



## METHODS

## Broadening the picture: Negotiating payment schemes for water-related environmental services in the Netherlands

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## ARTICLE INFO

## Article history:

Received 12 September 2008

Received revised form 20 February 2009

Accepted 9 June 2009

Available online 7 July 2009

## Keywords:

Payments for environmental services (PES)

Water management

Negotiation analysis

The Netherlands

## ABSTRACT

This paper explores how the development of payment schemes for water-related environmental services can be understood and supported. Currently, the development of such payment schemes is perceived mainly through theoretical lenses offered by economists and hydrologists. Notwithstanding the usefulness and appropriateness of these theoretical lenses, they have difficulties to accommodate certain aspects of the development of payment schemes for water-related environmental services. Specifically, the discussion of negotiation aspects remains relatively isolated and superficial, even though it is generally acknowledged that the development of payment schemes is often significantly influenced by political negotiations. This paper addresses this limitation. It shows how the main elements of negotiation analysis can provide a theoretical underpinning for important drivers behind the development of specific payment schemes, which are beyond the scope of hydrological or economic rationality. Four cases of water-related payment schemes in the Netherlands are studied, employing one of the key insights offered by negotiation analysis: the importance of the underlying interests and values of the parties involved. The findings of these four cases show the potential of negotiation analysis as a useful complement for understanding and supporting the development of payment schemes for environmental services.

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## 1. Introduction

One of the remaining challenges in modern water management is the adequate translation of water flows into financial flows. Payments for environmental services (PES) offer a promising mechanism in relation to this challenge. PES schemes provide a market-based mechanism whereby beneficiaries of water-related environmental services pay service providers to promote conservation activities, in this way expressing non-market values in financial terms (Pagiola et al., 2002; Engel et al., 2008). In relation to water, such environmental services include maintenance of base flows, reduction of peak flows, erosion control and water quality protection (e.g. Kiersch et al., 2005; Smith et al., 2006).

Although the relative simplicity of the concept and its popularity may suggest otherwise, the development of PES schemes is not without difficulties. Especially for water-related schemes, the scientific evidence to support the assessment and valuation of upstream–downstream linkages is often weak (Wunder et al., 2008, p. 846). This lack of a scientific and economic rationale, coupled with a lack of monitoring, is one of the main constraining factors when it comes to evaluating the performance of existing systems (Pagiola, 2002, p. 53; Rojas and Aylward, 2003, p. 92; Wunder et al., 2008, p. 846) as well as

a for the development of new schemes (Johnson et al., 2001, p. 11; Landell-Mills and Porras, 2002, pp. 148–149). Logically, it would affect the willingness of service buyers to pay for services they may not receive and/or the willingness of service providers to accept payment levels that are much lower than the actual opportunity costs associated with a certain activity.

However, the lack of scientific knowledge and sound economic valuation has not prevented the development of PES schemes in the past (see e.g. Rojas and Aylward, 2003; Kosoy et al., 2007; Wunder et al., 2008). It has also not prevented these schemes from continuing to exist, and it is not preventing new PES schemes from being developed elsewhere. Apparently, economics and hydrology are not the only perspectives needed to explain the development of these market-based mechanisms.

An interesting question then is what additional perspectives are helpful to explain and understand the development of water-related PES schemes. This question is addressed in this paper, starting with a review of current literature on the development of water-related payment schemes. This review suggests that negotiation analysis could offer a useful additional lens to understand PES development. Therefore, key elements from negotiation analysis are discussed and linked to aspects of PES development that are difficult to understand within existing frameworks based on hydrology and economics. The applicability and usefulness of a negotiation analysis perspective is further explored for four cases of water-related PES schemes in the Netherlands.

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## 2. Current literature on the development of for water-related payment schemes

### 2.1. Hydrology, economics, and institutions

The interest in water-related payment schemes for environmental services has resulted in numerous reviews, lessons and guidelines related to PES development and implementation (Johnson et al., 2001; Landell-Mills and Porras, 2002; Pagiola, 2002; Echavarría et al., 2004; FAO, 2004; Tognetti et al., 2004; Smith et al., 2006; Engel et al., 2008). In these reviews and guidelines, one can recognize three dimensions that are considered important in developing PES schemes: hydrology, economics and institutions.

Hydrology provides the scientific basis for a watershed payment scheme, through the establishment of cause–effect models of hydrological processes in watersheds that link land use to the provision of watershed services (e.g. Johnson et al., 2001; Echavarría et al., 2004; FAO, 2004; Tognetti et al., 2004; Smith et al., 2006). Economic principles and valuation methods then help to translate this scientific basis into an economic valuation of environmental services, which in turn provides an indication of appropriate payment levels. Furthermore, economic theory identifies important issues that should receive attention in the development of payment schemes, such as the need to review if PES practices are profitable for both supply and demand sides in the market, as well as ideas on how to stimulate demand (e.g. Pagiola, 2002; Echavarría et al., 2004; FAO, 2004; Smith et al., 2006).

This economic dimension can be fruitfully combined with an institutional dimension, for instance through new institutional economics (Landell-Mills and Porras, 2002), to also include attention for transaction costs, distribution of impacts, property rights, etc. (Johnson et al., 2001; Landell-Mills and Porras, 2002; Pagiola, 2002; Echavarría et al., 2004; FAO, 2004). The institutional dimension further covers legal frameworks, contract forms and the administrative and organizational arrangements for the implementation of PES schemes (Echavarría et al., 2004; Smith et al., 2006). However, there is a consensus that addressing these more specific issues can only be meaningfully done once hydrological science and economic valuation have provided a solid basis (Johnson et al., 2001; Landell-Mills and Porras, 2002; FAO, 2004; Smith et al., 2006).

### 2.2. Negotiations between actors in PES development

Despite the emphasis placed on the scientific and economic basis for PES in the prevailing reviews, many of the aforementioned authors recognize that the evolution of PES schemes in practice is more influenced by politics than science, through a process of negotiations among multiple actors (Johnson et al., 2001; Pagiola, 2002; Echavarría et al., 2004). A few recent publications put these negotiations more central in the analyses of PES development.

A report by Hope et al. (2007) assigns a prominent role to the negotiation dimension throughout the process of PES development, combining field experiences from Costa Rica and India with insights from different bodies of literature. Similarly, experiences reported by Van Noordwijk et al. (2008) on rewards for environmental services in Indonesia, the Philippines and Nepal, also stresses the importance of negotiations in setting up PES schemes. Both reports stress, inter alia, the need to identify shared interests, values and associated incentives that work both for people and the environment, as well as the importance of institution-building. Furthermore, both reports propose some rapid assessment steps that should be part of a pre-negotiation phase. This is in line with other papers that propose a more pragmatic use of the hydrological and economic analyses to get PES initiatives started and to limit transaction costs (e.g. Tognetti et al., 2004; Smith et al., 2006; Asquith and Wunder, 2008; Reid and Boyd, 2008).

A paper by Kosoy et al. (2008) takes a closer look at the motivations of local farmers in Mexico to participate as service providers in PES

programmes. Drivers of PES participation on different levels are distinguished, from the farmer to the community, and key factors on these levels are identified such as simple rules, effective communication and involvement of actors in the rule-design process. However, all three papers make only limited reference to the body of literature that is generally known as negotiation analysis, which we believe has the potential to make an important contribution to the understanding and support of PES development.

## 3. Broadening the picture: Negotiation analysis

### 3.1. Negotiation analysis

Negotiation analysis as it is discussed here stems from the Harvard Negotiation Project that was initiated in the early nineteen-eighties and that produced what is probably the most cited book on negotiations: “Getting to Yes” (Fisher et al., 1991). Negotiation analysis is rooted in game theory, decision analysis, and behavioral decision theory. Given the complexity of negotiation processes, and the many disciplines that can shed light on their progression, research so far has not been able to produce a single analysis framework offering clear prescriptions (Raiffa et al., 2002, p. 85). However, there is one concept that provides the nucleus of the literature on negotiation analysis: the concept of *value*.

### 3.2. The role of values in negotiation analysis and PES development

Negotiation analysts consider negotiations to be essentially processes of creating, claiming and sustaining value (Sebenius, 1992; Allred, 2000; Raiffa et al., 2002). The importance of the underlying values of parties is underlined by well-known approaches for negotiation, such as principled negotiation (Fisher et al., 1991) and integrative bargaining (e.g. Pruitt, 1981). The key insight offered by these approaches is to focus on the underlying interests and values of the negotiating parties, rather than the specific outcomes or measures preferred by different parties.

The importance of creating and claiming values is recognized in the mainstream literature on PES development, for instance in the ‘logic of payments for environmental services’ as described by Engel et al. (2008). Conservation activities by (upstream) service providers create value for (downstream) users of these services. By sharing some of this value with the upstream communities in the form of payments, the conservation activities become interesting for both parties. The created value, when translated in monetary units, provides the boundaries between the minimum and maximum levels of payments. Within these boundaries, a specific payment level is negotiated, in a process of claiming values by service buyers and service providers.

Negotiation analysis offers some further insights on the role of values, which help to explain why parties may accept a payment below or above the levels that would be economically rational. One of these insights is that the values held by an actor in a negotiation can be classified using two basic types of values: values related to the issue under negotiation, and values related to the relations with the other parties (Fisher et al., 1991). Thus, parties in a PES scheme will value not only the issue under negotiation (environmental service provision), but also the maintenance or improvement of relations with other actors in the watershed. Service buyers may not only be interested in the environmental services, but also in maintaining an image as a responsible corporate actor among downstream companies (Pagiola et al., 2002, p. 276); a hybrid value that mixes maintaining good relations and reaping economic marketing benefits from a ‘green’ or sustainable image.

Another insight from negotiation analysis is that creating values can be helped not only by looking for common ground and shared interests, but also by a focus on *differences* (Lax and Sebenius, 2002). Successful deals are generally based on creative use and re-combination of differences in relative valuation, capability, perceptions, beliefs about the future and

attitudes towards time and risks among parties. Such differences provide the room to negotiate deals that ensure that parties are satisfied on those aspects that are most important to them. Upstream farmers may accept low payment levels because of an interest in receiving recognition of land property rights (FAO, 2004), or because they consider them to be token incentives to support socially desirable activities (Kosoy et al., 2007). In this case, service providers apparently value increased land security or the societal recognition of their role as environmental stewards, whereas service users are interested mainly in the economic or environmental value associated with the provided services.

### 3.3. Values and power: the best alternative to a negotiated agreement

Each party involved in a negotiation is likely to assess the value of a negotiated agreement relative to the value of an expected outcome without such an agreement. This concept is known in negotiation analysis as the 'best alternative to a negotiated agreement' (BATNA) (e.g. Fisher et al., 1991; Raiffa et al., 2002). If the value of a negotiated agreement is perceived to be higher than that of unilateral action, parties are more likely to accept a negotiated agreement. This is related to issues of power in negotiations; a powerful actor will have a good alternative to a negotiated agreement.

The concept of an alternative to a negotiated agreement fits the observations that sometimes service providers decide to participate in a payment scheme on a voluntary basis now, if they expect that, without a PES agreement, they may be forced to change their land-use practices through new regulations in a few years time, or their land may be incorporated into an adjacent protected area (Kiersch et al., 2005). The concept also fits the example of the well-known payments scheme developed for the New York City watersheds. When this scheme was established in the 1990s, it was far from certain that this would be sufficient to ensure good quality drinking water for New York City (NRC, 2000). Nevertheless, the best alternative to a negotiated agreement for New York City was to invest in a multi-billion dollar filtration plant, which made a multi-million dollar payment scheme look very attractive, even if its impacts were not completely certain.

### 3.4. Changing the negotiation game

An important element in negotiation analysis, is that of learning by parties and changing the game. A negotiation process features a set of parties, negotiating over a set of possible measures to be taken, adhering to certain rules. However, any of these elements may change over time. Additional parties may enter the negotiation, or existing parties may leave, and the measures that are being considered may change. Also the issues under negotiation may change; for instance, different issues in different negotiation arenas may be linked. This may make an agreement more or less likely in the course of the process. These changes may be deliberate, since the human parties in a negotiation process are capable of learning; they can use this learning not only to improve their strategies within a given structure, but they may also use it to modify the structure of the game (Sebenius, 1992).

PES schemes themselves are an example of changing the game, because they use markets rather than regulatory pressures to instigate a change of behavior. Also, the creation of new actors or rules as part of a PES scheme may help to increase the value of a negotiated PES scheme relative to the existing situation. For instance, in the PES scheme for Quito, Ecuador, the fact that the scheme is being administered by a newly established independent body, rather than a government institution, is seen as an important feature by the non-governmental actors involved (Lloret, 2005).

### 3.5. Implications for PES development

The above paragraphs indicate that it is possible and meaningful to apply a negotiation analysis perspective to PES development pro-

cesses. However, this is based only on anecdotal evidence, citing some examples from PES development processes. In order to further explore the usefulness of a negotiation analysis perspective, additional steps are needed.

A key difference between negotiation analysis and most of the existing PES literature, is the focus of negotiation analysis on a broader range of underlying interests and values, beyond hydrological and economic values. If negotiation analysis really holds promise as a complementary perspective on PES development, then a targeted investigation of underlying values should uncover the existence of more than 'just' hydrologic and economic values. Furthermore, uncovering the broader range of values should also lead to the identification of an additional set of actions that would seem sensible for the parties involved in negotiating PES schemes.

Thus, a logical first step in further exploring the applicability of a negotiation analysis perspective on PES development, is to investigate the broader range of interests and values held by two of the main parties in negotiating PES arrangements: service providers and service buyers.

## 4. Case results: interests of PES providers and users in four cases in the Netherlands

### 4.1. Methodology for the case study research

The underlying interests and values of service providers and service users were studied in four cases in the Netherlands where payments for water-related environmental services had been, or were about to be, applied. Each case involved one or more water boards as service buyers, whereas farmers were the service providers. Generally, the water boards acted as initiators of the payment schemes.

Background information on possible motivations of providers and users was collected by studying policy and research papers regarding the use of payments for environmental services as a water management instrument in the Netherlands. This literature study resulted in the identification of possible interests and values of Dutch water boards as service buyers and of farmers as service providers. These pre-defined interests were then used as a starting point for data collection from our cases, but we also looked beyond these predefined interests. This was done by collecting more general information on the involved parties and their interests, their perceptions, and their means to influence the PES development process. This should enable the identification of possible additional values and interests involved in PES development.

Data on the four selected cases were collected through semi-structured interviews with the public service buyers, the service providers (farmers), intermediary parties (NGOs such as nature or agricultural associations) and other key informants. In total, 31 respondents were interviewed. This information was supplemented by information from case documents, meeting minutes, contracts, websites and field observations. The purpose of these data was to identify possible motivations of the participants in development of PES schemes, based on the information they used to reach their decisions. We did not add any economic analysis of our own to complete their information or to test whether or not the assumptions of those participants in the cases were correct. Details of the reported case study research can be found in De Groot (2008).

### 4.2. Introduction to the four researched cases

The first case was located in the Oude Rijn area and concerned the design of a planned PES scheme by the local water board, in order to realize both water quantity and water quality objectives. Specifically, the water board wanted to combine increased water storage and retention with improved water quality and ecology. One of the measures to realize these objectives was the broadening of water

courses in combination with the construction and maintenance of nature friendly stream banks. Farmers whose lands bordered the targeted water courses could voluntarily participate and receive compensation for construction and management activities.

The second case, in the province of North-Brabant, concerned a follow-up project of an earlier pilot project. During the pilot project, 700 farmers had participated voluntarily to maintain some 1250 km of buffer strips on the borders of their farm lands, on which they did not use fertilizers or pesticides. The costs for farmers, mainly due to a small decrease in revenues from turning farm land into unproductive buffer strips, had been compensated by the four water boards involved and the province of North-Brabant. The purpose of the studied follow-up project was to expand the scope of the project to cover some 2700 km of buffer strips along water courses. However, after one year, by the end of 2007, the participation in the follow-up project was disappointing with a mere 350 farmers, covering only 700 km.

The third case concerned some valuable nature areas in Midden-Delfland, located in the densely populated western part of the Netherlands. By 2004, some 50 km of nature friendly banks had been realized to support national nature conservation policies. For this purpose, lands had been expropriated by national government from local farmers, after which ownership was transferred to the local water board for further nature friendly management. This should help to maintain a suitable environment for local flora and fauna and should reduce stream bank erosion. However, the forced expropriation did not provide a good climate for maintenance of the nature friendly banks and the fences around them. To improve this climate, the 67 farmers in the area were receiving a compensation for the maintenance of the fence since 2004. With 12 of them, a small pilot project was started in 2006 to also include actual management of the nature friendly banks adjacent to their lands. Although this initial pilot only covered 4 km of banks, the intention was to upscale the effort in subsequent years.

In the Krimpenerwaard, the location of the fourth case, a cooperative effort was started in 2004 to improve water quality and ecology in the area. Different measures were defined as part of this broad project to sustain – among others – a viable population of characteristic species for the peat ditches in the area. One of those was the Black Tern, a characteristic bird species. Farmers placed small rafts in the water courses, stopped mowing the grass of the banks on both sides of the Black Tern colony and fenced these areas to prevent grazing. They were compensated financially for these activities by the water board.

4.3. Interests and values identified from literature

Prior to data collection in the four cases, more general background documents were studied to identify interests and values of service

providers and service buyers. The identified interests from these documents echoed the emphasis on the economic-scientific interests discussed above, considering PES development from an economic cost-effectiveness perspective. For instance, PES schemes would be more cost-effective than conventional policy instruments for water boards, because PES schemes would mobilize the local land users who would have more information about the state of their lands and who would be more flexible in timing the application of certain measures in response to natural variations. The resulting factors are summarized in Table 1, which also contains further details on the indicators and data collection methods for the analysis of the cases.

4.4. Values and interests of water boards

Although the background literature suggested that costs and effectiveness were important interests of service buyers in PES development, both costs and effects were difficult to determine explicitly in the cases. In this regard, these cases fit in well with the international experiences with PES schemes cited earlier in this paper.

Water boards stated that the effectiveness of the studied payment schemes was difficult to estimate because of the complex causal linkages involved in ecosystem dynamics and the lack of adequate monitoring programs (see Table 2). Accurate determination of effectiveness thus was difficult, expensive and time consuming. Furthermore, time lags in the water system further limited assessments of effectiveness. Therefore, water boards often used participation of farmers, rather than ecological impacts, as a proxy indicator for effectiveness. The direct costs related to payments were quite straightforward to determine, but the transaction costs related to negotiation and administration were much harder to assess. The existence of such costs was acknowledged, but not estimated by the local water boards in any specific detail (see Table 2).

Assessing the cost-effectiveness of payment schemes beforehand instead of after their implementation was even more difficult, because in the four cases studied this depended on the participation among farmers. For instance, if all but a few farmers would participate in a scheme for stream bank management, the absence of a few farmers would have a disproportionately large negative impact on the cost-effectiveness of the scheme. It would pose considerable costs for the water board, having to maintain two different types of management systems, and one could question what the ecological effects of one plot with a nature friendly bank would be, when the plot is surrounded by regular plots along the watercourse.

Water boards often did not have solid evidence on the cost-effectiveness of PES schemes to motivate their decisions. However, the interviews and document analyses suggested that there were

**Table 1**  
Background information on case study methodology.

	Pre-defined interests and values	Corresponding indicators	Data collection methods
Water boards (service buyers)	Effects on physical water system	Chemical indicators (concentrations of nutrients and other substances)	Technical case documents and interviews
	Direct costs	Ecological indicators (occurrence of species and biomass concentrations/coverage)	Technical case documents and interviews
Farmers (service providers)	Transaction costs	Direct costs for payments to farmers	Payment details in contracts and project documents
	Financial benefits	Costs for administrative and contractual requirements	Project documents and interviews
	Investment costs	Monitoring costs (effects and compliance)	Project documents and interviews
	Effects on farm management	Received payments for service provision	Payment details in contracts and document
	Transaction costs	Investment costs for equipment and loss of production capacity (loss of useable farmland)	Project documents and interviews
		Recurring costs and benefits due to efforts required for service provision as part of farm management	Interviews
		Costs due to administrative and contractual requirements	Interviews

**Table 2**  
Estimations by water boards of the effects and costs of payment schemes.

Case	Estimated effectiveness	Estimation issues effectiveness	Estimated costs	Estimation issues costs
Nature friendly banks Oude Rijn	PES considered most effective option to realize water quantity and quality objectives compared to alternative options (buffering and draining)	Effectiveness determined by willingness to participate (unknown yet)	Direct costs for construction and maintenance of banks around €180 M for six years. Much higher than costs for alternative options (€30 M)	Transaction costs (supervision, organizational costs) not estimated yet, depend also on participation levels
Active strip management Brabant	Less nutrients and pesticides in surface water; improved biodiversity	Monitoring program was not implemented due to high costs. Effectiveness now determined by willingness to participate	Cost estimates in project budget 2007–2013: €10 M. €6.9 M for buffer strips, €3.1 M for communication, monitoring and two pilots with new services	Payments depend on participation of farmers. Full transaction costs are hard to determine but considerable
Nature friendly banks Midden Delfland	Considered most effective option for ecological objectives, due to resulting 'mosaic' pattern (instead of uniform bank management by contractor)	Difficult to quantify these ecological effects. Effectiveness assessed by willingness to participate	To be based on bandwidth between costs for management by contractor, via land (enforced right of border crossing) or via water (more expensive)	Costs of these management alternatives are still unclear. Difficulties in estimating costs when everyone participates except a few
Bird protection, Krimpenerwaard	Increased bird population of Black Terns due to flexibility and familiarity of local farmers	No direct significant improvements found, but other factors (predators, incidental traffic nuisance, etc.) influence effectiveness as well	Annual budget of €2500 proves sufficient	Lump sum cost estimate, including payments and compliance monitoring

additional interests at work, which could be categorized in three groups: strengthening of relations, awareness raising and exploration (De Groot, 2008).

1. Strengthening of relations: The water boards involved in the cases in North-Brabant and the Krimpenerwaard understood the value of cooperation with both land users as well as other governmental organizations. Building a good relation with farmers and other governmental organizations offered an additional motivation to start a PES scheme. By implementing a PES scheme water boards could ensure an increase of good will as well as an example of cooperation. In other projects water boards would depend on the same actors, so positive experiences with cooperation in establishing a PES scheme could increase the willingness to cooperate in other projects.
2. Awareness raising: Another interest of water boards was creating awareness, which was mentioned by water boards in all cases, with the exception of the Oude Rijn area. By involving the public, in

this case farmers, in the implementation of water management measures, they would be more likely to appreciate the value of water. Furthermore, involving farmers would make them more aware of the consequences of their agricultural activities on water quality and ecology.

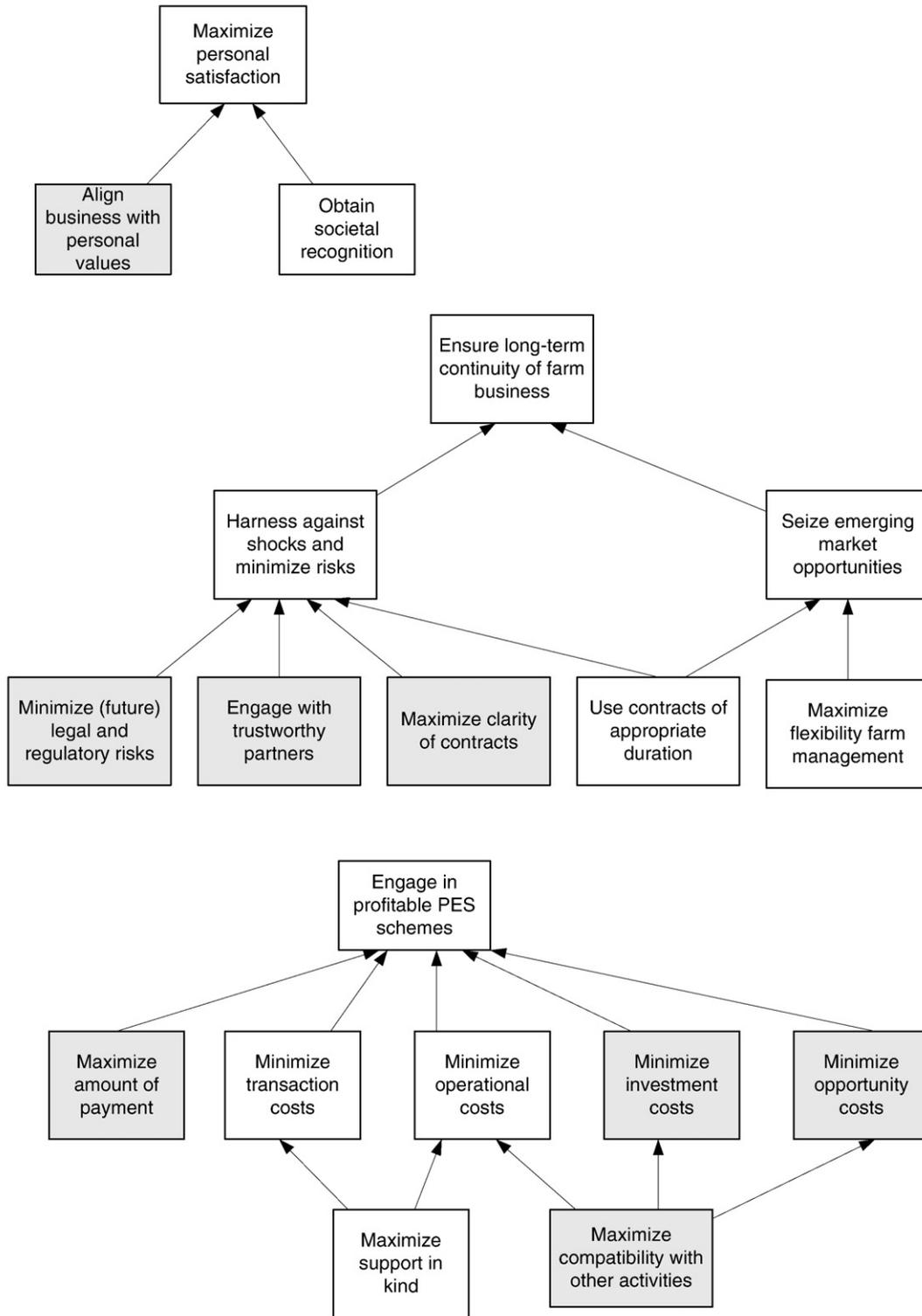
3. Exploration of PES schemes as policy instruments: For water boards, the interest in PES schemes in itself was an argument to start a (pilot) project. Water boards in all cases, with the exception of the Krimpenerwaard case, stated that they would like to acquire knowledge about payments for water related services and to improve their comprehension of the market forces that influence this policy instrument. This exploration motivation was linked to underlying expectations about efficiency, relation improvements or awareness raising.

#### 4.5. Values and interests of farmers as service providers

For the Dutch farmers, as for water boards, the assumption in the studied policy and research papers was that farmers would be driven primarily by economic interests. Thus, we looked specifically at the

**Table 3**  
Overview of payments to farmers in the four studied cases.

Case and service	Payment structure	Realistic example for one farmer		Farmer perception of compensation
		Service provision	Payment	
Oude Rijn – nature friendly banks	9 types of payments for construction costs, 4 types for maintenance	100 m of banks and water courses, bank width 3 m, excavation depth 0.30 m for bank and 0.70 m for water	€4370 construction costs & €70 annually	Unknown (design phase), but complicated contract and no compensation for loss of land
North-Brabant – active strip management	Annual payments for loss of income and maintenance costs, plough land: €0.60 per running m/y, grass land: €0.30 per running m/y	400 m buffer strip on plough land	€240 annually	Compensation is lower than in previous project (2002–2007), but still seems to offer important motivation to participate
Midden Delfland – nature friendly banks	Fence construction: €5 per running m, annual payments: €500 per participant/year, €275 per plot/year, fence maintenance: €3.25–€3.75 per running m/year, mowing: €4.75–€5.75 per running m/year	Management of 500 m of nature friendly banks	€2500 construction costs & €4775 annually	Payment is perceived as lucrative (eight to ten times higher than standard amount of payment for these services in other projects)
Krimpenerwaard – bird protection	Annual payments: raft maintenance: €45/year, fence maintenance: €0.44 per running m/year, loss of income: €0.12 per m <sup>2</sup> /year	Raft with colony of black terns and management of 250 m strip along water course	€245 annually	Payment is perceived as appreciation rather than additional income



**Fig. 1.** Means–ends objectives of agriculture providers of environmental services. Note that more relations exist than shown here, also between the three main categories. For instance, to ‘engage in profitable PES schemes’ is itself a means-objective that helps to ‘ensure the long-term continuity of the farm businesses’, and means-objectives related to contracts also influence transaction costs.

payments and the costs of farmers for service provision. Given the individual and site-specific differences between farmers, Table 3 reports on realistic examples of farm payments and the perceptions of farmers regarding the amount of compensation payments. In the Midden Delfland case, payments were perceived as very lucrative; in North-Brabant, this was less so; and in the Krimpenerwaard case payments were merely considered token incentives. This range of

findings suggest that also here, additional interests are likely to play a role, at least in some cases.

From the interviews in the four cases, eight elements surfaced that had a significant impact on the willingness of farmers to participate in a payment scheme. Some of these were quite directly related to economic considerations and are well-known from the existing body of literature on PES design, others pointed to aspects that played a

**Table 4**  
Suggested steering options for water boards in the four studied cases.

Factors that influence acceptance of farmers	Steering options for water boards
1. Amount of payment	- Raise payment (within borders of European legislation concerning state support)
2. Opportunity costs	- Relate payments to (dynamic) opportunity costs, e.g. linked to cereal prices
3. Investment costs	- Provide compensation in advance
4. Compatibility of environmental service provision with regular farming activities	- Involve farmers in the design of a service agreement that is compatible with their regular farming activities - Determine whether possible nuisance of the service agreement can be mitigated or compensated
5. Clearness of agreement	- Improve the communication between the water board and service providers, for instance by appointing an area manager - Design an unambiguous contract - Communicate carefully to avoid negative rumours about the contract
6. Trust	- Be informed about policies and plans of other government actors, try to influence these plans - Clarify (financial) situation of the project to service providers - Explore the reputation of intermediary parties among service providers prior to involving them actively - Ensure intensive interaction with the intermediary parties involved
7. Correspondence between farmers' personal values and proposed measures	- Take personal values as well as business values into account in discussions prior to designing a PES scheme
8. Attractiveness of alternative measures	- Communicate the alternatives to a PES scheme to farmers

more indirect role, and which might be overlooked more easily. The eight main elements were:

1. Amount of payment: level of financial compensation for (conservation) activities
2. Opportunity costs: by implementing measures net profits from on-farm activities were sometimes foregone. E.g. the decision to implement a buffer strip instead of sowing grain would be influenced by the possible profits from grain production.
3. Investment costs: equipment and skills needed for new (conservation) activities
4. Compatibility of environmental service activities with regular farming activities: e.g. mowing of banks might easily be combined with regular mowing activities; organic farmers could more easily join an agreement in which the use of chemical fertilizers was forbidden.
5. Clearness of agreement; in case the agreement was not entirely clear, or when lots of exceptions and conditions were included in the contract, the willingness to accept was likely to be reduced.
6. Trust: The level of trust that farmers had in their water boards proved important. This level of trust was based on history, involvement of intermediary parties and assumptions about water boards and their intentions.
7. Correspondence between personal values of farmer and proposed measures; e.g. love of nature by farmers or personal belief in merits of organic agriculture.
8. Attractiveness of alternative measures; water boards could pursue alternative strategies to realize their water objectives. These alternatives might be less favorable for farmers.

The above eight elements surfaced from case study interviews, but they can be put into a more structured form by using a value-structuring technique known as a means–ends diagram, as described for instance by Keeney (1992). Such diagrams are meant to structure causal relations between means and ends, or means-objectives and more fundamental strategic objectives. An arrow between two objectives means that the

realization of one (means) objective is assumed to contribute to the realization of the other, more strategic, objective. Using this technique allows us to distinguish three fundamental interests of farmers that apparently play a role in decisions (not) to participate in PES schemes: an interest related to personal satisfaction, one related to long term continuity of the farm business, and an interest in more short-term economic profitability. The eight elements that were highlighted in the four cases are marked, the additional elements result from literature or were also suggested in individual cases and seem to fit the pattern (for instance, the duration of contracts) (Fig. 1).

The point of the shown means–ends diagrams is not to provide a comprehensive picture of interests and objectives that drive PES negotiations, but rather, to give an indication of some of the interests that can play a role. It shows that the interests involved are broader than economic interests defined – quite narrowly – as short-term profitability. Identifying the interests at play in PES development allows one to identify ways to address them, thus raising the chance of designing a PES scheme that is beneficial for all the involved parties. This is illustrated in Table 4, which identifies some steering possibilities for the water boards to address each of the eight elements that emerged from the four cases.

#### 4.6. Wider implications of case findings

The factors and steering options shown in Table 4 are based on the four analyzed cases, but may be informative for other PES cases as well. For instance, they show an interesting overlap with the key factors driving participation of farmers in PES cases in Mexico, identified by Kosoy et al. (2008). As mentioned earlier, they identified for instance the importance of simple rules, effective communication, and involvement of actors in the rule-design process.

Table 4 confirms that also other parties play an important role in the payment schemes, in addition to service providers and service users. Especially the intermediary parties can play an important role – both positively and negatively. In all cases, water boards relied on local intermediaries for the communication with the farmers and/or for the implementation of the payment schemes. The water boards expected these local intermediaries to be instrumental in the communication with local farmers, but this was not necessarily the case. Local farmers did not always consider the intermediary party to be well-equipped for a formal task in administering payment schemes and they did not always trust the intentions of the intermediaries. The selection of a suitable intermediary party thus is an important steering option, which requires sufficient insight in the position and reputation of organizations within the local actor network.

Finally, our case findings confirm the importance of communication in setting up PES schemes. In the four cases, open communication about for instance alternatives to a PES scheme, about contractual arrangements and keeping communication channels open through an appointed area manager, helped a great deal in crafting acceptable agreements. This confirms a negotiation analysis hypothesis by Raiffa et al. (2002, p.86) that often, a “Full, Open, Truthful Exchange” is a good approach to adopt for negotiating parties.

## 5. Conclusions

In this paper, we addressed the question of how the development processes of payment schemes for water-related environmental services could be understood and supported. The existing literature depends primarily on hydrology and (institutional) economics to understand and support the development of these payment schemes. Notwithstanding the importance of these perspectives, they are not sufficient to understand why and how existing schemes have been, and are being, developed. Since aspects related to negotiations among parties are known to be important, we have looked at negotiation analysis as a perspective that might complement hydrologic and economic lenses.

Although we have only scratched the surface of the negotiation processes in the development of environmental payment schemes, our findings clearly show the promise of negotiation analysis – and its constituting fields of game theory, decision analysis and behavioral decision theory – for understanding these processes. The results from four studied cases in the Netherlands indicate that the concepts and the analytical tools of negotiation analysis provide a useful addition to the existing lenses through which PES development is regarded. They help to identify and structure additional factors that drive PES development in one framework with more common economic, hydrological and institutional factors. Furthermore, these factors can be logically connected to specific actions. This helps to formulate recommendations, as in our cases, but will also be helpful in understanding the rationality of a broader range of actions in other cases.

If we want to improve our understanding of the processes through which payment schemes for environmental services are being developed, we need to look for additional theories and frameworks that can complement the existing perspectives. Our findings show that negotiation analysis is certainly a promising candidate in this regard, which would deserve further attention from researchers and practitioners involved in PES design and evaluation.

### Acknowledgements

The authors would like to acknowledge Wil Thissen and Aad Correljé from TU Delft, Erwin de Bruin from Grontmij, and the participants in the studied cases for their support and collaboration. Two anonymous reviewers provided helpful comments on the manuscript.

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