes through appropriate laws and regulations.
- *Public pa men schemes:* Public motivation to pay for watershed services exists and a public body must determine which services have the highest priority for protection. There must be sufficient financial resources available to support the payment scheme.

3.4 Mobilising financial resources

In designing a payment scheme for watershed services, there is an obvious emphasis on determining what services are bought, who is buying, who is selling and how transactions are conducted. How buyers pay and what sources of funding are available for developing and maintaining the scheme also need to be determined.

In cases where buyers are business entities with revenues directly linked to benefits from watershed services – a hydroelectric company for example – then private financing of the scheme might be justified on commercial grounds. For publicly-funded schemes and for schemes where the beneficiaries simply do not have the financial resources needed, finance will have to be raised. Financial resources are also needed to pay the many other costs of a scheme, besides actual payments between buyers and sellers. These added costs need to be explicitly factored into the financing of schemes and include:

- Research and development costs (e.g. to quantify the links between land use, management actions and water quantity available downstream).
- Capacity building, community education and public awareness (e.g. for public-awareness campaigns to explain to consumers where their tap water comes from to promote their willingness to pay).
- Operational costs for coordination and administration (e.g. for consultants or NGOs that assist with the design or administration of a scheme).
- Monitoring and evaluation (e.g. for assessment of impacts and additionality of a scheme).

- Transaction costs, to meet social, legal and regulatory obligations (e.g. for legal counsel and for lawyers to draft contracts).
- Contingencies for inflation and unforeseen events.

ADDED COSTS NEED TO BE EXPLICITLY FACTORED INTO

fo 80 ea o en e long- e m in i ional and poli ical legi imac . In 2006 he f nd' endo men a US$ 3.5 million, b a e pec ed o g o o US$ 7.4 million b 2010. E en ial o i cce a he fac ha he f nd had ong ppo f om he Ma o of O i o and o he infl en ial pa ie ho championed he plan, and f om he o majo a e e in he a e hed he a e and elec ical ili ie .

Ecosystem services provided: Wa e hed con e a ion o enhance d inking a e q ali in he ci of O i o.

Stakeholders Involved:

- *Buyers:* FONAG and i con ib o . EMAAP-Q he a e ili in O i o hich con ib ed o e US$ 3 million, i h malle con ib ion b TNC, an elec ical ili , a b e e and he S i de elopmen agenc .
- *Sellers:* Wa e hed manage and ad oca e . Tho e ho nde ake efo e a ion, . eillance of p o- ec ed a ea , ainable managemen in ag ic l e, and de elopmen of eco o i m aining, com- m nica ion and en i onmen al ed ca ion.
- *Intermediaries:* FONAG, F ndacion An i ana, and TNC. Se e al in e media ie o ked o e abli h FONAG hich no ac a in e media and b e .

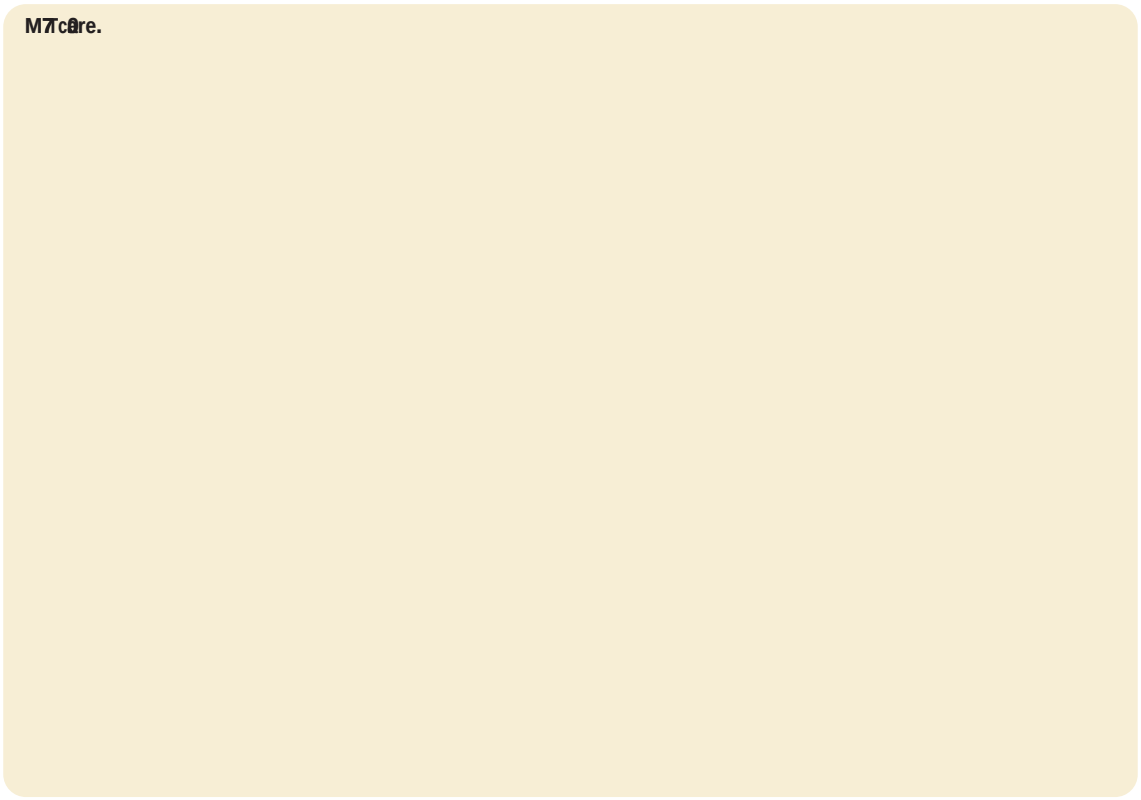
The fund is run as a non-declining endowment – only investment returns are distributed for watershed management. In the future, there is need to attract more investors, to expand the fund and broaden the decision-making base and ensure that the interests of stakeholders, such as poor people, are not overlooked.

3.4.2 Elements of sustainable financing

A sustainable financing strategy should be developed to strengthen the stability of payment schemes for watershed services and therefore the confidence of stakeholders in them. A range of issues should be considered. First of all, a diverse, stable and secure funding portfolio should be built to minimise risk. Second, budgeting should cover the full range of costs, not just payments. These additional costs can be considerable, especially for new schemes in an area. Third, funding of capacity building for participants in the financial management and operation of the scheme. This is critical for the long-term sustainability of the mechanism. Finally, ensuring that a stable and enabling legal and institutional framework is developed to support the scheme. This may require making changes to law to ensure that participating institutions are entitled to raise funds and disburse them.

LONGER TERM SUSTAINABLE FINANCING SHOULD BE INCORPORATED INTO THE BUSINESS PLAN FOR A PAYMENT SCHEME.

Sustainable financing should be incorporated into development of a business plan for the payment scheme. A business plan differs from simple budgeting for the scheme. It specifies how much money is needed to implement a set of planned activities and the sources of income to meet short, mid and long-term funding needs. Business planning can thus form the basis for setting priorities, both for collecting revenues and for spending.



3.5 Checklist: designing payment schemes

Creating markets to help internalise costs perceived as externalities

- Determine if the elements of a marketplace for watershed services are in place or need to be created. Is there recognition of the goods and services provided by watersheds, and are there potential buyers and sellers? Are intermediaries needed and are they available? Are there mechanisms in place for the negotiation and execution of transactions? Is there an enabling legal and institutional framework, including clearly defined property rights for watershed services?

Understand willingness to pay and opportunity costs

- Use valuation data and economic analysis to compare the willingness to pay of service buyers and the opportunity costs of sellers.
- Take into account the costs of alternatives to payments schemes, such as investment in infrastructure.
- Verify that there is an overlap between the requirements of upstream and downstream stakeholders that provides room for negotiation.

Clearly define the goals for the scheme

- Specify how the scheme will provide additionality relative to a baseline, and consider the geographical scale of actions needed.
- Ensure that the scheme will address social equity and not increase the disadvantages faced by poor people.
- Be aware of the danger of leakage, where the scheme simply shifts the location of resource degradation. Aim to establish permanence.

Carefully evaluate which type of payment scheme is the best fit

- Check that the pre-conditions for any payment scheme, relating to the need for action, governance, supply and demand for services, can be met.
- Assess whether private payment schemes, cap-and-trade, certification or public schemes are suitable approaches given the social, economic and political context of the issue in question. Compare their advantages and disadvantages.
- Determine whether the specific conditions needed for each type of scheme can be met.

Identify financing needs and options for mobilising funds

- Undertake business planning and include a strategy for sustainable financing of the scheme.
- Include the full range of costs, including design, administration, legal advice, and monitoring and evaluation costs.

change choices about how watersheds are used and managed. They also have to explain how the values of watershed services justify financial transactions between beneficiaries and providers of services. Not least, they need to explain how these payments are in the interests of all parties. As engagement and interest grows, people need to come to the negotiation table to work out deals that transform the vision for a payment scheme into practice.

Multiple triggers for starting or accelerating dialogue about watershed services and payment schemes are possible, including:

- *Changing Policies:* Government or private sector policies may change, perhaps as the limited impacts of statutory, command-and-control approaches to reducing land degradation become more apparent. New policies may encourage alternatives that devolve decision making away from the centre towards farmers and other land-owners. Bringing stakeholders together is then an opportunity to discuss how benefits can be generated and how these and their costs can be shared among stakeholders in a watershed.
- *Ne Informa ion:* New information and broader understanding of the linkages between economic activities in watersheds may result in individuals or groups recognising their shared interests. For example, downstream irrigators facing sedimentation of canals might open discussions with upstream farmers about reducing soil erosion and sediment delivery to streams. Likewise, upstream farmers who wish to improve land management, but lack the necessary finance, could start a dialogue with downstream users over benefit sharing.
- *Tension or Conflic :* Rising tension or conflict among stakeholders can be a powerful motivation for starting dialogue or coming to the negotiation table. For example, tension can easily arise in a watershed if downstream water users are impacted by a decline in water quantity or quality caused by abstraction or pollution of water upstream. Mechanisms for dialogue and dispute resolution then create opportunities to identify shared interests and enable stakeholders to find innovative solutions. Where development pressures are high, forward thinking stakeholders may recognise that dialogue is needed. Participatory planning may then offer a forum for agreeing incentives for watershed management.
- *Crisis:* Crisis can provide an opportunity for change. The welfare impacts and economic losses caused by floods, drought or catastrophic hurricanes or cyclones can be both devastating and a powerful stimulus for action. At such times, stakeholders may have higher motivation for working together to reduce vulnerability. Windows of opportunity may be brief, but solidarity after a catastrophe can be used to bring people together to discuss new incentives for using watershed management to protect their shared interests.
- *Poli ical Supporr :* Experience from on-going payment schemes has shown that political support is vital if payment schemes are to move successfully from concept to negotiation. For example, at the Sama Biological Reserve in Tarija in Bolivia, the local NGO Prometa has conducted several studies showing willingness to pay for environmental services by local users. However, the scheme has not taken off because in the prevailing political environment, it is seen as "a new water tax".[26]
- *Champion:* Another turning point on the pathway to agreement can be the emergence of a champion for a payment scheme. This might be an influential individual, group or coalition who is committed to the concept and its aims. Such a champion is likely to be outwardly free of vested interests in the way a watershed is managed and is therefore able to play the role of facilitator and catalyst for change. Champions for payment schemes have been institutions, NGOs or individuals able to articulate the potential effectiveness of a payment scheme. They are often connected to networks able to facilitate access to information sharing, technical assistance and funding.

unilateral decisions are often quicker to implement, they rarely prove to be sustainable. It may be expedient, however, to keep the initial number of parties relatively limited while exploring and testing a payment scheme initiative, to allow some agreement to be reached with a smaller number of parties.

4.2.1 Identifying buyers and sellers

Service beneficiaries

The key question in identifying potential buyers for watershed services is: who has economic interests in the watershed services at stake? Answers should begin to emerge from the identification of benefits from watershed services in valuation studies (Section 2.2). Knowing who to approach to participate in negotiation of a payment scheme then depends on whether demand for watershed services is from direct or indirect users of services. There are two broad categories of users, with different types of stakeholders associated with each.

IDENTIFYING BUYERS REQUIRES KNOWLEDGE OF WHO HAS INTERESTS IN THE SERVICES AT STAKE.

Direct users of watershed services are individuals or organised groups who are directly affected by land management upstream. This group could include hydropower generators or final consumers of domestic water supply (with demand channelled through waters utilities). It could also include water-related industries, such as beverage manufacturers, irrigators or pulp and paper companies. Direct users of services are more likely to include private buyers with interests in private payment schemes (Section 3.2.1)

There are a variety of possible indirect users of watershed services. These include national and local government, as well as international agencies with interests in financing of development or nature conservation. Pooling of buyers creates an indirect user of watershed services. In this case, services are bought by a single fund for users with a variety of interests, as in the example of FONAG, the Water Protection Fund in Quito, Ecuador (Case 9, Chapter 3). Pooling of service cation of ben807ts froml bu

Downstream ecosystems are water users and are therefore an important source of demand for watershed services. Developing mechanisms to enable water to be allocated to maintain downstream ecosystems can be critical for economies and societies. Mechanisms are needed for incorporating demand for water by downstream ecosystems in payment schemes. Some experience of this exists. For example, some revenues that are effectively derived from the environment, for example through tourism, can be earmarked to pay for watershed services (Box 4.1). In such cases, downstream demand for water by ecosystems needs to be represented in negotiations.

DOWNSTREAM ECOSYSTEMS ARE WATER USERS AND ARE THEREFORE AN IMPORTANT SOURCE OF DEMAND FOR WATERSHED SERVICES.

Box 4.1: Can downstream ecosystems pay?

Do n eam eco em a e an impo an akeholde in nego ia ing he alloca ion of a e hed e ice . A o nd he o ld, legal and a e polic in men a e being e i ed o ecogni e and p o ec en i onmen al flo in i e ba in , a e plained in he IUCN-WANI oolki FLOW.[27] Ho e e , e peciall in de elop-ing co n ie , implemen ing e i ed o Tc0ldm86.oe pn , a folack an a a51 (A)o ecoandhncan 8(o)1(n)1(-)..i

controls on land use and management. They must be situated in the necessary positions in the landscape (see Section 2.1) and there should be a clear understanding of who holds property rights for both land and services (see Section 5.2.1).

OBJECTIVES OF ANY PAYMENT SCHEME HAVE TO CLEARLY DEFINE WHAT IS BEING PAID FOR.

In reality, it may be necessary to make some service providers a higher priority than others. Blanket approaches that aim for broad-based participation can be suitable at national scale and are a way of cutting transaction costs. However, they also have inefficiencies because payments are then made outside of priority areas such as water recharge zones, biodiversity hot-spots or communities where vulnerable social groups are located. A critical question to consider, therefore, is which groups of service providers will have the biggest desired impact within the resources available. In the example in Box 4.2, priority groups were identified by determining which groups were most likely to be influenced by payments.

Box 4.2: Determining priority groups of service providers

Oppo ni co fo al e pa i e land e can help o de e mine hich g o p ho ld be gi en p io i a po en ial e ice elle in nego ia ion of pa men cheme fo a e hed e ice . The g aph ho n he e a adap ed f om ob e a ion made in B a il and Co a Rica[30]

Re n f om li e ock ai ing a0 /a6e ignifican l highe han he ma im m illingne - o-pa of do n-
eam e . ice b e . The /a6e i li le economic j ifica ion fo pa ing li e ock fa me o change land e
i ho a la ge b id ha i likel o bea li le /a6ela ion o he . al e of o demand fo he e . ice p o-
. ided. Thi lea e he ag ic l al ec o a he g o p mo likel o pa icipa e ef /a6fec i el in a pa men

An effective intermediary seeks to maximise downstream service buyers' demand by identifying sellers who will deliver the greatest improvement in services at the lowest cost. This is not straightforward and is almost certain to vary by location. The principle should hold unless other political, social or environmental criteria are imposed or included in the goals of the scheme.

In their role as honest broker, intermediaries must also weigh-up possible perverse incentives for changes in currently benign

UNDERSTAND THE MOTIVATIONS AND CAPACITIES OF THE DIFFERENT PARTIES.

4.3.1 Institutional analysis

It is important to gain an in-depth understanding of the way people are organised in the watershed. This is the institutional context and it frames the way people and communities interact and is the organisational setting in which a payment scheme will have to operate. The purpose of institutional analysis is to identify how institutions link to and influence buyers and sellers of watershed services and what changes are needed for a payment scheme to succeed. Both local and external institutions need to be considered. At the local level, the assessment needs to ask:

- What are the rules that currently govern watershed management, whether formal or informal, and whether enforced or not?
- What institutions are important in the operation of these rules?
- What other institutions shape the choices and behaviour of people in the watershed?
- Who controls these institutions and what incentives (or disincentives) do they create for watershed management?
- What institutions if any currently link potential buyers and sellers of watershed services?
- What support can local institutions provide for negotiation?

PAYMENT SCHEMES MUST BE SOCIALLY AND POLITICALLY ACCEPTABLE AND INSTITUTIONALLY FEASIBLE.

External actors that need to be considered are outside institutions trying to promote (or reduce) change. This includes intermediaries and champions in payment schemes, but also other outside influences, such as other development or conservation projects in a watershed. The assessment needs to identify the goals of these groups and the resources and incentives they bring to the watershed. Their influence on local institutions needs to be characterised.

Guidance for negotiations should emerge from the institutional analysis. This should be used to shape the architecture of the payment scheme – that is how it should be constructed to function effectively within the local reality. For example, the assessment should help negotiators decide what institutions should be involved, what roles are appropriate and where gaps mean that new institutions need to be created.

In Costa Rica, participation of a private hydropower company in a national payment scheme for watershed services is facilitated by a set of institutions that link landowners and consumers. Each institution has a specific role in the architecture of the payment scheme (Case 10).

Case 10: Institutional roles in a scheme for financing of upstream reforestation in Costa Rica[33]

The Go e nmen of Co a Rica o iginall e abli hed he Na ional Fo e Office and Na ional F nd fo Fo e Financing (FONAFIFO) o p o ide incen i e fo efo e a ion. FONAFIFO compen a e p i a e lando ne ho ag ee o p o ec , ainabl manage o efo e hei land. The F nd i financed b a 5% na ional ale a on fo il f el . FONAFIFO al o e e a an in e media be een h d opo e companie and p eam fo e o ne .

Ene g a Global (no Enel La in Ame ica), a p i a e h d opo e compan loca ed in he Sa apiq i a e - hed, p o ide elec ici fo abo 400,000 con me . The compan an ed o p o ec he a e hed o inc ea e he eliabili of eamflo h o gho he ea and o ed ce edimen a ion. Th o gh FONAFIFO, Ene g a Global pa o ne of p eam p i a e land o efo e hei land, engage in ain- able fo e o con e . e fo e co e . Lando ne ho ha e ecen l clea ed hei land o lando ne

- Assessment of the power over decision making held by stakeholders.
- Analysis of the control stakeholders have over the actions needed to operate a payment scheme.

As shown in Table 4.1, the results from power analysis are used to relate the power of different stakeholders to their potential to control implementation or be affected by a payment scheme. Thus, it may be most beneficial to invite powerful stakeholders with a high-level of control to be

The alternative is to use an integrative approach, which builds on collective learning and incorporates the wider interests of stakeholders that stretch beyond the immediate issues of watershed services. Instead of having to adamantly defend their positions – or their slice of the cake – parties can use the negotiation as a forum to educate other participants about the concerns and constraints they face. As mutual understanding grows, stakeholders can then develop solutions to problems that accommodate shared interests and acceptable compromises.

For example, using integrative negotiation processes might mean that solving secondary issues can be a catalyst for wider agreement. In Costa Rica, upstream land managers were not in favour of participating in a payment scheme if benefits were simply dollars paid per hectare. If road improvements and access to land titles were included, then agreement was possible. In Sukhomajri, India compensation was negotiated for restrictions on grazing in upland areas. The agreement included construction of new irrigation infrastructure and mechanisms for benefit sharing, as the community had an interest in diversifying their livelihoods (see Case 15, Chapter 6).

Negotiation will not always be successful. There may just be too much divergence in the interests of the various stakeholders. In such cases, any agreement might inevitably leave some people worse off, making it impossible for them to participate. Cooperation might be difficult because information is hidden from some stakeholders. There may just not be enough evidence to convince all parties that it is worth taking part, leaving too much uncertainty about, for example, links between the actions of service providers and the value of benefits.

INFORMATION IS A CRUCIAL INPUT INTO THE NEGOTIATION PROCESS.

Information is thus a crucial input to the negotiation process. The essential components of the evidence base that need to be brought to the negotiation are the assessment of watershed services (Section 2.1); the valuation of watershed services (Section 2.2); the design framework for the scheme (Section 3.3); and the stakeholder and institutional analysis (Sections 4.2 and 4.3).

4.4.2 Elements of an agreement

Agreements on payment schemes for watershed services involve a formal contract between buyers and sellers of services. The form of this contract, and the parties included, varies with the type of scheme (Section 3.2). However, all agreements have some fundamental elements:

- *Ser ices pro ided:* The agreement should specify the services provided. These must be carefully defined, to ensure that all parties have the same understanding of what is being paid for. Contracted services can be specified in terms of management actions implemented – such as hectares of forest planted – or in terms of quantitative service indicators. Caution is needed, however, when using service indicators such as, nutrient loads in rivers or minimum flows. Besides requiring sophisticated systems for measurement, natural variability of indicator values may be high and there is a danger that sellers may not meet contractual obligations through no fault of their own.
- *Compensa ion:* The amount and form of compensation for services provided must be agreed

Chapter 5

Rules At Work

Payment schemes for watershed services need clear and enforceable rules and transaction mechanisms. Without an understanding of these and agreement by all parties, a payment scheme will not operate successfully. Failure to establish appropriate rules and transaction mechanisms is likely to erode trust and confidence among stakeholders. The new choices and behaviours in watershed management promoted by the scheme will then not be implemented. The key ingredients are effective institutions and reliable contract law, supported by good governance, effective transaction capacities and credible enforcement. Hence, designing the rules for a payment scheme calls for development of an institutional framework for the scheme. This includes the clarification of rights, agreement of obligations among parties, establishment of contractual arrangements and mechanisms for ensuring compliance and enforcement.

PAYMENT SCHEMES FOR WATERSHED SERVICES NEED CLEAR AND ENFORCEABLE RULES AND TRANSACTION MECHANISMS.

5.1 Enabling institutions

5.1.1 Institutional framework

Formalisation of the water sector depends heavily on the level and pace of economic development in a country (Table 5.1). For example, in the developing countries of sub-Saharan Africa, the water sector is much less formalised than in the highly industrialised countries of Western Europe. As a result, the water sector in sub-Saharan Africa is principally organised on the basis of customary arrangements applied at community level. In a highly-industrialised economy, in contrast, large water industries are organised on a commercial basis. A different institutional framework is needed for a payment scheme in each of these settings.

LOCAL PAYMENT SCHEMES MAY BE OPERATED USING INFORMAL INSTITUTIONAL ARRANGEMENTS.

Where the formal institutional environment is ineffective – because laws are weak or not enforced – local payment schemes may be operated using informal institutional arrangements that are based on customary law.[38] Key legal issues in making rules for a payment scheme in this context are clarification of rights and tenure and establishing effective compliance and enforcement mechanisms (Table 5.1). Where the reach of formal laws is wide and effective, a payment scheme can make use of existing law – relating for example to enforcement of contracts – and therefore new rules are likely to focus most heavily on how to monitor compliance (Table 5.1).

Table 5.1: Influence of level of formality on the development of the institutional and legal framework for a payment scheme for watershed service.

Stages of institutional development	Examples	Formal / customary institutions	Institutional arrangements in water sector	Priority legal issues for payment schemes
Completely informal				
Largely informal				
Formalising				
Highly formalised				

The rules needed to run a payment scheme for watershed services effectively also vary with scale and the public or private nature of the scheme. At local scales where deals are made between buyers and sellers of specific services, for example relating to sustainable use of a specific forest area, schemes may be based on private agreements (Section 3.2.1). Reliable contract law, or clear customary norms, and enforcement capacity are then key. As scale increases, it is harder to directly link buyers and sellers of services and the need grows for appropriate public institutions to facilitate transactions (see Section 3.2.4).[39]

RELIABLE CONTRACT LAW, OR CLEAR CUSTOMARY NORMS, AND ENFORCEMENT CAPACITY ARE KEY.

GOOD GOVERNANCE IS NEEDED TO BRIDGE THE GAP BETWEEN

property rights are not clear to everyone. These rights relate to both tenure and the ownership of watershed services. With clearly defined rights to sell services, disputes over who is entitled to be paid will be prevented

All of these tenure issues need to be taken into account for property rights to effectively support a payment scheme for watershed services. Hence, property rights must provide for more than the regulation of land ownership and include the natural resources that land provides. Ensuring that property rights are clearly designated – whether though formal law or customary arrangements – is an essential step in ensuring that payment schemes result in the intended incentives for better choices and behaviours in watershed management.

The process of registering tenure rights can be an instrument for clarifying rights among stakeholders. A right can only be registered once a person is entitled to this right. Registration of rights is thus a test of rights and a mechanism for determining who are the actual service providers under payment schemes for watershed services.

However, registering tenure rights must not ignore customary rights, as this would lead to social exclusion and, in many contexts, unsustainable land use. Tenure systems must accommodate both formal property rights recognised by the legal system, such as land titles, permits and licenses, and customary rights. Customary rights are unwritten or informal rights, based on long-term occupation or tradition, through which rural people have access to natural resources. A payment scheme that excludes land users without registered property titles – very often indigenous communities – will further marginalise already poor communities. This could then well lead these stakeholders to revert to unsustainable or illegal land uses to generate revenues.

THE DESIGN OF OBLIGATIONS AND REQUIREMENTS IS CRITICAL TO THE SUCCESS OF THE PAYMENT SCHEME.

5.2.2 Setting obligations and requirements

The overall goals of the parties in a payment scheme for watershed services are straightforward. One party, the service buyer, wants to ensure that a particular watershed service or a bundle of services is delivered. The other party, the service provider, wants to be rewarded for the benefits delivered. To be more than a declaration of intent, however, these goals must be backed up by clearly defined obligations and requirements with real legal meaning. Obligations and requirements can be understood as the specific practices and procedures required by the payment scheme. The precise design of these obligations and requirements is critical to the success of the payment scheme. Parties might agree to define obligations under a scheme on the basis of actions, results or outcomes. These can be monitored against specific targets for an agreed set of indicators (see Chapter 2 and 6). If payment schemes are well designed, then compliance will achieve the desired environmental results. If they are poorly designed, then compliance will be hard to achieve or fail to deliver the intended results.

A GOOD DESIGN WILL REFLECT THE PRACTICAL REALITIES OF COMPLIANCE AND ENFORCEMENT.

been met will rest with the service provider.[43] Thus, great care is needed in specifying what activities, service results or outcomes are contracted under a payment scheme. Performance must be measurable and open to proof that can be used as legal evidence (Case 12).

Case 12: Disputed evidence of plantation forestry on streamflow in South Africa

S eamflo Red c ion Ac i i ie (SFRA) i a So h Af ican a e polic in men ha ecogni e a e a a limi ing e o ce fo de elopmen and he need o eg la e land e ba con me a e . Plan a ion fo e i h e o ic ee pecie (e.g. pine and e cal p) ha long been ecogni ed a ha ing highe impac on a e e o ce han na i e ee . SFRA aim o a fo e ba ed on q an i a i e ed c ion in eamflo . Ho e e he fo e ec o di p e he h d ological e idence behind ne and inc ea ed cha ge , beca e of he comple i of in e ac ion be een land cape and h d olog in land- e mo aic . A he deba e mble on, SFRA polic ma be implified o a pid f e di p e , ba ing SFRA pa men on land e in ead of h d ological c i e ia. Liabili fo SFRA pa men o ld hen be m ch mo e ea il a e ed, making he polic mo e acce able o he fo e ec o and he o e all cheme mo e effec i e.

Timeframes for payment schemes

The legal and contractual framework for payment schemes must define when and for how long it will be in force. Deadlines for compliance with obligations and requirements need to be specified. In addition the scheme should aim to create long-term impacts, and thus agreement is needed on steps for ensuring the sustainability of the provision of watershed services. The timeframe for a scheme can specify that payments will be made for a few years, a few decades, or even forever. Where payments are only foreseen for a limited period, then provisions need to be made to guarantee sustainability once payments stop. O 576egaop impart

scheme, or specific events that would trigger a review, such as instability in the economy. It should be specified further whether only certain aspects of the scheme will be reviewed at such times, or whether the whole basis for the scheme is subject to review. Even a full re-negotiation of the scheme can be stipulated to ensure that the scheme remains equitable after undergoing change. Including such provisions often increases trust and the motivation of stakeholders to join.

Additional procedures need to be

More punitive sanctions, based on law, may also be foreseen in setting rules for a payment scheme. For example, in cases of negligence, penalties such as fines or payment of damages could be sought. Criminal sanctions can be imposed in cases of severe negligence or in cases of falsifying documents or other fraud.

Other specific provisions are needed to support enforcement of the payment obligations of service buyers. Enforcing payments often requires appealing to court and, consequently, service sellers may need funding and legal representation to help them protect their rights. Intermediary institutions can play an important role in this context, by supporting service sellers in bringing legal action against downstream buyers who are unwilling to fulfil their agreement to pay for services delivered.

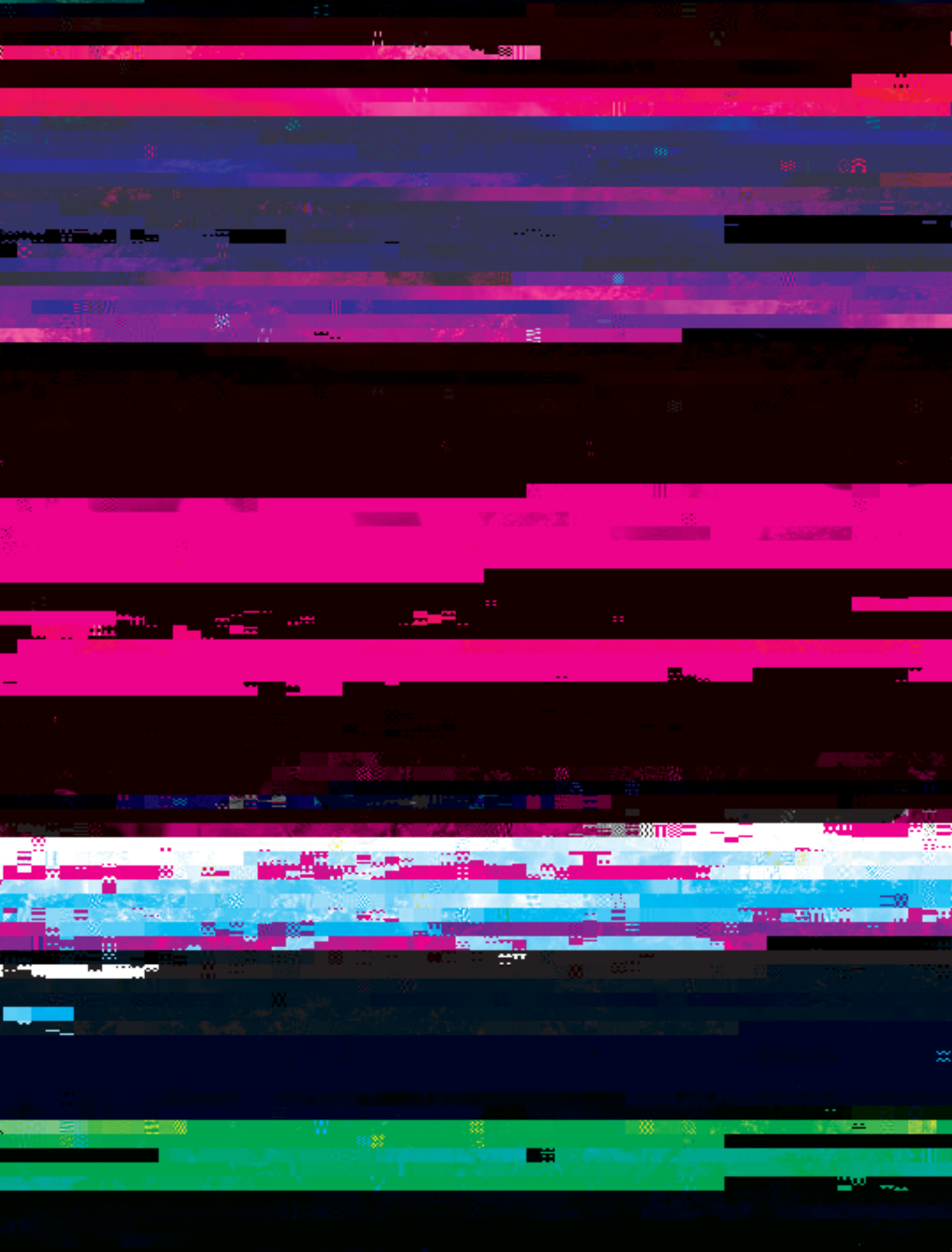
5.4 Checklist: making the rules

Design an institutional framework for implementation of the scheme

- Identify the institutions needed to support implementation and operation of the payment scheme.
- Utilise formal and informal institutions as appropriate and ensure compatibility with customary law and practices.
- Ensure that the institutional framework is appropriate to the legal and wider institutional context in which the scheme will operate, and to the scale and the extent of public or private involvement in the scheme.
- Establish good governance to build credibility and demonstrate the fairness of the payment scheme.

Clarify land and resource tenure

- Ensure clear tenure and property rights. Make sure there is agreement on who has the right to derive income from watershed services, who can exclude others from unauthorised use of



Chapter 6

Learning from Partners and Experience

The building blocks of a payment scheme for watershed services have been laid out in the preceding chapters. Building and running a successful payment scheme requires putting these pieces together in a coherent set of agreements and actions. This demands leadership and management of change. Most often, it is project managers in intermediary organisations who face the task of coordinating the development of each of these components and of assembling them into a cohesive, workable scheme. In doing so, they need to keep focused on creating incentives for water and land managers to change their behaviours towards more sustainable use of watershed services. In many ways, establishing and managing a payment schemes implies establishing a social learning process. In this, stakeholders engage to jointly learn to redefine priorities and reflect upon principles and outcomes.

ESTABLISHING AND MANAGING A PAYMENT SCHEMES IMPLIES

Figure 6.1: Setting-up and running a payment scheme requires social learning among stakeholders.

6.1.2 The learning cycle

A strategy for developing and running payment scheme can be broken down into a series of discrete elements that together form a learning cycle (Figure 6.1). This plan-act-review cycle has four key elements:

Step 1. Setting-up

During this phase, an initial situation analysis is carried out. These combine the assessment of watershed services (Section 2.1), stakeholder analysis (Section 4.2), institutional analysis (section 4.3.1) and power analysis (Section 4.3.2). These analyses help to deepen understanding of the situation within the watershed and to establish a baseline against which future progress can be measured. Initial steps are undertaken to build stakeholder support and communicate about watershed services, their values and options for improving their management.

In this early stage, one would establish an interim steering group that can help to galvanise stakeholder support for the process. This group would have the task of outlining the general process, the timeframe, institutional requirements and the resources needed to arrive at an

and responsibilities. Finally, the various elements of the payment scheme must be laid down in a contractual arrangement (Section 5.2). As in the previous stage, it is important to communicate frequently to ensure transparency and build trust among parties.

Step 3. Implementation and management

During this stage, the parties move to implementation of the agreed scheme. A formalised steering group (or other coordination mechanism) is set-up and embedded in wider existing institutional arrangements. The management structures and procedures required for the running the scheme are also put in place. Resources needed to run the scheme are secured from the buyers, sellers and third parties if required.

Close working relationships among stakeholders continue. These may facilitate developing

6.2.1 Feasibility studies and learning

One of the first questions that needs to be answered in relation to the feasibility of a payment scheme is: will payments work? Will payment (or in-kind rewards) provide the incentive needed to for upstream landholders to change to preferred choices for land use and management?

Scenario analysis can be used to find answers. It is used to test the adoption of changes in land management by stakeholder groups under alternative types of incentives. Responses to alternative scenarios are surveyed or explored in focus groups. Differences in preferences among stakeholder groups can then highlight what other issues need to be tackled for incentives to

After the feasibility assessment, pilot schemes might be set up. They are another opportunity to undertake further cycles of planning, acting and reviewing before moving to full-scale implementation. Pilot schemes can be run for a limited time in a sub-catchment of a larger basin where the full scheme will be implemented. Alternatively, pilots may be run for only a simplified set of objectives relating to a sub-set of the watershed service included in the full scheme. The aim of a pilot phase should be to test both the management of the scheme and its impacts. Testing of impacts is done through monitoring key-indicators and evaluating the results. Reflection on the results and impacts of pilot schemes are thus an opportunity to refine plans for implementation of the full scheme.

6.2.2 Monitoring and evaluation

The learning cycle should not end with the launch of a payment scheme. Monitoring and evaluating the impacts of actions is a critical mechanism for review of projects and hence learning. As implementation of a payment scheme proceeds, tracking key environmental and social indicators is used by managers and stakeholders to determine if a scheme and the participating parties are doing what they set out to do. Where gaps or failings are identified, results from monitoring are used to adapt the scheme through the learning cycle. If serious underperformance is recorded, consideration might be given to altering the design of the scheme and changing the contractual arrangements accordingly.

MONITORING AND EVALUATING THE IMPACTS OF ACTIONS IS CRITICAL FOR LEARNING.

Evaluation of a payment scheme in Costa Rica assessed environmental and social impacts of the scheme (Case 14). The study concluded that the scheme was creating environmental benefits, but was not benefiting the poor.

Case 14: Impacts of a payment scheme on farmers in Virilla watershed, Costa Rica[46]

The 'Pa men fo En i onmen al Se ice ' p og amme in Co a Rica a e p in 1995 o enco age fo e p o ec ion and managemen b pa ing fo e o ne fo ca bon, biodi e i , land cape and a e hed e ice p o ided b hei fo e . Impac of cheme n nde hi p og amme in he Vi illa a e hed e e e al a ed. The d fo nd ha landowne in he a e hed e e ela i el eal h and ell ed ca ed, and ha mo pa icipan e e no dependan on he land fo hei li elihood. Landowne iden ified a ange of benefi f om he cheme. The e incl ded en i onmen al benefi ch a ed ced land deg ada ion and imp o ed a e q ali . Fo ome he economic benefi in he fo m of he pa men e e impo an . Addi ional benefi e e acce o aining and echnical ppo and oppo ni ie o a eco- o i m en e .

The d al o fo nd ha poo e ho ehold e e of en e cl ded f om he cheme. Fi , ho ehold ecei ing go e nmen elfa e benefi e e no en i led o pa icipa e. Second i a diffic l fo malle - cale fa me o e a ide fo e a ea on he fa m. While he cheme a c ea ing en i onmen al benefi , he efo e, nde he e i ing a angemen he cheme a no ppo ing po e alle ia ion.

Monitoring and evaluating outcomes helps scheme managers to adapt to changes in the watershed and in the wider social and economic environment. Results from monitoring and evaluation studies can be used to learn lessons and build the capacities of buyers and sellers. For example, monitoring and evaluation might identify training and support needs for enhancing the quality of the activities, the results achieved and the outcome or impacts attained.

Learning was the key to adaptation of watershed management in Case 15, from India. Cycles of planning, acting and review have seen the scheme change in response to the needs of stakeholders.

Case 15: Adaptive participatory watershed management in the village of Sukhomajiri, India[47]

In he 1970 , e iden li ing in Chandiga h, do n eam of he illage of S khomaji i, e e e el affec ed b a e ca ci ca ed b il a ion of Lake S khna. A e men fo nd ha S khomaji i a he ca e of a la ge ha e of he edimen load. In e pon e, a a e e a ocia ion a e p in Chandiga h in 1982 o collec fee f om a e e and f nd inf a c e imp o emen and in e men in a e hed managemen . To ec e he ppo and pa icipa ion of S khomaji i, f nd e e p o ided o con c a e e oi fo i iga ion in S khomaji i.

Lando ne belo he e e oi benefi ed f om inc ea ed a e fo i iga ion, b landle indi id al depending on common land abo e he e e oi fo nd ha hei acce o g a ing a e ic ed. To gain addi ional ppo fo a e hed p o ec ion f om landle ho ehold , he a e e a ocia ion in o- d ced a benefi ha ing em. A adable a e igh cheme a in od ced, he e e ho ehold a a a ded he ame igh o a e . Tho e i h no e fo i iga ion a e (ch a he landle) e e hen able o ell hei igh o o he o p o ide financial e a d fo compl ing i h a e hed p o ec ion.

However, fluctuations in water availability made the system of water rights difficult to maintain. The scheme was therefore adapted again. The water user association returned to collection of fees from water users for watershed protection. However, one of the aims of the scheme became to employ landless people to implement watershed protection, thereby providing another incentive to gain their support.

Planning for monitoring and evaluation should take place during the design and negotiation of a payment scheme. This requires a clear definition of:

- The financial and human resources required.
- The key indicators used.
- A data collection strategy.
- A reporting format and strategy.
- A procedure for using the monitoring results.

The budget required to monitor and evaluate a payment scheme is likely to be proportional to the scale of the scheme and the total funding. For example, evaluation costs for seven World Bank impact evaluations were between US$ 200,000 and US$ 900,000, representing 0.20 - 1.25% of total project costs.48 Such figures are beyond what can be afforded by smaller projects working, for example, in sub-catchments. They may have to spend 5-10% of their funds on monitoring and evaluating their scheme. However, this may be a wise investment. Good monitoring of actions and downstream responses provides a strong evidence base compared to descriptive

anecdotes only. Buyers, sellers and third-party sponsors or donors are much more likely to support schemes if pilot schemes where properly monitored and showed real downstream impacts.

The timing of evaluations is important. Planning for an evaluation should consider the level of monitoring carried out, the purpose of the evaluation and when the results are needed. With good timing, results can be used for overcoming key obstacles, preparing for new funding cycles or as an input into a policy process.

The amount of time required depends on whether monitoring is done to confirm that actions have been taken, results have been achieved or impacts have materialised. Seeing evidence at the impact level may take many years. This is particularly true for social impacts, for example on health or education. Assessment of impacts on natural resources needs to account for variability, for example between wet and dry years. Hence, evaluations may have to be carried out over more than one year or drought-wet cycle.

The objectives of monitoring should be clearly defined. Targets for key indicators should guide the evaluation of performance at the action, results and impact level. Deciding which indicators to use in an evaluation is thus a key step. It should be done through a consultative process and be included in negotiating a payment schemes and be formalised in the agreement. Ensuring that all stakeholders understand and agree with how success will be monitored and judged will increase trust and confidence in the scheme.

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Glossary

Additionality
The action of impacts that would not have occurred without an intervention.

Bequest value
Aadpmm7tuTtiof imTotal Economic VueBenatural resourcesn id ecosystems to future generaon. s

Existence value
A component of Total Economic Value: the intrinsic value of environmental or natural resources, regardless of their current or future use possibilities.

Externalities / Externality costs
Economic side-effects. Costs or benefits arising from an economic activity that affect somebody other than the people engaged in the activity, and which are generally not taken into account in decision making.

Feasibility studies
A preliminary study undertaken to ascertain the likelihood of a project's success, generally including assessments of technical and financial viability.

Fiscal
Relating to government taxation, spending, or financial matters.

Fiscal mechanisms
Financial tools used by the government to affect economic behaviour, for example taxes, subsidies or direct spending.

Governance
The exercise of political authority and the use of institutional resources to manage society's problems and affairs.

Indirect-use value
A component of Total Economic Value: environmental services which maintain and protect natural and human systems.

Institutional analysis
Identifies how institutions influence buyers and sellers of watershed services, and changes needed for a payment scheme to succeed.

Institutions
Institutions can refer, narrowly, to specific organizations – or, more broadly, to the policies, rules, incentives, customs and practices that govern social relations.

Infrastructure
The basic physical structures and services – both man-made and natural – that are needed for the functioning of a community or society.

Micro-catchments
A watershed area usually used to describe a smaller part of a river basin draining into a tributary stream. Similar to sub-catchments.

Monitoring & Evaluation (M&E):

Marginal cost
The change in cost associated with producing one additional unit of a good or service.

Nonpoint source pollution
Pollution from many diffuse sources, for example when runoff moves over and through the ground carrying natural and human-made pollutants into lakes, rivers, wetlands and coastal waters.

Non-use values
A component of Total Economic Value: values that derive from the benefits of the environment but do not involve using it in any way, either directly or indirectly.

Opportunity cost
The value to the economy of a good, service or resource in its next best alternative use.

Option value
A component of Total Economic Value: the premium placed on maintaining environmental or natural resources for future possible uses, over and above the direct or indirect value of these uses.

Payment schemes
Arrangements for payments between buyers and sellers of goods or services.

Payment for environmental services (PES)
Market-based approaches using payments or rewards to encourage or discourage specific practices in natural resources management.

Perverse incentives
Incentives that undermine or lead to the opposite of the desired result.

Point source pollution
Pollution released at specific identifiable sites, for example from factories or sewage outlets.

Power analysis

Remedial action
Actions taken to remedy or correct a situation, to return something to its previous or proper state.

River basin
A watershed area usually used to describe a large land area that drains into a major river.

Scenario analysis
A process of analyzing possible future events by considering alternative possible outcomes or scenarios.

Social learning
A learning process in which stakeholders engage to learn jointly to redefine priorities and reflect upon principles and outcomes.

Sub-catchments
A watershed area usually used to describe a smaller part of a river basin draining into a tributary stream. Similar to micro-catchments.

Subsidies
Monetary grants given by a government to lower the price faced by producers or consumers of a good, generally because it is considered to be in the public interest. A subsidy is essentially the opposite of a tax.

Taxes

Watershed

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Erratum

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