Evolution of Land Conservation Policy.

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The paper looks at the development of conservation policy since the mid-20th Century. It reviews how land conservation policy developed in the UK, and the ethical and policy design issues which emerged as the focus of conservation expanded. It then considers how the lessons learned may be applied to address environmental conservation needs in developing society situations.

The first steps in UK conservation policy entailed legislation to establish public rights over privately owned resources. Other legislation recognized the public interest in the environmental values of the rural environment. The next step was to offer payments to rural land owners and operators not to change use. This assumed that land owners had a right to determine the environmental standard on their land and created a problem of asymmetric information. More positive policies followed to generate additional public goods, raising issues of selection bias, and causing some erosion of property rights as expected standards of environmental management were raised. This led to an extensive literature on policy design to avoid these issues, which will be briefly reviewed.

Voluntary conservation initiatives are increasingly being framed as Payments for Environmental Services (PES). PES is heralded as an efficient means to achieve conservation goals. This paper, illustrated with examples from developing areas, addresses advantages and limitations of PES in terms of land conservation policy and warns about limiting policy to utilizing strict PES frameworks due to the complexity of conservation goals, reallocation of property rights, trade-offs between efficiency and distributional issues, uncertainties surrounding additionality of PES and the valuation of conservation benefits and costs.

Keywords: Agri-environmental policy, principal-agent theory, Payment for Environmental Services.

1. Introduction.

The paper explores the way in which land conservation policy has developed. While starting with development in the UK, the paper then discusses the introduction of Payments for Environmental Services internationally. It recognizes that there are diverse objectives in specific situations (e.g. amenity preservation or creation, wildlife conservation, safeguarding historic sites, protecting commons, particularly forestry commons). It also recognizes that conservation policy develops alongside private initiatives, and from differences in initial rights over land. The options and requirements for public policy vary according to whether land is in public ownership, private ownership or shared ownership. In all cases, policy is concerned to modify use rights and incentives for the land in question.

One of the central issues discussed by the paper is the nature of the interaction of public policy with private and collective initiatives. Is there a danger, in some circumstances that public policy will stifle or crowd out private initiatives or change their nature? This was very much the concern of an earlier paper (Colman, 1994), where it was argued that the many of the best areas with conservation value had been created by private stewardship motivated by altruistic notions of stewardship which could be undermined by the introduction public policy payments to reward conservation. In other, possibly more important, cases the issue is of how public policy might strengthen community action to safeguard valuable habitats and forested areas (Rola and Coxhead, 2005, Ostrom, 2010).

Another set of issues, where incentives are offered to landowners or users to safeguard or create land-use features of social value, is of how to avoid the problems of selection bias and moral hazard of paying individuals who fail to deliver. Recognition of these issues has led to an extensive theoretical literature on improving incentive mechanism design to avoid the pitfalls (e.g. Choe and Fraser, 1999, Moxey et al., 1999, Latacz-Lohmann and Van der Hamsvoort, 1997 and Ozanne et al., 2001, Latacz-Lohmann, 2010).

The theoretical and experimental research on mechanism design has focused on situations where public policy has sought to conserve key features or establish new public goods where clear existing ownership and user rights are established. Issues of conservation policy for land (such as forests) in countries where *de facto* common user rights exist present different problems, but nevertheless create some opportunities for the application of policies which have applied in more developed areas.

2. Development of UK Land Conservation Policy.

2.1. Planning control.

The immediate period following the Second World War saw major developments in UK land conservation; the emergence of what Sheail (2002) refers to as a 'third force', after agriculture and forestry, in rural land management. In Sheail's (p.10) terms "the conscious stewardship of rural landscapes and the coastline for their amenity and wildlife, and the opportunities they afforded for outdoor recreation". The 1947 Town and Country Planning Act set the scene by effectively withdrawing private rights to develop land which have subsequently had to be applied for from a local planning authority when landholders wish to develop land. Since that time, land development in rural areas has been subject to severe restrictions. A few years later, the 1949 National Parks and Access to the Countryside Act was a major development in UK rural land conservation. It provided for the creation of National Parks and a number of other protective land use designations. Bodies were established to identify Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Areas of Outstanding Natural Beauty (AONBs). Each of these land designations has its own system of regulation and management. In the National Parks, the first of which was the Lake District National Park in 1951, somewhat more restrictive planning controls have been imposed over housing and agricultural building development. There the regulations have been extended to stipulating the building materials to be used, as well as location and size of domestic, farm and industrial buildings. Thus the Act created certain public rights over use of privately owned and managed land, in addition to establishing formal rights of access for walkers and horse riders across farmed land.

The conservation regulations were not overly restrictive of farming activities, but rather were designed to preserve the character of specially valued rural areas and landscapes. This was initially seen to be provided by a prosperous agricultural sector that would 'look after' the land, supported by payments guaranteed by the 1947 Agriculture Act. The primary threat was seen as arising from urban development. Essentially regulations aimed to maintain traditional building styles and the general pattern and type of farming. Unlike the National Parks and AONBs, many of the SSSIs were small agricultural sites with special wildlife or geological significance. Prior to 1981, the main form of protection was given the through the planning system, but it became apparent through the 1970s that the intensification of agriculture, stimulated by agricultural policy support, was also damaging the environmental values that the sites were intended to protect. This led to a major debate culminating in the 1981 Wildlife and Countryside Act. Notwithstanding proposals for stricter regulation, the version of the legislation that was eventually passed established what came to be termed the 'voluntary principle' (Lowe et al. 1986). The

legislation stipulated that potentially damaging operations should not be permitted in SSSIs unless notification was given so that negotiations could be undertaken to establish rates of payment for an agreement to manage the sites in the public interest. This created one of the first moral hazard issues in the operation of policy. It presented land owners with an opportunity to threaten change of use and demand payment not to do so; the hazard being the difficulty of knowing with certainty that the land owner would actually go ahead and damage the site if no payment could be agreed to prevent the change of use. This is the typical asymmetric information issue in conservation policy, where the policy maker (principal) cannot know the intention and actions of the farmer (agent).

2.2. Incentives for conservation management.

It had not been the intention of the legislation governing SSSIs that payments should be made for certain types of land management. Rather, it was the inability to impose effective penalties on those damaging sites by change of use that led to payments being made in a number of cases. The voluntary principle for SSSISs established a reference level of property rights (Hodge, 1989, OECD, 1999), that sets a minimum standard of land conservation that is a duty on landowners. Actions causing the standard to fall below this level are treated as pollution. However, the standard demanded by government was above this level and so was characterized in terms of the provision of public goods, for which positive incentives were created. Over this period, the pressure for agricultural intensification grew during the 1960s and sharply increased when the UK joined the EU in 1973 and agriculture benefited from the higher prices of the Common Agricultural Policy. A particular, high-profile case arose in the case of the Halvergate Marshes in Norfolk. This was (and because of policy intervention, still is) a large flat area of windswept open grazing land, with no buildings and with no fences or hedges to impede the view; drainage ditches divide the grazing areas. In 1983/4 a number of farmers wanted to plough up areas of the Marshes to grow cereals leading to an at times violent campaign to prevent what many saw as ruination of a unique landscape. It became clear that the site-based, voluntary approach of SSSIs would be too bureaucratic and excessively costly in order to protect the environmental values of the landscape. The policy response by 1987 was for Government to establish an experimental scheme under which fixed rate payments were offered to landowners to maintain the land for summer grazing only. In the event no land was ploughed. A few very small landowners did not apply for the payment, but the overwhelming majority accepted the payment despite no doubt many having no intention of changing the use of the land. Clearly the politics of conserving the marshes overwhelmed the normally cautious approach to making grants, and it can be argued that the payment scheme was overly costly (Colman, 1989).

The case of the Halvergate Marshes is of particular importance, because the scheme became a model for Environmentally Sensitive Areas (ESA) in the EU, a designation established under EC

Structures Regulation (797/85). In the UK the area designated as ESA grew to 15% of its total agricultural area by 1994, and ESAs have been established throughout the EU. This basic approach has subsequently been developed and extended through other agri-environment schemes, with some variations across the different countries within the United Kingdom. In addition to the ESAs the Countryside Stewardship Scheme (CSS) was introduced in 1991. This was not limited to designated areas and was available to farmers in all locations. The scheme has consistently emphasised the provision of new environmental values over the protection of existing ones and was also discretionary in that only applications judged to be offering the greatest environmental benefits were accepted into the scheme. Since 2004, both ESAs and CSS were closed to new entrants and have been replaced by Environmental Stewardship. This comprises two main components, Entry Level Stewardship and Higher Level Stewardship.

The development of agri-environment mechanisms required that more sophisticated processes were required to devising payment schemes, if only because budgetary pressures meant that it was unacceptable to adopt a general model whereby grants were offered on a large scale to farmers for conservation which required no changes of action. There was also a shift in objectives from the essentially negative approach of preventing intensification in the early stages of the scheme to a much more positive orientation towards the creation of new environmental features later on. This is where the literature on mechanism design comes into play in an attempt to ensure payment only where additional public benefit is derived from the payments. From a public policy perspective, what are required are payment schemes which specifically target those who would definitely take actions deemed to damage valued sites and, in the opposite direction, to target those who generate additional public goods associated with land use without over-compensating them for doing so.

3. Land Ownership and Conservation.

Land conservation policy is directed at diverse objectives. A very important one is to conserve areas in their existing state and prevent further erosion of the land's stock of socially valued attributes, such as biodiversity, amenity or visual beauty and rarity in one or more of these respects. Policy may also aim to enhance the stock of attributes. That particular areas of land are seen as ripe for conservation policy generally reflects to a large extent the management of the area up to the point where policy is initiated. The land may have been privately owned, group owned or owned by a public body and managed in ways which left the land generating significant public goods or the capacity to do so. Alternatively, but mainly in developing countries, areas may still contain unexploited patches which are coming under pressure from unmanaged settlement. We may distinguish here between the conservation of cultural landscapes, essentially in developed 'old world' countries (Hodge, 2000) where valued aspects of the environment are

the products of particular traditional agricultural systems and ‘new’ or ‘resettled’ countries where pre-existing land uses are more highly valued for their ‘natural’ environmental qualities.

The importance of prior sympathetic land management to establishing the conditions for successful conservation policy is well exemplified by the structure of ownership within UK ESAs prior to their creation. Charitable bodies and government agencies had managed land in ways which created a core of land with high conservation value. Two examples relating to ESAs in England illustrate this well.

Table 1 here.

In the case of the North Peak ESA (Table 1) 56.5% of the area under ESA management contract was owned by two bodies; the National Trust which is substantially financed by its members and by admissions charges to conserve historic houses, gardens and land areas and the water companies which restrict intensive farming in key upland watersheds. The management objectives and style of these organisations as well those of the public authorities managing small areas of land and grouse moor management of private landlords combined to create a large contiguous area of managed moorland worthy of conservation.

Table 2 here.

The Brecklands ESA comprises three landscape types of conservation interest. The forestry element was almost entirely managed by the Forestry Commission with 61.6% of the area. Approximately 35% of the ESA (largely heathland, but with some wetland) was managed by the Ministry of Defence and other public bodies and only 4.6% in private or charity ownership. Almost 80% of the area designated as Sites of Special Scientific Interest, which lead to justification for ESA status, was owned or leased by the public bodies.

While the ownership of these two example ESAs at the beginning of the 1990s is somewhat different, and is reflected in other ESAs, it illustrates the importance of public and voluntary sector ownership in having created conditions under which policies for conserving larger special landscape types were subsequently developed. It also highlights interesting policy issues with the initial schemes which offered fixed per hectare payments for compliance with a defined set of management criteria. Many of the owners would probably have continued managing in the way which led to conservation status without receiving the payments they gladly accepted, and secondly the management prescriptions were not a guarantee that desired outcomes would be obtained. These issues are returned to below.

While the ESAs were rather special cases, insofar as the objective was to safeguard quite large areas of special environmental value, the policy design issues they faced were common to the broader set of conservation policies in OECD countries. These are to provide incentives to landowners to produce public goods through their land management; these may involve maintaining existing public goods or to produce additional public goods such as greater biodiversity, wildlife corridors, water-quality protection,

etc… In the more general developed country policy setting, the issues centre around providing incentives to largely private landowners to efficiently produce public goods. These are the issues addressed by the mechanism design literature.

4. Issues in and outcomes of conservation mechanism design.

Research on this issue has focused on two key issues relating to asymmetric information between the conservation authority (principal) and the land operator (agent) executing the conservation activity. Farmers have an informational advantage over the principal which can take two forms, adverse selection and moral hazard.

Adverse selection exists in framing the initial contract, or indeed deciding whether a contract is justified at all, because the principal is unable to quantify accurately the cost incurred or benefits created by the agent. Policy design issues in adverse selection have been addressed *inter alia* by Moxey et al. (1999) and Ozanne and White (2007). One way of addressing the issue in certain circumstances is to auction contracts for conservation (Latacz-Lohmann and Van der Hamsvoort, 1997). This is an obvious approach where policy aims to create new public goods by minimising the public cost of achieving a defined level of additional output or maximising return to a fixed budget; it enables priority in awarding contracts to be given to those offering the lowest cost to produce additional units of the public good. Auctions would be less satisfactory in cases such as the Halvergate Marshes where the priority was maximum protection and ensuring maximum participation. Situations such as that might call for a variety of alternative contracts including the ultimate mechanism of compulsory powers by the conservation authority to purchase the land.

Moral hazard occurs *ex post* because the conservation authority cannot perfectly and costlessly verify that the agent is correctly executing the contract. There is a clear trade-off between increasing investment by the authority in monitoring and achieving higher levels of compliance by landowners. Typically monitoring occurs on a sample basis, with a proportion of farmers randomly sampled each year. The higher the penalties and the greater the risk aversion by farmers the lower the monitoring investment needed by the principal (Ozanne et al. (2001)). Typically there will be a degree of non-compliance and hence ‘imperfect monitoring’ which is accepted by the authority. It becomes an inevitable political issue as to how much should be invested in monitoring to reduce the moral hazard of violating contract conditions and paying excess rewards to land operators.

Where the provision of land conservation public goods is not highly site specific but could be provided if only some landowners contract into the policy auctions, an obvious option is for landowners to tender to provide the public goods in an auction of conservation contracts. It is attractive where there is

a fixed budget for the scheme, and ensures that those willing to offer a lower price to supply the public goods can be selected. Such reverse tendering approaches achieve a high implicit differentiation of payments which favour efficiency.

There are a number of ways in which tendering can be operated. All successful tenderers may be paid the contract price of the last, highest price bidder in a sealed auction. This creates pressure for those tendering not to try and overstate the costs of supplying the public goods, as they do not know the bids of others. Alternatively tenders can be made on the mixed basis of a fixed policy price element plus a tender to supply additional effort (i.e. to supply additional outputs at a tendered cost). Design of such schemes has been explored by Laffont and Tirole (1985) and Latacz-Lohman (2010). Where tendering effort is part of the scheme one issue is how to get the agents to provide the effort needed to deliver the required outputs (Laffont and Martimort, 2002).

Many conservation schemes have multiple public goods, in which case it makes sense to provide contracts in the form of a menu of either outputs or inputs, so that landowners can select a number of elements to tender for which is appropriate to their specific land attributes and labour supply. As the Latacz-Lohman and Schilizzi's extensive (2005) survey of the theory and practice of auctioning conservation contracts show there is a large range of factors and alternative features of designing a successful conservation contract auction, and a 'learning by doing' process is occurring as more schemes are implements. Table 3 highlight developed from their study highlights actual schemes, with one addition.

Table 3 here.

With the exception of the Conservation Reserve Program (CRP) in the USA, which has had a long history of development, most tendering programmes are relatively small in budgetary terms. And most agri-environment programmes still operate with menus of fixed payments to provide incentives. The tenders are for limited periods, even though the conservation objectives are long-term. That leaves opportunities for the tender design to be modified as additional experience and theory lead to more efficient design. Because most of the schemes are small, it has been possible to apply judgemental approaches rather than rigid *a priori* criteria in selecting successful bids. Some of the schemes pay all successful bidders at the cut-off rate of the highest successful bid, others pay each successful bidder the amount he/she has tendered.

While principal-agent theory strives through both theoretical and experimental work to increase the efficiency of auctions to deliver a range of environmental benefits from changed land management the fact remains that most schemes operate with predetermined fixed payments which agents apply for to either commit to specified land management inputs or, more problematically, certain outputs. The increasing number of 'conservation' projects in developing countries outlined in the following section

underlines these points, and introduces a new over-arching terminology, Payment for Environmental Services.

5. Payment for environmental services (PES), principal and practice in developing countries.

There is an academic and political thrust that is cementing a potent metaphor of nature as a fixed stock that can sustain a limited flow of ecosystem services. Recent interdisciplinary efforts by conservation biologists and environmental economists (see e.g., Daily 1997; Daily et al. 2000; Fisher et al. 2008; Balmford et al. 2008) attest to the potency of this metaphor as a way to help describe our relation with nature (Gomez-Baggthun, 2010). The Millennium Assessment (2003) catapulted global research towards understanding how ecosystems deliver flows of services for human well-being. While some see this as pragmatic view to mobilise polity towards conservation, others criticise due to its overriding effect of potentially over-simplifying the way scholars and decision makers understand nature and its relation to humans. The ecosystem service framework implicitly calls for optimizing the use of ecosystem services, particularly with emphasis in poor countries. As Norgaard (2010) puts it, the dominance of this emergent paradigm may end up blinding us to the ecological, economic, and political complexities of the challenges faced by conservation policies. Nevertheless, the concept of ecosystem services has become a powerful academic paradigm (Fisher et al., 2009) for thinking about development and environment and for designing environmental management programs (UNEP, 2008; TEEB, 2008; World Bank, 2009).

PES is perhaps the most direct form of providing conservation incentives to local land users (Ferraro, 2001; Ferraro and Kiss, 2002; Wunder, 2005, 2006, 2007). For more than a decade a number PES programs have been established in developing countries that share similar institutional frameworks (Wunder, 2006; Engel et al., 2008). The most common PES schemes include local initiatives for conserving watershed services and regional and global markets for biodiversity and carbon sequestration services. Other PES schemes are associated with conserving landscape beauty or 'bundled services' which become a commodity subject to trade (Landell-Mills and Porras, 2002). The impetus of PES derives from theoretical arguments that these schemes are more cost-effective than command and control projects (Ferraro and Simpson 2002). However, they remain poorly tested in developing countries, although there are a few in Latin America, and multi-country initiatives by ICRAF in Asia and Africa, respectively.

Some well-known initiatives include large scale government-financed PES programs in Costa Rica and Mexico in which fiscal instruments, mainly taxes, and donors' funds are used to pay for land conservation. For instance, the Costa Rican programme, *Pago por Servicios Ambientales* (PSA) was

originally implemented using revenues from fuel taxes and is currently co-financed through external funds from World Bank loans and GEF grants (Pagiola 2008). Another well known state-funded program is Mexico's payments for hydrological environmental services program (Muñoz-Piña et al., 2008). There is also a growing number of user-financed PES programs. Most of them include payments for watershed services between downstream users and upstream forest owners, such as those in Ecuador (Wunder and Albán, 2008), Bolivia (Asquith et al., 2008), and meso-America (Kosoy et al., 2007). Other contracts are being brokered between organisations and private landowners, communities or governments (Milne and Niesten, 2009). Usually, besides the land area under the programme, the main difference between government financed programs and user-financed programs is that the latter tend to focus on just a single ES (usually either a water-related service or carbon sequestration) (Wunder et al., 2008).

generally, user-financed programs show closer adherence to Wunder's (2005) definition of PES, being more targeted in their effects, compared to the larger government-financed PES that often have broader and less well-defined objectives. Indeed, the latter can sometimes be hard to distinguish from more traditional subsidy programs.

Table 4 here.

Table 4 presents details of a number of PES projects from a variety of developing countries. All of them use fixed payment rather than tendered prices, reflecting the observation that this is the norm in developed countries also. A highlighted issue is the weakness or absence of effective monitoring as to whether the ES services paid for are actually delivered. Compared to command-and-control and other disincentive-based conservation policies, PES is an innovative approach based on "a voluntary transaction where a well-defined ecosystem service is bought by a buyer from a service provider if and only if the provider secures its provision (conditionality)". (Engel et al., 2008; 664). Conservation PES schemes are thus associated with voluntariness, i.e., involved parties must have the possibility to terminate the contractual relationship, and with a conditionality feature, i.e., a monitoring system must accompany the intervention, in order to ensure that the provision of services is taking place. It implies that while PES is at least welfare-neutral for those who participate in a voluntary scheme it offers financial advantages as conditionality implies that some of the enforcement costs may be saved when non-compliance can be sanctioned by reducing or discontinuing payments (Wunder, 2005; Borner et al, 2010).

An overriding institutional precondition is secure property rights to the land providing the ecosystem service in question so that local land users can guarantee delivery of the service by being able to exclude others from modifying service quantity and quality (Borner, 2010, Vatn, 2010). This is an overriding issue particularly in developing countries where institutional preconditions are usually weak. As with other voluntary conservation schemes PES schemes create a de facto (re)-definition of property rights insofar as service providers acquire contract obligations to maintain or undertake specific land use

activities and in some cases buyers also gain the right to trade the service units for their own commercial purposes (e.g. carbon sequestration credits) (Muradian et al., 2010).

The first generation of PES design and implementation in developing countries, backed up by inter-governmental organisations such as the World Bank, was solely concerned with the efficiency of PES, separating such schemes from rural development initiatives (Pagiola et al., 2005, 239). These first-generation PES programmes received criticisms due to their potential negative effects in terms of maintaining asymmetric power distribution, and generating changes in the behaviour of participants towards a vision linking conservation and rent seeking (e.g. Kosoy and Corbera, 2010). Further, due to the limited acceptability of the approach, given its potential negative distributional impacts, a new generation of PES-labelled scheme design is emerging (Wunder, 2008). It is envisaged that successful implementation of PES schemes for conservation will be those that are designed to deliver a win-win strategies for conservation and poverty reduction (Muradian et al., 2010; Pascual et al., 2010).

However, since it is likely that the overriding efficiency criterion in PES design will imply targeting service providers based primarily on competitive criteria, such schemes will continue to prioritize those land users with secure property rights with the most favourable service additionality (or effort) and willingness to accept compensation ratio. This has important implications on the distributional impact of conservation PES schemes. In fact, it is possible that "since the poor sell cheap" (Martinez Alier, 2004) the poor would be a priority target group. In this case, the commoditisation of services can affect such providers in a way that can have further implications for the management of the resources, for instance if this undermines informal institutions such as collective action (Clements et al. 2010). In addition generalisation of PES in developing countries may pose the 'burden of environmental protection' disproportionally on the poor. Further, as Corbera et al. (2007) point out an excessive focus on economic efficiency can make PES 'blunt instruments with respect to issues such as procedural fairness and equitable distribution of project outcomes' (Corbera et al. (2007): 608).

Following from Wunder et al. (2008), design issues with PES schemes may be characterised as follows:

- Conditionality: payments are at least nominally conditional. In reality, conditionality is generally lower in government financed programs than in user-financed programs, but variable between programs. When programs require high set up investment cost for the land owner, payments must often be front-loaded to help farmers finance the required investment, which reduces conditionality (Wunder, 2008). Compliance of contract requires monitoring.
- Monitoring: Necessary but not sufficient for compliance. Usually done by field inspection and remote sensing.

- Sanctioning: Usually the primary sanction for non-compliance is the loss of future payments, either temporarily or permanently, and sometimes repayment of previous payments. However, some programs do not even employ the simple sanction of withholding future payments due to political pressure.
- Additionality: PES program will only result in an increase in the provision of ES if it induces a real change in the targeted land-use actions. Measuring additionality is difficult, as it requires comparing the observed 'with-intervention' behavior with an un-observed 'business-as-usual' counterfactual scenario.
- Permanenence: That a PES program is generating ES at a given point in time does not guarantee it will do so over the long term. While a PES program is in effect, continued ES provision is likely to depend primarily on continued financing of the program. User financed programs are likely to be more permanent if the link between conservation and ES provision is scientifically proven while state driven PES programs depend on budgetary issues.
- Leakage/spillage. Successful ES generation may be undermined to the extent that environmentally-damaging activities are merely displaced. Little is known about leakage, because it is hard to calculate reliably.
- Perverse incentives. PES programs can create perverse incentives, specially if additionality is stressed. The classic example being that offering payments for reforestation could induce deforestation. If payments are offered only when there are clear threats of degradation, then potential applicants may be induced to create such threats. Contract design becomes of paramount importance to reduce perverse inentives. PES with well designed contracts can become an option value (Wunder et al, 2008).
- Payment differentiation: Government financed programs often pay uniform rates countrywide often due to equity concerns and administrative ease (Wunder et al 2008). Local user financed programs are prone to more differentiation. Reverse tendering may increase differentiation.

6.Concluding Observations.

In several ways there has been evolution in Land Conservation Policy. The command and control approach embodied in the UK's 1949 legislation (and in USA National Park policy) has been superseded by policies to attract volunteer agents to manage land to protect and produce a variety of additional public environmental goods. Under increasing pressure to exploit land and encroach on forest and wilderness areas, the number of schemes and their geographic spread has steadily increased. Not all projects have

required government inspiration. Private commercial and charitable organisations have voluntarily invested in conservation despite concerns that policy incentive prices would drive out such initiatives; it cannot be judged whether the growth of official policies has diminished such initiatives.

Two new literatures have developed to try and improve the efficiency of conservation policies, principal-agent mechanism design and the PES literature which embraces the first. Both of these highlight the problems of designing efficient policies. Many of the problems are clear enough:

- The asymmetric information issue whereby the policy authority (principal) is not fully aware of the agents' costs and ability/willingness to deliver can be partially addressed through sophisticated schemes to auction payments to produce the desired public goods.
- A choice has to be made whether to deliver schemes on the basis of offers to commit quantities of inputs or commitment to quantities of outputs, delivery of which are inherently uncertain because of natural factors.
- Whether schemes operate on inputs or outputs, the issue of compliance is a key one, and the costs of monitoring is a major issue. Sophisticated mechanism design may raise administrative costs at the front end, while monitoring costs come later and are typically high is a serious attempt is made to enforce penalties for non-compliance.
- Only if monitoring is undertaken seriously can it become clear that agri-environmental payments have not become a new form of general subsidy to land operators.
- The design of auctions and tendering as ways of increasing efficient policy delivery has been a logical process of development where title to land is well established, with theory and practice both leading to better design.
- Nevertheless most official schemes rely on fixed schedules of payments, rather than tenders, and here efficiency has been improved by recognising more sharply the diversity of objectives in many projects and providing menus of options at different prices.

However, the extent to which these lessons from economic analysis have been applied in practice is less clear. Policy makers will always be more concerned with distributional issues than is typically recognised in economic analysis. It may be wondered whether agri-environmental policy would have developed at anything like the scales in which it has, especially in Europe, if there had not been pressures to reduce the substantial level of government expenditure on agricultural support coupled with pressures to continue to support farm incomes. Agri-environment schemes offer another route to support farm incomes. In the case of PES, the coupling of the policy with objectives to address poverty will also influence policy design and implementation. Further, changing social judgements about rights and

responsibilities will also shift approaches over time. The voluntary principle towards the management of SSSIs has been substantially replaced by regulations preventing certain actions by land managers without compensation under the 2000 Countryside and Rights of Way Act. The Entry Level Scheme allows all farmers a very wide choice of actions for a set payment, exacerbating the problem of adverse selection. But one argument made for this is that farmers protecting the environment deserve payment whether or not they threaten to cause damage. Thus the ethical argument might be seen as overriding the efficiency argument. As in all areas, policy implementation responds to a variety of factors and influences. But the economic analysis has made an impact and widens the options for finding trade-offs amongst the many policy variables. We can expect to see this process continue in the further development of PES as a major element of land conservation policy.

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Table 1. Land ownership under management agreement in the North Peak ESA 1991.

Owning organisation.	Area (ha.)
National Trust.	14,325 *(36.6%)*
Water companies.	7,414 *(19.9%)*
Local Authorities.	706 *(1.8%)*
Peak Park Authority.	520 *(1.3%)*
Total	22,965 *(58.7%)*
Private landlords	16,165 *(41.3%)*
Total area in ESA management	**39,130**

Source: (Colman et al. (1993))

Table 2. Land ownership under management agreement in the Brecklands ESA 1991

Owning organisation.	Area (ha.)
Forestry Commission	20,000 (61.6%)
Ministry of Defence	11,000 (33.8%)
English Nature	438 (1.3%)
County Wildlife Trusts	607 (1.9%)
Local Authorities	246(0.8%)
Water Companies	125 (0.4%)
English Nature	65 (0.2%)
National Trust.	7 (-)
Total area in ESA management	**32,488**

Source: (Colman et al. (1993))

Table 3. Details of a selection of Auction Projects.

Program	Objectives	Design Features
Auction Schemes		
Conservation Reserve Program (USA). Initiated 1985.	• Control land erosion. • Wildlife enhancement. • Water quality control. • Air quality improvement.	• Budget limited. • Tendering by sealed bid. • 10-15 year contracts. • Repeated rounds. • Regional differences in priorities. • Assessed using Environmental Benefits Index and cost per unit of benefit.
Bush Tender (AUS). Started 2001.	• Increase biodiversity. • Improved bush management.	• Budget limited. • Tendering by sealed bid. • 6 year contracts. • Assessed using Biodiversity Benefits Index and cost per unit of benefit. • Payment at bid price for those successful.
Auction for Landscape Recovery. (AUS). Started 2004	• Increase biodiversity. • Control salinity in soil and groundwater.	• Budget limited. • Tendering by sealed bid.. • Expert group assessed benefits on basis of "biodiversity complementarity".
EcoTender. (AUS). 2003 and 2005.	• Increase biodiversity. • Control salinity in soil. • Quality of stream water	• Budget limited. • Tendering by sealed bid. • 5 year contracts. • Assessed using Environmental Benefits Index and cost per unit of benefit.
Grassland Conservation Pilot Tender (Germany) 2003-2005	• Maintain low –intensity grazing. • Floral biodiversity.	• Budget limited. • Initially fixed-price offer –failed. • Revised scheme tenders for payment above fixed price. • Two-stage tendering by sealed bid. Some bidders eliminated in stage 1 by tendering at higher price than a hidden maximum. Remainder of bidders into a second round with a lower hidden maximum. • 1 year contracts – because was a pilot to test the mechanism design. • Payment at bid price for those successful.
Payment for Agrobiodiversity Conservation Services (PACS) (Bolivia, Peru) 2009-11	• Conserve landraces by farmers at the community level • Quinua varieties under risk due to market pressure	• Budget limited. • Tendering by sealed bid at community level across two agroecological zones in the Andes. • Expert group assessed benefits on basis of effectiveness of conservation through a "safe minimum standard" • 1 year contracts – because was a pilot to test the mechanism design.

TABLE 4. Characteristics of PES Schemes in developing countries.

Programme Name (country)	Household Benefit per year US$*	Targeting	Conditionalities	Monitoring
PROFAFOR (Ecuador)	252	- Geographic	-Active plantation management, including fire control and surveillance, and keeping out livestock.	-All contracted areas are visited at least once annually -Certification companies scrutinize the annual carbon uptake. -Members would legally have to reimburse the payments received if they do not fulfil the terms.
Silvopastoral Project (Colombia)	607	- Geographic - Self selection of individuals with minimal farm and herd size criteria	-Maintain or switch to land uses that provide environmental services. -Output based system. Payments are by increasing an Environmental Service index.	-Annual payments are made after land use changes have been monitored in the field. -Switch to land uses that reduce service provision would incur payment reduction
Bolsa Floresta (Brasil)	517	- Geographic -Self selection	-Commitment to zero deforestation, -Participation in dwellers' associations.	-Annual monitoring of by satellite images and analysed by partnering institutions -yellow and red cards * Families who have deforested a crop area up to 50% larger than the crop area in 2007 will receive a 'yellow card'. Those who continue deforestation in the following year will receive a 'red card' and the payment will be suspended. If the new crop area extended more than 50% (compared to the 2007 crop area) a red card will be given immediately and payments cease. Families given either two consecutive yellow cards or three in alternate years will be excluded from the programme.

PSA-CABSA Niños Heroes (Mexico)	545	- Geographic -Self selection.	- Not be receiving support from any other PES programme - Make projects comply with rules established for small-scale afforestation and reforestation projects under the Kyoto Protocol's CDM - A forest management plan, and show that PES activities were additional.	-A monitoring process is considered in the design but rarely done. - Participants might return payments in case of no compliance. - Participants were entitled to a deferral in the application of sanctions if they showed that failure to comply was due to an uncontrollable reason. - No sanctions have to date been imposed.
Silvopastoral Project (Nicaragua)	592	- Geographic - Self selection of individuals with minimal farm and herd size criteria	-Maintain or switch to land uses that provide environmental services. -Output based system. Payments are by increasing an Environmental Service index.	-Annual payments are made after land use changes have been monitored in the field. -Switch to land uses that reduce service provision would incur payment reduction.
Biodiversity Conservation Payments (Cambodia)	120-160	- Geographic -Self selection	-Stop hunting key species, - Abide a land use plan.	-Local monitoring by villagers -Certified by external agency -Output based, no service no payment -Self enforcement within the community.
Tlekung and Cidanau Watershed payments (Indonesia)	42-132	Geographic based on contribution to sedimentation	-Tree planting at a density of 500/ha in identified critical land under their individual ownership -Survival of seedlings and tree maintenance -Put in place and maintain high quality terracing.	-A team representing the involved parties verify planting and maintenance -An external agency facilitate the contracts, payments and compliance -output based: The payments are distributed after verify the target was fulfilled.
Bakun Watershed Protection (Philippines)	31	Geographic	-Adopt land management plan and tree planting but no specific target.	-Private agreement between the involved parts for monitoring purposes.
Wildlife Conservation Lease Programme (Kenya)	306	Geographic, Self selection	-Retain ownership land. -Leave land open, uncultivated and unsubdivided.	-Violation of conditions involves termination of payments. -Payments might be restored if fencing is removed.

			-Graze sustainably. -Share both pasture and water among livestock and wildlife. -Allow free movement of livestock and wildlife.	-Independent monitoring and evaluation of programme implementation, lease. compliance and impacts, with stakeholder participation.
Nhambita Community Carbon (Mozambique)	34	- Geographic after evaluation of conditions for carbon sequestration	-Involvement in forest and fire management, forest rehabilitation or agroforestry, -Restrict timber extraction to the amounts defined by a resource inventory	-Monitoring of compliance is carried out by community technicians with support from the carbon broker technical team - International agencies audit the carbon -Community/ broker disputes are resolved by consultation and Individual/broker disputes are resolved dependant on the infraction based on guidelines defined the contracts.

Source: (Rodriguez, Pascual et al. 2010).