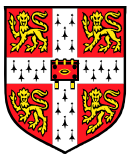

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Equity Considerations and Payments for Ecosystem Services

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Equity Considerations and Payments for Ecosystem Services

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Abstract:
Payments for Ecosystem Services (PES) schemes are now increasingly being adopted as a solution to environmental conservation problems in many countries throughout the world. Examples of these market based instruments are tradable pollution permits or certificates for ecosystem services. However, equity outcomes have rarely been considered in the implementation of such instruments. Neo-classical economic analysis does not explicitly take such equity considerations into account with efficiency concerns being the overriding goal. Increasingly this is being seen as inadequate to meet sustainability objectives and there is evidence to suggest that the adherence to an equitable framework for such schemes may determine whether or not stakeholders will participate in these markets. In this paper we develop a framework for consideration of equity in PES schemes. First the background and historical beginnings of these instruments are provided. A review of some existing schemes, particularly those that have tried to address income equity (pro-poor schemes), is presented and raises important issues related to efficiency versus equity concerns A framework is then provided to allow for the consideration of equity and fairness in such schemes designed to protect and enhance ecosystem services. Here a methodology for measuring equity, fairness and justice issues in PES and market based instrument schemes is developed on a case by case basis.

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1 Introduction

Market instruments to enhance or protect ecosystem services or the services provided to humans by nature are increasingly being proposed by environmental economists and policy makers alike as an efficient and cost effective solution. Such solutions attempt to bestow property rights on services such as carbon sequestration or biodiversity in an attempt to place some monetary value on these previously unvalued services and to encourage individuals to realize their worth with a view to enhancing and saving them. Such solutions are based on efficiency related outcomes being the overriding goals. Increasingly however, equity issues are being raised as possible deterrents to individuals taking part in such Payment for Ecosystem Services (PES) or Market Based Instrument (MBI) schemes and as such these schemes are failing to meet the necessary sustainability objectives of natural resource management. For example, a recent study by Landell-Mills and Porras, (2002) of 287 case studies of markets for forest ecosystem services and the impact on the poor concluded that the costs (social and other) of such schemes had rarely been assessed – 'the lack of attention to equity impacts of emerging payment schemes raises a number of concerns' (p. 5). In another study, Syme et al. (1999a) concluded that people in Australia have consistently rejected using water markets over ten years and 'effectiveness will depend on the community's agreement on the rules that underpin the market. This acceptance is likely to depend on fairness judgements' (p.68). They also applied principles to other cultures (e.g. Germany – see Syme et al. 1999b). In another study it was concluded 'Whatever the case may be, equity considerations directly affect the acceptance of MBIs by the constituency.' (Schilizzi 2003, p. 29) Therefore apart from ethical reasons, the adherence to an equitable framework for MBIs may determine whether or not stakeholders will participate in these markets.

Equity does not only relate to what is perceived as being 'fair' between individuals although this may be a critical component of whether or not individuals will take part in such a scheme. There is also the need for consideration of fairness between humans and non humans - for example, the allocation of water between human needs and environmental needs. A related issue is the practice involved in such market based schemes of restricting access to public goods by privatising these goods in order to allow trading to take place. Questions arise as to how far should we go in such schemes and who decides if this is to happen? Also if all public goods were privatised what would be the implications? These issues are all linked to equity and fairness considerations.

The problem involved in assessing such issues though is one of defining what is equitable and fair and how do we go about measuring equity and fairness. In this paper we review the literature on equity issues involved in PES and MBI schemes and establish a framework for the consideration of equity and fairness in such schemes designed to protect and enhance ecosystem services. We do this by establishing a conceptual framework for measuring equity, fairness and justice issues and by setting up a methodology for assessing such issues involved in the use of these instruments. The aim of the paper is not to provide a definitive study on equity issues in PES instruments but to raise issues concerning equity that should be incorporated into these schemes. We start by reviewing some of the existing schemes particularly those that have tried to address income equity (pro-poor schemes) and raise some important issues that address efficiency versus equity concerns. We then provide a conceptual framework and a methodology for adequately incorporating equity considerations into the design of such schemes on a case by case basis.

2 Is Equity Important?

Issues of equity and fairness have been widely debated in the PES literature. Schilizzi (2003) clearly states that while PES schemes are not designed for equity reasons, if equity is not taken into account and a scheme or policy is deemed to be inequitable – it will simply not be implemented.

Alix-Garcia (2004) provides a broad overview of the literature written about PES schemes. Most theoretical papers focus on targeting (Ribaudo, 1989; Babcock et al., 1996; and Wu, 2000), a small group of empirical papers analyses farmer willingness to participate in conservation programs (Parks and Schorr, 1997; Dupaz, 2003) and there is a variety of case studies (Pagiola et al., 2002; Aylward and Togenetti, 2002; Hernandez et al., 2003). Equity considerations are discussed in the case studies and in theoretical considerations of effectiveness and efficiency.

However, authors who do focus on equity as an issue admit that it is difficult to incorporate into an economic framework. Raymond (2003) claims that while equity-based norms have a significant influence over environmental decision-making (citing evidence that a number of US PES schemes nearly failed because of equity-based disagreements), there is still a reluctance to consider equity explicitly in studies of public policy. Schilizzi (2003) explains that this reluctance stems from a multiplicity of competing equity principles.

The following tables illustrate how different notions of equity affect PES schemes. Table 1 shows that different notions of equity affect how it is viewed in PES schemes. Table 2, focusing on carbon trading schemes specifically, divides equity into three elements of access, legitimacy and outcome. These tables are representative of the equity elements discussed in the literature and, taken together; provide an outline for considering equity in PES schemes.

Table 1: Different definitions of equity imply different questions	
Equality of opportunity	What determines access to a PES scheme?
Equality of outcome	Are the poor equally likely to benefit as the rich?
Positive discrimination	Are schemes designed to benefit the poor rather than the rich?
Process	Do the poor participate in scheme design?

Source: Grieg-Gran, 2004, online

Table 2: Three Elements of Equity in the Context of the New Carbon Economy		
Equity in access	*Equity and legitimacy in institutions and decision-making at all scales*	*Equity in outcome*
Depends on information, communication and knowledge; and the way institutions operate at different scales. Ease of access will determine participation and benefits from project outcomes	Concerns the way in which projects and rules operate and whether all stakeholders are able to have a voice in the project. Equity will not only be about participation but about inclusion and negotiation of competing views.	Concerns the way project outcomes impact the different stakeholders. The impacts will be conditioned and partially determined by access and decision-making, but are primarily about who gains and who loses in terms of the distribution of project costs and

		benefits

Source: Brown & Corbera, 2003

Section 2 adopts the three elements of Table 2: access, outcome and legitimacy (which correspond to the questions of equality of opportunity, equality of outcome and process in Table 1) to discuss whether PES schemes benefit the poor. The issue of positive discrimination outlined in Table 1 is a focus of Section 4.

2.1 How PES Impacts on Equity

It is as yet unclear how PES impacts on equity (Schilizzi, 2003; Grieg-Gran, 2004). The diversity of the case studies shows mixed evidence because impacts on equity are design and context-specific (Grieg-Gran, 2004).

However, most authors agree that equity is an important consideration when it comes to PES schemes. Langeweg (1998) points out that PES schemes address equity and sustainable development issues because they can generate incomes for developing countries (especially in terms of climate change mitigation). Wilson and Howarth (2002) believe that equity considerations must be written into PES programs because the allocation of ecosystem services directly affects many people and raises normative questions about social equity.

One equity implication of PES schemes is whether they will change existing power structures (either positively or negatively) in the control of essential ecosystem services. There is some disagreement in the literature. Jenkins et al. (2004) claims that creating markets for ecosystem services may fundamentally change the distribution of rights and responsibilities for ecosystem services. However, the International Institute for Environment and Development (IIED, 2002) claims that markets generally reflect existing power structures. This view is supported by Corbera and Adger (2004) who say that most markets for ecosystem services are more likely to reinforce existing power structures and inequalities in access to resources. The UN Environment Program (UNEP, 2005) explains that in poor countries, the transfer and use of ecosystem services are usually done through non-market channels. Thus the general consensus is that while existing inequalities in access and rights over essential ecosystem services may theoretically be affected by PES schemes, in most cases, they are not. This is in itself an equity issue as perhaps PES schemes should be designed to change existing power structures.

3 Equity Considerations in PES Schemes

3.1 Do PES Schemes benefit the poor?

Most equity debates in the literature are framed around whether PES schemes benefit the poor. One of the reasons for government enthusiasm over PES schemes is its potential to benefit the poorest members of society. In fact, in many case studies, it is simply assumed that PES benefits the poor. However the reality is somewhat different. A review of case studies (mainly from Latin America) shows that PES schemes can benefit the poor only if they are designed specifically with that goal in mind. Although Wunder (2005) warns that the small scale of most PES schemes constraints poverty alleviation.

3.1.1 Access

Table 1 and 2 above mentioned access as one of the elements of equity and access is the first and most important hurdle for the poor to overcome. IIED (2002) outlines key constraints that limit the poor from accessing PES schemes. They are:

- lack of property rights over land and related environmental services
- inadequate technical and market-related skills,
- poor market information
- lack of market contacts,
- inadequate communication infrastructure
- inflexible contract design
- lack of access to start-up capital

The top one – lack of property rights over land is a key issue (Grieg-Gran, 2004; Wunder, 2005; Rosa, et al., 2004; WWF, 2006). The poorest of the poor are mostly landless peasants who either occupy land illegally or do not have formalised titles to the land they farm. Lack of land rights automatically precludes participation in most PES schemes. However, there are local PES schemes in Costa Rica which have a much more flexible criteria, allowing all those who work and live on the land (i.e. not just landowners) to qualify for payments (Rosa, et al., 2004).

The Costa Rican government set up a national PES scheme in 1995, which was designed to encourage forest protection and management by paying forest owners for four environmental services: carbon, biodiversity, watershed management, landscape beauty (see Box 1 for its results). The scheme initially did not have any pro-poor mechanisms built into it but it was assumed that it would have a positive impact on poverty (Miranda et al., 2003). Because it was viewed partly as a conservation and partly as a social welfare program, poor households that depend on other government benefit schemes and small landholders who were given land under the Agrarian Development Institute Program were not eligible for PES payments, even if the land they owned satisfied the criteria (Miranda et al., 2003). The scheme was designed to conserve land at risk of deforestation therefore initially; landholders who practiced agroforestry were excluded from payments. This exclusion was lifted in 2003, however, due to pressure from small land holders and indigenous groups (Rosa, et al., 2004). This idea of leaving land idle also discouraged many smallholders from joining as they used their forests to grow shade coffee or as shelter for cattle. Setting land aside for conservation reasons was not feasible for them and prevented them from joining the PES scheme (Miranda et al., 2003).

The same problem is found in the developed world. The United States runs an Environmental Quality Incentives Program which pays subsidies to encourage specific activities, such as nutrient management, fertilizes management, integrated pest management, irrigation management and wildlife management. A review of the scheme found that 61% of the US$22 billion paid out was received by 10% of the farms, indicating that big landowners get a disproportionate share of the payments at the expense of smaller (and most likely poorer) land holders (Kumar, 2005) reflecting the situation of their counterparts in the developing world.

3.1.2 Outcome

When the access barrier is removed, the poor may still not reap as many benefits from participation in a PES scheme as the relatively well-off. First and foremost, poorer participants face higher transaction costs (Wunder, 2005; Grieg-Gran, 2004; Miranda et al., 2003; WWF, 2006). This was the case in Costa Rica where the requirements of leaving land idle while the application was in progress and substantial travel to obtain necessary documents made the scheme unattractive to many poor landholders (Grieg-Gran, 2004).

Studies from Costa Rica indicate that the PES scheme brought financial rewards. Overall the scheme increased household disposable income by 15%, resulted in higher levels of

investments on the farm and contributed to some job creation (through the hiring of occasional workers) (Miranda et al., 2003). A small survey of PES participants living below the poverty line in the Oca Peninsula found that the scheme lifted half of them above the poverty line and became the primary household cash income source in 44% of cases (Wunder, 2005). However, in another area – the Virilla watershed, studies found that the participating landowners were mainly wealthy, well-educated and did not directly live off the land (Miranda et al., 2003).

Box 1: The PES Experience in Costa Rica

The 1995 PES Scheme in Costa Rica emphasises global environmental services provided by forests (particularly biodiversity conservation and carbon sequestration) and is primarily funded from a domestic tax on fossil fuels.
Between 1997 and 2002, the program covered more than 300,000 hectares and total payments exceeded US$80 million with 70% going for forest protection. The scheme contributed to the conservation of 16,500 ha of primary forest, the sustainable management of 2,000 ha and reforestation of 1,300,000 ha. By promoting live fences as well as sustainable agriculture and livestock practices the scheme decreases the chances of land use conversion.
The scheme also had non-tangible effects by strengthening the process of institutional innovation, de-bureaucratisation, decentralisation, promoting voluntary agreements to improve the environment and organisational and community innovation as well as fostering inter-institutional cooperation.
The scheme initially suffered from a number of equity issues that discriminated against the participation of the poor, but it evolved over time to address most of them.

Source: Miranda et al., 2003; Rosa, et al., 2004

3.1.3 Legitimacy

A third element of equity is the equity and legitimacy of institutions and decision-making processes. The question here is whether the poor have a voice in designing PES schemes. This hinges on the issue of political power held by the poor. The World Wide Fund for Nature points out that the poor lack skills, knowledge and resources for participating in emerging markets. They also have little voice in the development of the markets and thus risk being marginalised from market benefits (WWF, 2006). Janssen and Padilla (1999) find this is the case in the Philippines where mangrove areas are destroyed due to expansion of aquaculture (the conversion of swamps into fish ponds). The local population would support a PES scheme as the mangrove areas provide them with important environmental services (such as firewood, fish and protection from floods). But the owners of fish ponds are wealthy individuals who do not live in the area nor employ local people to care for them and therefore are not directly benefiting from environmental services provided by the mangroves and consequently not interested in their preservation.

Wunder (2005) says that PES schemes have a devastating impact on the landless poor who are engaged in environmentally degrading activities. This was a finding in Costa Rica where landowners considered security against squatters to be major benefit of PES program (Miranda et al., 2003). Squatters are the poorest of the poor and, although squatting is illegal, they were hurt by the scheme. The landless poor are also likely to be employed in environmentally destructive activities such as logging, firewood and charcoal makers, extractors of non-timber forest products or farm hands hired for clearing land and for

cultivating converted soils (Wunder, 2005). Any conservation scheme will thus hurt their interests by limiting their already meagre income.

Another problem raised by Rosa, et al. (2004) is that PES schemes can induce powerful outside interests to establish 'new' private property rights over resources previously managed by poor communities.

Corbera and Adger (2004) studied a carbon sequestration PES scheme in Chiapas, Mexico. They found that the project ignored internal conflicts and therefore reinforced existing unequal power relations within the community. In particular, landless families and women in general became excluded from project benefits because the carbon project ignored their role as carers of home gardens and focused on male-dominated tree planting.

3.2 The Distribution of Environmental Assets

The distribution of ecosystem services can have serious implications for equity. Some types of land are easier to conserve than others and this would make them better value for money in terms of PES, indicating that owners with land which, due to some environmental particularity, presents difficulties for conservation, would miss out in a PES scheme, regardless of their intentions to conserve. Two examples from Australia illustrate this.

The Australian state of Victoria has trialled a successful auction system called BushTender. In BushTender, land owners identify actions and management strategies designed to preserve native vegetation on their lands. Then they prepare a bid, with the assistance of a government field officer which specifies management actions to be taken and their cost. The bids are then submitted to the Victorian Dept of Natural Resources and Environment. The Department chooses to fund those bids that present the best value for money (Stoneham et al., 2002). In essence the system, while logical, is unfair because the price depends on the cost of provision of the service. In other words two people providing the same service will be paid differently if their cost in producing the same service is different (Eigenraam, et al., 2002). Therefore land owners whose lands might make conservation difficult would struggle to compete against those whose land does not pose problems. However, the auctions are voluntary so owners who would be disadvantaged are not forced to participate (Eigenraam, et al., 2002). Despite this theoretical unfairness, anecdotal evidence suggests that landowners see the system as fair because assessment system relatively objective (Eigenraam, et al., 2002). Hailu and Schilizzi (2003) conducted a hypothetical model of repeated auctions and found that repeated auctions (as opposed to the one-off system currently in use) would make the system inefficient and unfair due to information rents being extracted by winning bidders.

Flügge and Schilizzi (2003) examine a greenhouse gas restriction policy and how it could affect certain agricultural regions in Western Australia. They compare two different agricultural regions and how these would fare if a national tax on the amount of CO_2 equivalents emitted were applied. The Great Southern Region is livestock dominant and, due to agro-climatic differences has very few options of switching to less CO_2-intensive production. The second region is the Eastern Wheatbelt Region which is crop dominant. Results of simulations showed that if the tax was in the order of $50 per tonne of emissions, farms in the Great Southern Region would go bankrupt while those in the crop-dominant region would survive (Flügge & Schilizzi, 2003). A lower tax would still adversely affect one region more than the other. Therefore the price for reducing harmful emissions nationally will be paid by one region more than another due to factors beyond the control of the people who would suffer.

4 Efficiency versus Equity

While equity is an important consideration in PES schemes, the ultimate goal is conservation, not fairness or poverty alleviation. As Schilizzi (2003) states, their raison d'être is economic efficiency, not distributional equity. Wunder (2005) takes up this argument by saying that from an efficiency point of view; only those who constitute a credible threat to the provision of environmental services should be paid. We have already seen above how this creates an unfair situation whereby those who combine conservation with income generating activities (such as agro-forestry or shade-grown coffee), are excluded from PES schemes. The efficiency argument states that these individuals (who are doing the right thing by taking care of the environment) are already receiving an income from the environment and limited PES funds should go to those who are doing the wrong thing by destroying the environment.

In order to maximise efficiency, PES schemes have been concentrating on single environmental services (such as carbon sequestration), sometimes at the expense of other ecosystem services; and giving priority to simplified, large-scale ecosystems, preferably controlled by a few people (i.e. a few big landowners as opposed to many small land owners), so as to reduce transaction costs (Rosa, et al., 2004). This has had adverse or devastating effects on poor and marginalized rural communities. Alix-Garcia (2004) compared three types of PES schemes and found that the most egalitarian is also the least efficient.

The reason why most PES schemes insist on formal land title is also based on efficiency. PES payments are made for limiting resource use. Those without formal land rights cannot stop external agents from occupying the land and harvesting its resources (Wunder, 2005).

PES schemes financially reward people for limiting resource use. However, in many instances resource use is already illegal (for instance hunting wild animals, harvesting firewood, deforestation) (Wunder, 2005). If resource users who threaten the environment because of illegal activities receive payments to induce them to stop – is this not a de facto endorsement of crime? As far fetched as this might sound, deforestation is illegal in Costa Rica and national PES scheme described above is in fact paying landowners not to cut down their trees - something they should not be doing anyway.

A similar national PES scheme in Mexico – the Payment of Hydrological Environmental Services (PSAH scheme – see Box 2 below) is designed by the federal government to pay participating forest owners for the benefits of watershed protection and aquifer recharge in those areas where commercial forestry is not currently competitive. However most of the deforestation in Mexico occurs illegally and therefore the government scheme is again paying to stop illegal activities. Furthermore, forest owners with sustainable timber operations were excluded on the basis that they already benefited from the environment and were unlikely to destroy it. This decision was strongly challenged by timber and coffee producers who argued that it was unfair. They had for years conserved their forests by using them in a sustainable way and therefore they deserved payments more than those who failed to take responsibility for the environment (Muñoz-Piña et al., 2005).

In the end, a large share of participating forests were those which had some form of sustainable forestry activities – an outcome that was definitely fair and equitable (as the program was found to help the poor and marginalised – see Box 2 below) but it was inefficient as payments were directed at forests that were unlikely to have been cut down in the first place (Muñoz-Piña et al., 2005).

Alix-Garcia (2004) makes a counter-argument in favour of paying to stop illegal activities. She claims that when the law is enforced, deforestation does decrease but this also eliminates income generation opportunities in forests of low commercial value. Therefore when forest owners are poor, enforcing the law protects the environment at a cost of increasing poverty. There is thus a clear trade-off between equity and efficiency and poverty reduction and environmental protection.

Box 2: The Payment for Hydrological Environmental Services in Mexico

Mexico is generally considered to have the second highest deforestation rate in the world. It suffers from soil erosion and increasing water scarcity, problems both associated with forest loss. It is among the most biologically diverse countries in the world, with first place in reptilian diversity, third in bird, and fourth in mammal diversity. 80% of the country's forests are located in ejidos (community managed areas).

The PSAH scheme consists on direct payments to landowners with primary forest cover (forests in good state of conservation) given at the end of the year, once it has been proven that they were not deforested.

In 2003 more than 900 applications were received offering close to 600 thousand hectares. Only 271 forest owners were selected incorporating 127 thousand hectares into the program. In 2004, thanks to Congress support, the budget was increased in 50%. The number of applicants grew to 960, of which 352 new participants were chosen with approximately 180 thousand hectares.

A first and positive result is that, despite not being an explicit criterion, 72% and 3% of PSAH payments in 2003 and 2004 respectively went to forest whose population centres have high or very high marginalisation. Between 2003 and 2005, satellite images showed that less than 0.1% of the nearly 300 thousand hectares paid by the program was deforested. And those areas that were lost suffered from unintentional and very difficult to control forest fires, not to land use changes.

Source: Alix-Garcia, 2004; Muñoz-Piña et al., 2005.

It is important to note that not all PES schemes limit resource use. They can in fact be asset-building when trees are planted in degraded landscapes, for example. Such activities can trigger a net expansion in rural jobs and benefit unskilled rural labour, thus alleviating poverty (Wunder, 2005).

The equity versus efficiency dilemma is also apparent in the developed world and illustrated by a well-established scheme in America – the Wetland Mitigation Bank. This scheme demands that developers who want to develop (i.e. turn it into a mall or housing estate) land containing wetlands must first either protect an existing wetland or create a new one somewhere else before destroying one. The aim is not to have a net loss of wetlands but the rules are flexible as to wetland type and quality. This process has resulted in the destruction of wetlands in urban/suburban areas and establishment of wetland mitigation banks (large tracks of contiguous wetlands) in rural/sparsely populated areas. The outcome is that wetlands have moved out of areas where they may provide services to urban populations. The process has involved a trade-off between concerns over equity in terms of who has access to wetland services and economic efficiency (it's more efficient to create wetlands in sparsely populated areas where the people cannot enjoy their services) (Salzman & Ruhl in Pagiola et al., 2005).

5 Making PES more equitable

So far the literature has shown that 1) equity plays an important role in PES schemes and 2) although PES schemes are meant to maximise efficiency and not equity, 3) the case studies show that schemes have been adjusted to make them more equitable and less efficient. This indicates that in order to be applicable in the real world, PES schemes should become more equitable, even if this decreases their efficiency.

Much has been written on how to make PES more equitable. For example, both the IIED (2002) and WWF (2006) researched how to make PES more pro-poor. Their findings are detailed in Table 3 below. Rosa, et al. (2004) provides a comprehensive review of Latin American PES schemes and provides a useful summary of lessons learned from each country. These lessons correspond well to the findings of the WWF and IIED.

Table 3: Mechanisms to create pro-poor markets

WWF		*IIED*	
Mechanism	Description	Mechanism	Description
Formalise forest service property rights held by poor people	Formalisation of natural resource rights will give marginalised groups control over, and rights to, returns from environmental service sales	*Property Rights*	Property rights over land and related environmental assets must be assigned in ways that respect customary arrangements and that are equitable
Define appropriate commodities	Simple and flexible commodities that can be self-enforced, that fit with existing legislation and that suit local livelihood strategies need to be developed in poorer areas	*Market Participation*	Strengthening capacity for market participation, e.g. through training and education
Devise cost-effective payment mechanisms	In areas where regulatory capacity is weak, trading skills in short-supply and market infrastructure underdeveloped, simpler payment mechanisms are likely to be most effective	*Market Support*	Support through the provision of market information, advice, a contact point for buyers and sellers, and facilitation in the bundling of service contracts will reduce transaction costs
Strengthen cooperative institutions	Cooperation is critical in allowing poor landowners and service beneficiaries to share the costs associated with market participation. It is also essential for achieving a minimum level of supply or demand, thereby permitting market participation	*Start-up Capital*	Improving access to start-up capital so that poor individuals can make necessary investments in market participation
Invest in training and education	Training in marketing, negotiation, management, financial accounting, contract formulation and conflict resolution are important prerequisites for effective participation. Technical skills relating to forest management for environmental services are also needed.		
Establish a market support centre	To improve poor people's ability to participate in emerging markets, a central market support centre could offer free access to market		

	information, a contact point for potential buyers, sellers and intermediaries, and an advice bureau to support the design and implementation of contracts		
Improve access to finance	Where finance is needed to negotiate and conclude environmental service deals, the government may have a role to play in supporting access to funds		

Source: WWF, 2006; IIED, 2002

Both lists emphasise non-financial support to the poor. Information, training and education are key as well as the improvement to institutional capacity. This type of support deemed essential by two of the foremost international environmental organisations lies in the arena of international development and national education policies. In other words, environmental agendas must create partnerships with social development and poverty alleviation. There is no escaping the fact that non-environmental considerations like equity are essential to solve environmental problems.

In fact, WWF has created an equitable PES scheme which pursues a balanced approach towards poverty reduction and sustainable management of environmental services. The WWF scheme differs from traditional PES approaches by its focus on achieving equity and an equitable process of implementing the scheme (WWF, 2006).
The WWF is currently trialling its scheme by partnering up with CARE International to implement the Equitable Payments for Watershed Services (PWS) in 10 selected watersheds in Asia, Africa, and Latin America (WWF, 2006). This project is in its early stages and so far no evaluations are available.

6 The way forward

Worldwide, market based measures to control pollution or environmental degradation are becoming more and more popular compared to the traditional command and control measures. Andersen and Sprenger (2000, p. 9) looked at the rise of the use of market instruments in OECD countries over several decades and concluded that ‘ comparing the data for the eight best-documented countries, the number of economic instruments in use in 1992 was 25 per cent higher than in 1987. If the number brought into use in 1993 is also taken into account, the increase in nearly 50 per cent’ . This brings the total number of economic instruments to around 225 for the OECD countries in 1993.

In essence, PES schemes provide market signals to encourage certain reactions from market participants and are often credited with being more efficient than other methods such as those based on command and control or polluter pays principles. Market schemes may use, for example, trading mechanisms, auctions and price signals (in the form of subsidies and taxes) to change behavior (Murtough et al. 2002). Different instruments however have different implications for equity and fairness considerations (Schilizzi 2003) and must therefore be considered on a case by case basis.

The rate of takeup of PES programs and the types of instruments used has differed in different countries. Some researchers claim that their implementation rate has been linked to different views on equity in different countries. For example the acceptance of some market

instruments (in particular tradable permits) as an environmental policy measure has been more popular in the USA and Australia than in Europe. There may be other reasons however, such as institutional structures that are already in place to allow the implementation, that may play a role in the different rates of market instruments use in different countries:

'it may be that Europeans have a different sense of equity than Americans have – they may be referring, because of historical reasons or otherwise, to different equity principles. The existence of institutional structures which allow the introduction of MBIs in the USA more easily than they do in Europe also raises questions as to the nature and pace of institutional change, and how perceptions of equity influence this change.' (Schilizzi 2003, p. 29).

In Australia, trading in water entitlements has been undertaken is specific regions since the 1980s in response to continued environmental degradation as a result of limited environmental flows and the fact that the major user of the water resource is the irrigation industry. Equity issues involved in trading water permits has long been discussed (see for example Syme and Fenton 1993, Syme and Nancarrow 1997) although little has been done at the policy and implementation levels to address these equity concerns. Reasons of 'lack of fairness' have often been cited as crucial issues in determining whether farmers will participate in such instrument schemes.

At present in Australia a major commonwealth program (The National Market Based Instruments Pilots Program) has been initiated to explore the advantages and disadvantages of such instruments with both experimental and on-ground trials by providing $5mill worth of funding over twenty one priority regions. Although not explicitly mentioned as an area of investigation for these pilot studies, issues of equity and fairness need to be investigated as part of these studies for the afore mentioned reasons of possibly deterring participation if such concerns are not addressed and also because as a policy instrument, the ability of such instruments to achieve sustainability criteria will be partly determined by addressing the equity concerns of the participants of such MBI programs.

7 Conceptual framework

When trying to build a conceptual framework upon which practical studies of assessing equity considerations can be undertaken, the question remains - what do we mean by equity and how do we measure it? Amartya Sen defines equity as 'equality of something' where 'something' includes tangible and non-tangible resources. The dictionary definition (ignoring the definition related to the business accounting term) states that equity is *the state, quality, or ideal of being just, impartial, and fair* or *something that is just, impartial, and fair*. A relevant legal definition also exists which is *justice applied in circumstances covered by law yet influenced by principles of ethics and fairness*. The definitions therefore suggest that something that is just and fair is also considered equitable which leaves us with the problem of a single and exact definition of equity that could be used for measurement as many different interpretation will be made of justice and fairness (for issues not covered by precise legal definitions) by many different people. Table 4 summarises the many different ways that justice has been assessed in various environmental studies and suggests that the interpretation and measurement of equity is a situation specific phenomenon[1], best dealt with and measured by those that would be affected by the situation being assessed – the stakeholders.

[1] Syme et al. (1999a) refer to *universal* fairness criteria versus *situation specific* criteria.

Generally, such issues can be divided into those of 'procedural justice' or a *process* that will ensure a fair and just outcome and those of 'distributive justice' which is concerned with the final *allocation* of rewards and responsibilities regardless of the process.

Table 4: Review of principles and criteria linked with procedural and distributive justice[2].

Subject	Principle	Description	Level of equity	Source
Distribution of allocative resources				
Income	–	Household income	Intragenerational	Brown 2003
Income	'No envy' principle	It conveys the ideal of equal opportunity of consumption and defines a situation where no agent would prefer someone else's consumption bundle to his own (Diamantaras and Thomson, 1990). Thus its requirement is that every active agent should bear the same cost or enjoy the same gain (Varian, 1974).	Intragenerational	Ikeme 2003
Income	'Just deserts' concept	This option seeks remedies that are proportionate to the weight of the injustice. So remedies for injustice should not engender a secondary inequity.	Intragenerational	Ikeme 2003
Income	Total equality concept	It argues that everyone should have the same income, i.e. the bottom 10% of the population should receive 10% of the income (Le Grand et al., 1976; Stymne and Jackson, 2000).	Intragenerational	Ikeme 2003
Income	Minimum standard or basic need approach	It is concerned only with the poor in the society and argues that nobody's income should fall below a certain minimum level (Le Grand et al., 1976; Stymne and Jackson, 2000).	Intragenerational	Ikeme 2003
Negative impacts	Relinquishment	Not to carry out the project: If a project causes irreversible harmful effects to future generations and these cannot be avoided or compensated, it should be considered outside the choice of possibilities.	Intergenerational	Padilla 2002
Negative impacts	Precautionary and control measures	This option also implies the application of the inalienability rule (The inalienability rule involves a much more restrictive use of the power in present decisionmaking. The inalienability rule implies that the present cannot modify certain rights of future generations.). If the modification of the structure of rights that the original project would imply is avoidable (e.g. enhancing security systems) and it is still profitable, this option is more appropriate than the first one.	Intergenerational	Padilla 2002
Negative impacts	Compensation through an associated	In some projects it is possible to compensate the harmful effects on future generations through an	Intergenerational	Padilla 2002

[2] Giddens structurisation theory is used as the basic framework.

	project	associated project (e.g. reforesting). see Markandya, A., Pearce, D., 1988. Sustainable future. Natural environment and the social rate of discount. Project Appraisal 3, 2–12.		
Negative impacts	Financial compensation	This option would clearly modify the composition of the capacity bequeathed to future generations. There should not be doubts about the possibility of substituting the diminished resources and of establishing an investment fund allowing this future compensation. See Costanza, R., Perrings, C., 1990. A flexible assurance bonding system for improved environmental management. Ecological Economics 25, 55–57.	Intergenerational	Padilla 2002
Negative impacts	Compensation	Identifying compensation measures for those adversely affected by implementation of a project.	Intragenerational	Orlando 2002
Negative impacts	Minimization	Devising strategies to minimize negative impacts on people's lives;	Intragenerational	Orlando 2002
Welfare	Sovereignty	Equalize net welfare change across nations	International	Rose 1998
Welfare	Vertical	Welfare gains should vary inversely with national economic wellbeing	International	Rose 1998
Welfare	Compensation	Distribute permits so no nation suffers a net loss of welfare	International	Rose 1998
Welfare	Access for poorest	Forest resources access to poorest households	Intragenerational	Brown 2003
Welfare	Community involvement	Number of local people participating in project activities and who perceive benefits	Intragenerational	Brown 2003
Welfare	Capacity building	Investment in education, health services and capacity building	Intragenerational	Brown 2003
Distribution of authoritative resources				
Property rights	Sovereignty	All nations have an equal right to pollute and to be protected from pollution -> Distribute permits in proportion to emissions	International	Rose 1998
Property rights	Egalitarian	All people have an equal right to pollute or to be protected from pollution -> Distribute permits in proportion to population	International	Rose 1998
Property rights	Ability to Pay	Mitigation costs should vary directly with national economic wellbeing -> Distribute permits to equalize abatement costs	International	Rose 1998
Property rights	Initial allocation	Clarification of property rights	–	Brown 2003
Procedural justice and legitimation				
Income	Meritocracy	Inequality is accepted if everyone has had equal opportunity at initial allocation and differentials is only accounted for by difference in effort and hard work	Intragenerational	(Konow, 2001) in Ikeme 2003
Property rights	Consensus	The international negotiation process is fair -> Distribute permits in a manner that satisfies the (power weighted) majority of nations	International	Rose 1998
Property rights	Market Justice	Market is fair -> Distribute permits to	International	Rose 1998

		highest bidder		
Welfare	Rawls' Maximin	The welfare of the worst-off nations should be maximized -> Distribute largest proportion of net welfare gain to poorest nations	International	Rose 1998
Procedural justice and signification				
Participation	Communicating	Determining and communicating project boundaries	Intragenerational	Orlando 2002
Participation	Community involvement	Involving people as much as possible in the project process	Intragenerational	Orlando 2002
Participation	Community involvement	Involvement of community-based formal and non-formal organizations in project	Intragenerational	Brown 2003

Signification (e.g. shared understanding of ecosystem services)
Legitimation (norms/rules like definition of property rights over ecosystem services)

8 Methodology

A methodology has been developed here to allow the inclusion of stakeholders in the development and design of context specific PES schemes to account for the issues raised above in interpreting and measuring equity, fairness and justice.

In this methodology, a suitable scheme can be developed with the aid of stakeholder input and utilizing an experimental economics framework along with stakeholder surveys. The procedure includes the following stages:

1. Survey of landholders – to assess demographics, attitudes etc.
2. Experimental economics – to test reactions to different schemes and aid design and learning
3. In depth survey – involving equity considerations
4. Multi-criteria evaluation – to determine a favoured instrument
5. On ground trial – to test and monitor the instrument

An example of this methodology is now provided where the relevant stakeholders are farmers but the technique could be extended to other types of stakeholders as well. In 1. the first survey is sent out to all farmers in the region under study (approximately eighty) and will generally be assessing the types of farms and farmers that reside in the region. The questions to be asked include:

- Farmers thoughts about farming including attitudes to environmental conservation and their responsibilities, whether they are worried by the views of their neighbours and their attitudes towards new methods and techniques of farming
- Farm type and the extent of the salinity problem on their farm
- Farming practices as well as their use of technology such as computers
- Cropping enterprises
- Grazing enterprises
- Demographics

These questions can then later be used to assess what types of farmers are willing to take part in a market instrument scheme. In 2. the experimental economics framework aids in testing the way farmers will react to different types of schemes given their existing knowledge and

farm characteristics but the testing is done using a virtual trial of the instrument with the aid of computer facilities under 'laboratory' conditions. The experiments will aid in the understanding by the farmers of the schemes that could be eventually used in on-ground trials. At the end of the experimental phase, farmers will have greater knowledge of the way such schemes work and the implications of each scheme for their own farming situation as well as their likelihood in taking part in a 'real' scheme. It will also aid them in understanding the specific issues of fairness and equity involved in such schemes and whether or not equity or fairness issues play any role in how the participants respond to different process designs. This should enlighten further work on what types of issues need to be investigated and addressed when designing certain types of PES schemes.

A second questionnaire is then given to the experiment participants to fill out after the experiments are conducted. This questionnaire is based on one that was developed to examine equity and fairness issues involved in water trading by farmers in Australia (Syme and Nancarrow 1992). Individuals are asked to rank on a scale of 1 to 5 the degree to which they agree with various statements related to equity issues involved in the particular PES scheme. They are then asked to what extent they believe various schemes can be rated on a fairness scale and be prompted for further information if they believe certain schemes are unfair.

The next stage of the process is to engage farmers involved in the experiments, resource managers, agricultural extension officers, researchers and other local stakeholders in developing three or four different schemes that will be evaluated using Multi-criteria Evaluation. The criteria to be used will include, for example: the likelihood of rent seeking processes in the scheme, equity criteria (developed using the results of the two surveys), efficiency criteria, transaction costs, the likelihood of moral hazard problems and the likely participation rates for a particular scheme.

The final part of the framework uses the results of the above to implement a shceme as an on-ground trial for a group of farmers in the area. Monitoring and self auditing are then included as important components of the on-ground trial.

9. Discussion

In this chapter we have tried to investigate several issues involved in the assessment of fairness and equity related to market instuments in general and some that are particular to certain types of schemes. For example, these may be related to the perceptions of fairness and equity by the participants, issues of access by participants to the market based scheme as well as the procedures used to estimate and allocate such payments for ecosystem services. Specific to this study is the issue of involvement of stakeholders in developing the scheme and to review and assess issues related to equity and fairness in the scheme in question. Such issues may for example be related to the degree of fairness involved when environmental problems are deemed to be the responsibility of private landholders, the design of this specific scheme (and who participates in this design) and how it should be perceived as being 'fair' by the community, how the process should deal with random events of weather changes (as floods and droughts will have serious impact on outcomes) in a 'fair' way and how payments are deemed fair given that individual farmers start with different levels of environmental problems on their land that may result from past management, hydrogeology and typography.

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