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Costs of implementing agricultural soil protection policies – Insights from two German cases

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Abstract

Transaction costs (TCs) are often claimed to be a key determinant of how policies are actually implemented on the ground and what effect they ultimately deliver on soil quality and functions. Focussing on agriculture-related soil protection policies in Eastern Germany, we analyse data from key informant interviews in two case study areas (Brandenburg and Saxony-Anhalt) in order to provide new evidence that TCs do indeed matter for policy implementation. We systematically map TCs that occur at the policy implementation and operation stages and their drivers. Our data showed that in addition to TCs for 'information management' and 'coordination', existing frameworks need to be extended to explicitly consider TCs for 'enforcement'. Results illustrate that there is a broad range of TCs that are due to the complexity of soils and their management, property rights assignment and administrative processes. To some extent TCs in one policy arena can be reduced; however, often they are only superseded in place and time and, moreover, there are trade-offs between different kinds of TCs. The paper emphasises that every assessment of effective policy implementation requires a specification of TCs and over what time-frame they occur.

Keywords

Transaction cost economics, soil conservation, agricultural policies, policy evaluation, Brandenburg, Saxony-Anhalt

1 Introduction

Soil degradation as a result of intensive agriculture continues to be a serious issue in Europe and worldwide (EC, 2006; Boardman & Poesen, 2006; Banwart, 2011). Several agricultural and environmental policies at EU and national level try to address soil conservation aspects, such as agri-environmental schemes (AES), the Nitrates Directive, Cross Compliance Regulation, as well as national Soil Protection Acts and Nature Conservation Schemes (Louwagie, Gay & Sammeth, 2011). However, all these policies have in common that they address soil as a by-product with limited effect on the ground (Prager, Hagemann, Schuler & Heyn, 2011; Louwagie et al., 2011). There is a need to better understand why existing policy tools are not effective in addressing soil degradation.

Previous studies of decision making processes in other policy fields (Schleyer & Theesfeld, 2011; McCann, 2013; Alexandrescu, Martinat, Klusáček & Bartke, 2014) suggest that an analysis of the institutional framework can shed light on the challenges of implementing policies with a soil conservation focus. Indeed, Dobbs (2012) regards institutional analysis as "key for fostering agricultural sustainability". Transaction costs (TCs) are a central concept in institutional analysis, but as Birner & Wittmer (2009) note, TCs are seldom empirically measured in analyses. The acknowledgement of transaction costs, especially in the design of policy instruments, "enables the analyst to bring in practical issues that are normally ignored" (McCann, 2013, p. 260). Moreover, TCs are not only important for setting-up policies but also for running them (Vatn, 2010), and they can contribute to understanding and informing policy processes. Accounting for TCs can further help "evaluate current policies in order to improve their effectiveness" (McCann, Colby, Easter, Kasterine & Kuperan, 2005, p. 528). Rørstad, Vatn & Kvakkestad (2007, p. 1) emphasize that "the cost of managing a policy may be as important for efficiency as the cost of producing the goods and services". Understanding where, when and why TCs occur is important in order to reduce the administrative burden, bureaucratic workload and costs for the implementing authorities, as well as for farmers and other land managers.

So far, the academic literature has mainly covered TCs that occur for the implementation of agri-environmental schemes (AES) (*inter alia* Beckmann, Eggers & Mettepenningen, 2009; Matzdorf, Piorr & Sattler, 2003; Falconer & Whitby, 1999). For national soil protection legislation or other European policies that influence soil protection, such as the Nitrates Directive or the Cross Compliance Regulation, such analyses do not exist. In the current literature, there is also a lack of understanding of the diversity of TCs, as well as the substantial impact that some of these TCs can have on timely and adequate implementation of policies.

Policy characteristics, specific policy content and the way that policies are implemented, are key to policy success (Louwagie et al., 2011). TCs are important for all policy stages as they influence people's behaviour in operating the policy and responding to it, its efficiency, and ultimately what results and impacts a policy has 'on-the-ground'. Their neglect during policy design processes could negatively influence the implementation of, for example, AES (Falconer & Saunders, 2002).

The contribution of this paper is twofold. First, it addresses the gap in scientific literature on the institutional dimension of ex-ante policy assessments in the specific field of soil conservation, with a particular focus on transactions costs. We make a theoretical contribution by extending existing analytical frameworks to allow the systematic mapping of TCs that arise at the policy implementation and operation stage, including their drivers. Second, the paper explores reasons for the lack of effectiveness of existing policies in reducing agricultural soil degradation. Better understanding the drivers for TCs (what exactly creates these costs) allows for specific recommendations as to how certain TCs can be reduced, to increase the efficiency of policy implementation and operation. As such, the paper makes a contribution to enhance evidence-based policy making that is transferable to other policy fields.

2 Research approach

2.1 Conceptual considerations

Transaction cost economics (TCE) dates back to Coase (1937, 1960) and Williamson (1985, 1999) and has been applied to many topics, including natural resource management. This paper focuses on public TCs that occur in political decision making, policy implementation and monitoring. To some, TCE might imply that actual costs are being measured in quantitative terms and optimised. However, TCs are seldom measured in monetary terms, because they arise during or as a result of policy processes and are either not measurable or they are subsumed in general agency expenditures (Ostrom, 1992). In our understanding of TCs, we follow Vatn (2010, p. 1246) and ask "how costly it is to coordinate actions that are interrelated"?

In the context of natural resource governance, TCE has been applied in several studies, in particular with respect to AES (see Beckmann et al., 2009 for an overview). Mettepenningen, Beckmann & Eggers (2011) investigate determinants of public TCs and how costs can be reduced in the case of AES. Existing frameworks for the analysis of TCs especially for environmental policy making (e.g. Garrick, Whitten & Coggan, 2013; Hagedorn, Arzt & Peters, 2002; Ostrom, 1998 and more detailed Krutilla & Krause, 2011; Birner & Wittmer, 2004) already provide a set of criteria for the analysis of aspects relevant to TCs. Most of them are summarized by Paavola (2002, p. 97): "Gaining information, conducting negotiations, making collective decisions, encoding collective choices into institutional arrangements and rules, and enforcing these institutional arrangements are all costly efforts."

Krutilla & Krause (2011) look at TCs for environmental policy making by focusing on the transactions between the regulator, as a representative of society, and those who are regulated. These authors acknowledge that especially in the implementation and enforcement phase several kinds of TCs occur, such as costs of information gathering, administrative costs, and political costs due to stakeholders seeking to influence the design of regulations and guidelines. Paavola & Adger (2005) further differentiate sources of costs of information which are: i) limited cognitive capacity; ii) self-interested agents who do not disclose their preferences; iii) learning processes regarding attributes of environmental resources that take place over a long period of time; iv) adjustments taking time, and requiring learning and resources; and v) information often being scattered or not accessible for different actor groups due to a lack of authority.

Birner & Wittmer (2004) present different types of TCs arising from decision making and implementation. Because the step of transposing European policies into national policies and instruments involves decision making - especially for AES - we include these transaction costs in our analysis. For policy design Birner & Wittmer (2004, p. 669) distinguish i) costs of acquiring information, "including scientific and indigenous knowledge on natural resources and information on preferences in case of conflicting goals", and ii) costs of coordination including the organisation of events and conflict settlement. Key aspects of policy implementation and operation that impact on TCs are incentives for compliance, asymmetrical information, measurability of the outcome, use of social control and problems that arise from non-compliance (Birner & Wittmer, 2004). From these theoretical assumptions we derive that TCs that occur during policy implementation can be categorised into 'TCs for information management' and 'TCs for coordination'.

2.2 Empirical foundations and analysis methods

Based on the theoretical background of TCE, this paper investigates the specific issues of policy implementation and enforcement in two German federal states – so-called Länder. The focus is on policies that target soil conservation to secure soil as the basic resource for agricultural activities. For Germany, these policies include 1) the Federal Soil Protection Act, 2) regulations and directives that farmers need to comply with under the Cross Compliance Regulation (e.g. the Nitrates Directive and its transposition), and 3) agri-environmental schemes (AES) targeting soil degradation under the Rural Development Programmes of individual states (Prager et al., 2011).

The Soil Protection Act and the AES were already mature policies during the time of the study. The Soil Protection Act came into force in 1998 and is a 'command and control' measure prescribing good practice approaches. AES are even older, with the basic idea of the programme stemming from the MacSharry reform in 1992. Although AES are a European programme they are individually designed at Länder level, with the design requiring concurrent processes at several levels (ministry, local offices, land managers) and several stakeholder groups (administrators, NGOs, farmers).

The Cross Compliance Regulation came into force in 2003. It introduces requirements such as the Good Agricultural and Ecological Conditions (GAEC), but it also compiles a range of established regulations such as the Nitrate Directive. Although the data underlying this paper are from 2003/4 and 2008, they provide a solid basis for analysis, because the policies have not substantially changed since that time, only the contents of the AES went into a new phase (2008-2013).

The two Länder Brandenburg and Saxony-Anhalt are used as case studies (Yin, 2009) in order to (1) gather empirical evidence regarding the influence of TCs, and (2) complement the aforementioned frameworks to reflect the empirical evidence. The objective is to present data that show where in the institutional structure TCs occur, when and why.

The empirical data for the analysis were gathered through a total of 43 guided key informant interviews (based on Gilchrist & Miller, 1999) conducted in Brandenburg (BB) (2008) and Saxony-Anhalt (ST) (2004/2005) (Figure 1). Although data are from two states and from different time periods, results are still comparable as the implementation of soil policy and administrative structures in these two neighbouring states are similar.

Figure 1 to be placed here (Map of case study areas)

All interviews were conducted face-to-face, except two telephone interviews. Interviewees were chosen with the aim to represent the broad range of actors involved in soil policy implementation and operation (Table 1). They included government (G) staff of the Ministry of Agriculture and Environment and of local agricultural offices, and non-governmental (NG) interest group representatives such as the farmers union, Friends of the Earth and the Organic Farming Association. The aim of the interviews was to learn about processes in design and implementation of agricultural soil protection policies including the role of TCs as one key aspect. Respondents were not asked directly for TCs, but instead asked to give their views on the perceived policy implementation and operation, which provided the basis for deriving a wide picture of TCs. The interview guides (available from the authors on request) contained open questions on the design and implementation process, roles of actors involved, communication patterns and coordination between actors, as well as involvement in decision-making processes related to policy implementation and operationalization.

Table 1 to be placed here

The interviews are labelled according to the states (either BB or ST), the type of interviewee (G or NG) and a number, e.g. BB-G-03 is the third governmental interviewee in Brandenburg. The empirical material illustrating the role of TCs in soil protection policy implementation was analysed as follows: Interview notes were analysed qualitatively based on robust textual analysis from interview transcripts. Statements were systematically analysed by coding them to a list of TCs that was derived from the literature, in particular the frameworks introduced in the previous section. Based on the results of this exercise, the coding frame was revised.

3 Transaction costs in policy implementation

This section presents empirical evidence for different TCs and their determinants. The results of the analysis are presented in the following in three categories. These categories reflect the theoretical assumptions discussed in Section 2.1. The analysis of our empirical data suggested that the distinction of TCs for 'information management' and 'coordination' was not sufficient, hence we introduced an additional category of TCs called 'enforcement'. As we will discuss in Section 4, the distinction of three categories is easier to explain to decision makers and makes it more simple for them to relate their experiences.

We extracted influencing factors (determinants) of TCs from the interviews and sorted them into the three categories. In the order of presentation, we labelled each factor with a capital letter to ease later discussion and references. For each factor, we discuss whether its impact increases or reduces the extent of TCs. Table 2 summarises the conclusions by type of TC and the expected impact directions. This approach to presentation aims to enhance the clarity of the paper, but we acknowledge that other categorisation of the empirical information would have been possible (and would be equally valid).

3.1 Enforcement

It is impossible to have policies which require compliance with standards without enforcement. Our empirical material provides interesting evidence to support this claim. In particular, the roles of enforcement and control measures, and of taking evidence versus social control are discussed.

Detecting non-compliance and imposing penalties requires resources (Lehmann, Schleyer, Wätzold & Wüstemann, 2009). In this article, compliance is understood as farmers adhering to the rules previously outlined, e.g. farmers apply the rules of the GAEC standards and do not remove hedgerows from their fields. The environmental effectiveness of the measures is not a subject of the study. Governmental interviewees present themselves as being convinced that the control system is the basis of successful policies, and ensures enforcement of regulations (BB-G-5) and that "farmers are much more willing to cooperate when they hear of Cross Compliance checks, because they fear a reduction of their subsidies" (BB-G-3). If the institutional framework provides incentives for the target audience of a policy to comply, which includes informal rules such as peer pressure and social control, then costs for enforcing the policy are lower. However, administrative staff need to dedicate time for on-site checks, as well as checking records, which translates into TCs. We surmise that an increased number of checks are associated with increasing TCs (**A**).

While social control and peer-pressure can reduce TCs, the possibility of social control is very limited in particular with regard to AES, because in most cases external actors are not aware of which schemes a farmer has signed up for, if any. They would not know what the prescriptions are with which the farmer should comply. So, if a farmer received payments for conversion to organic farming and hence only carries out a minimum amount of field maintenance, this might not be immediately obvious as he could also participate in a non-tillage scheme (ST-G-12). Therefore, social control and peer-pressure can reduce or increase TCs (**B**). Some interviewees view penalties as an effective enforcement mechanism, yet in areas such as soil conservation, where both determining the outcome of a conservation action, as well as detecting and producing evidence for offences is difficult, TCs can be highly significant. It is generally difficult to prove what exactly a farmer has done wrong, or what was due to weather conditions (e.g. in erosion events). Some environmental offences are reported by citizens (BB-G-7), but this has also disadvantages, as one interviewee explained:

> "People file a notification based on their own personal views which then starts up this control and sanctioning machinery that is not always necessary." (BB-G-1)

Hence: to detect non-compliance and to produce evidence for offences tends to increase TCs (**C**).

Furthermore, interviews repeatedly revealed that one crucial determinant of ensuring enforcement is the personnel capacity of administrations and related organisations. The personnel capacity for gathering and analysing necessary baseline data and drawing conclusions on the state of the soil is considered to be decreasing. For example, in the Brandenburg case there is only one member of staff at the district level responsible for the tasks related to soil conservation. When the federal soil protection law was passed, no additional staff or funding was made available for its implementation (BB-G-2). In addition, staff with a soil science background in research institutes are increasingly rare (BB-G-2, BB-G-9) but were previously an important source of data and expertise for agencies. Interviewees complain that budget cuts both in Brandenburg and Saxony-Anhalt have led to merged offices and departments and reductions in staff in administrative units at state, regional and local level. Qualified personnel tend to reduce TCs (**D**), nevertheless, gathering and analysing data tends to remain an inevitable TCs increasing factor (**E**). In this context, it was stated that handling and processing applications and contracts, carrying out on-site checks, and other tasks are time-consuming and costly activities for an authority. Therefore, processing applications and contracts **(G)**, as well as on-site checks both tend to increase TCs (**F**).

Some interviewees complained that there is little room for communication between agency staff and farmers. Agency staff claim that advice on AES is not their responsibility, but should be provided by the privately-organised advisory services (ST-G-12). However, the uptake of schemes and innovative conservation measures will increase with the availability and quality of advice to farmers (BB-NG-9). More interest in schemes would lead to more applications and queries. Hence, it might be in the interest of some personnel not to promote AES (ST-G-13). Promoting AES and advising on changes to legislation and regulations also requires training for agricultural advisors, yet in the long run, more efficient soil conservation could be ensured. Providing advice and instructions comes with a cost that might be outweighed by the benefits, thus it could increase or reduce TCs **(H)**.

In summary, this section outlined the determinants of administrative costs faced by the implementing authorities. Due to the characteristics and range of soil processes, outcomes are difficult to monitor and non-compliance is difficult to prove, which increases TCs **(C)**. Timely, strict enforcement and better data provision would raise the TCs **(A, C)**, because it requires increasing the personnel capacity and gathering of data (**E, F, G**). However, a crucial determinant is the personnel

capacity in the long term for enforcement by providing evidence and assistance (**D**). We find that TCs are not only a burden for the actors involved, but need to be understood from the perspective of administrators and farmers, with regard to investment into capacity (**D**) and community (**B**) development, e.g. in conjunction with advice (**H**) – an aspect that will recur in the following sections.

3.2 Information management

Information is essential for policy implementation. Information includes biophysical data, technical information, knowledge of communication channels and administrative procedures, as well as practical information about farmer support needs. Different actors have different kinds and levels of detailed information available, at different points in time and in different forms – in other words, actors have imperfect, i.e. asymmetric or incomplete, information. In practice, asymmetric information is a concern for all actors. Asymmetries can have different reasons; either that actors withhold information to be in a more favourable situation than others, or actors do not communicate the information they have, because the information is not required or regarded as unnecessary in the specific situation. In both case studies, information asymmetry was found between different actor groups and within actor groups, i.e. within one authority. Some staff may be less motivated than others to exchange information.

There is evidence that information asymmetry increases TCs (**I**). In order to address the issue of incomplete information, an investment in (scientific) research would be needed. Our evidence shows that the perception of the role of science and scientific organisations differs between actor groups. Regional authority staff access and use scientific knowledge provided by research organisations in Brandenburg (BB-G-2; BB-G-9), but non-governmental actors often lack access to this information (ST-NG-02). An (external) contribution of scientific knowledge tends to decrease TC **(J)**.

The contact with interest groups is important for the ministry because they represent the main channels for information on AES (ST-G-08). To tap into external knowledge, the ministry uses several mechanisms such as organising consultations, requesting reports from the local offices, and informal knowledge transfer. Some interviewees are convinced of the usefulness of consultations while others think they waste time and resources. NGOs in Saxony-Anhalt asserted that there are “definitely not too many meetings” (ST-NG-02), whilst ministry staff found there are too many (ST-G-17).

The broader the audience at meetings, the more opinions can be gathered and negotiated, but again with a trade-off in time. Therefore, these meetings involve TCs not only in terms of facilitation and time for such an intense exchange but, as Crase, O`Keefe & Dollery (2013) show in their case study on consultation for the reallocation of water in Australia, might even result in higher costs for taxpayers afterwards. Hence consultations can increase or decrease TCs (**K**). Requesting and analysing reports seems to be less effective and tends to increase TCs (**L**).

Working groups are a platform for exchange of information between a broad range of actors. Some of the actors are much in favour: “A working group would make a lot of sense. We have been suggesting it for a while” (ST-NG-06). In particular, for the localised adaptation of soil conservation measures and discussion of problems, a working group of farmers, local authorities, all levels of administration, and ministry officials is seen as useful (BB-G-9). But interviewees also acknowledge the extensive effort needed to organise a working group and convincing people to become involved, because they are asked to contribute over and above their usual workload (BB-G-8). Others voice the opinion that a permanent working group is not the best use of people’s time and prefer ad-hoc organised meetings to exchange information. The willingness to talk, but also the ability to

contribute one's own opinion and be heard, is seen as essential. Working groups tend to decrease TCs (**M**).

A stumbling block on the road to efficiency appears in segregated organisation, e.g. although the agriculture and environment sectors are combined in one ministry in Saxony-Anhalt, departments typically dealt with separate sets of stakeholders so that AES were informed by agricultural interest groups only (Prager & Nagel, 2008) (cf. (**S**) below). Moreover, coordination and communication becomes more costly due the practice of rotating administrative staff with the objective of building administrators' skill base and reducing the risk of individuals taking advantage or misusing their network and contacts. Many interviewees raised this issue and commented that this practice brings friction and loss of continuity, and ultimately knowledge, indicating that staff rotation tends to increase TCs (**N**).

To ensure information is distributed, the ministry in Saxony-Anhalt organises training for technical staff at the local agricultural offices in order to familiarise them with new procedures, directives, funding rules and applications. These events are generally useful for information transfer and coordination between the various administrative units but there can be an information overload and saturation: "If there are too many training events, we don't attend anymore" (ST-G-01) – so training can either decrease or increase TCs (**O**).

Agricultural authorities organise information events for farmers, for example after substantial changes to AES are implemented, i.e. such changes have knock-on effects in terms of costs of organising events and distributing information. TCs in the process of information distribution are increased by uncertainty regarding what actions are required. This might be due to the desire of decision makers to decrease costs during a negotiation phase, but this increases TCs in the implementation and enforcement phase. Interviews provided evidence that these problems exist for many regulations. Information events to disseminate information to farmers can increase or decrease TCs (**P**).

The empirical data provide evidence that the way in which information is distributed is crucial with respect to successful communication. A Brandenburg interviewee explained that an option for reducing costs and still reaching a large share of farmers is for an authority representative to speak at an event organised by an interest group, or by using farmer associations to distribute information (BB-G-10). The farmer association would know how best to get the message across to their constituency. Utilizing existing platforms for information transfer can decrease TCs (**Q**). There is awareness among governmental interviewees that using official communication channels may hinder information transfer: "The process is slowed down and some units, who feel they might be impacted, will, for example, hold back a report. In this case I go to the interest groups, who take it straight up to the ministry" (ST-G-03). Informal communication is important for decision making procedures: "The main lines of our everyday business are decided in an informal setting" (ST-NG-02). The main reason for using informal channels is inefficiencies in the official channels, for example the requirement for duplication of communication by post and email. Many interviewees admitted that they regularly email directly to the relevant person "because we need the response quickly, [and] following the official communication channels takes too long" (ST-G-01). In the face of costly official communication procedures, staff seek to reduce TCs, mainly by shortening the time needed to get access to information or to pass it on. Utilizing informal communication and knowledge transfer can decrease TCs (**R**).

To summarize, information is needed for the implementation of a policy. Different stakeholders hold different bits of information and gathering all this information from different sources requires resources. However, the actual level of TCs is dependent on how information is distributed, how much effort people put into actively transferring the message and the use of the most efficient channels. It will not be optimal for policy implementation to always minimise TCs as gathering information and facilitating communication is crucial, and there is also a productive component inherent in the costs. Therefore, the focus should be on balancing the costs and benefits of gathering and sharing information efficiently for policy implementation and operation – involving all relevant actors.

3.3 Coordination

In addition to information-related costs, coordination costs matter. By coordination we understand processes and actions such as administering data, drafting and checking contracts, on-farm checks, issuing payments, and managing conflicts.

In line with increased information requirements in segregated organisations, costs for coordination are likely to be higher in policy areas that require coordination between different authorities (e.g. agriculture and nature conservation) as compared to areas that can be addressed within one department only. In Saxony-Anhalt, for example, the ministry comprises a division for agriculture and a division for nature conservation. Both should be involved in designing AES, but cooperation is found to be limited. TCs tend to be higher in policy areas organised in a segregated manner **(S)**.

Interviewees indicate that increasing coordination costs occur as a result of involving relevant actors (**T**), but also for managing conflicts that might occur when interests differ (**U**). Consultation is a statutory requirement, but the ministry has discretion regarding whom to involve and to what extent. Similar to working groups, consultations are a tool to coordinate different interests and gather information but take time and effort to organise (cf. **K** above). The underlying assumption is that consultations will create support and legitimacy for a policy as well as help distributing information, e.g. through the representatives to the interest group members. Generating 'buy-in' is also expected to increase uptake of AES.

Environmental groups in Saxony-Anhalt find it increasingly difficult to contribute to consultations, as AES and soil management are not their core business and they lack the capacity to keep up with the changing legislation and funding regulations, which in turn limits their ability to provide competent input when consulted (ST-NG-04). There is also an issue around neglecting consultation outputs in further decision making (BB-G-5). If input is perceived to be disregarded in decision making, actors will be less motivated to contribute or become involved. With decreased motivation to participate, the costs for getting people involved would increase. Therefore, less motivated actors can increase TCs **(V)**.

Birner and Wittmer (2004, p. 669) identified the settlement of conflicts as a TC together with 'resources spent on meetings' and 'costs arising from delayed decisions': "These costs are obviously influenced by the number of different actors or interest groups involved in a particular governance structure, and by the prevailing conflicts of interest between them." In Saxony-Anhalt, a ministry representative claimed that the ministry's task is directing and leading, but instead they have to become involved in technical problems, such as administering and checking the field blocks that are the basic unit for calculating AES payments (ST-G-15). There are also latent conflicts between different levels of administration, and between administration and NGOs/farm advisors. For

example, “the ministry sees the local office only as the administrator, not as a partner with technical expertise” (ST-G-12). TCs can decrease if the own role perceived by actors was a clear and important one (**W**).

Conflicts may also arise when the purpose of a scheme is perceived differently by different stakeholders. Some might want to see environmental outcomes on the ground, while others are focused solely on reducing the risk of complaints and law suits, and making a scheme operational and efficient from an administrative point of view (ST-G-12, ST-NG-01). Others (especially the farming lobby) said they prefer to maximise payments to farmers with only minor changes to farming operations. Detecting and managing latent and open conflicts is increasing TCs (**U**), but understood to be a key task. In particular, the clarification and operationalization of policy instruments can increase TCs (**X**), but seems to be inevitable for effective policy implementation and operation.

This section showed that TCs for coordinating processes are sometimes perceived to be very high. Not only do different actors have to be integrated in the process, which is often an obstacle for non-governmental actors, but also discussions are time-consuming. On the other hand, an open discussion may lead to an enhanced understanding of positions and an outcome that is supported by all actors, thereby being of crucial importance for successful policy implementation. Due to differing interests and positions, conflict resolution is a necessary step in this process. Increased TCs at this stage are assumed to be a good investment in delivering an effective policy later on.

4. Discussion and Conclusions

In the previous sections, the results were presented according to three categories of TC: ‘enforcement’, ‘information sharing’ and ‘coordination’. The first TC category ‘enforcement` is driven by several determinants such as the measurability of outcomes that are regarded as a main task for the administrations under consideration. Soil conservation is regarded as what Birner & Wittmer (2004, p. 673) call ‘care-intensive transactions` which are “activities that are difficult to monitor because they involve carefulness, watchfulness, and diligence and, therefore, leave ample room for shirking – or even sabotage”. This attribute is crucial for agricultural land use as policies suffer from the fact that soil degradation is difficult and costly to measure, especially in the case of erosion and compaction. Soil organic matter by contrast is measurable to some extent; however, in all cases the cause-effect relation is often hard to detect (cf. Towers et al., 2006).

The second category ‘information management` involves TCs for acquiring information and distributing information. AES almost certainly require more coordination efforts than other policies because of the active integration of a range of actors which leads to the third category ‘coordination`. On the one hand, this ensures that the policy is targeted to the specific local needs, but on the other hand, coordination becomes a central determinant for successful implementation. Conflict management is an additional factor that requires coordination and also communication. It has not been explicitly mentioned in existing frameworks but it has a great influence on implementation and operation processes.

Table 2 to be placed here

Capturing such a wide range of TCs was facilitated by collecting data through personal interviews not directly asking for TCs, but instead collecting rich descriptions of how actors experienced policy implementation and operation, an approach that we argue has provided the basis for deriving a more complete picture of TCs. Table 2 illustrates the types of TCs and the determinants that can increase or decrease these costs – according to the perception of our interviewees. For example, a downward facing arrow should be read as likely reducing TCs, e.g. 'Informal communication and knowledge transfer' is a factor that reduces the cost of 'Information management'. The following sections summarise what we conclude from these findings with regard to the diversity of TCs, their drivers, and displacement of TCs over time and place.

4.1 Diversity in transaction costs and their drivers

The data indicate a diverse set of TC drivers. Individual determinants may increase or decrease TCs depending on circumstance. The analysis points to a number of trade-offs that precludes the depiction of unambiguous costs. For example, the more information that can be gathered by involving more stakeholders in the consultations **(K, P)**, the better the basis for the resulting decision (because diverse actor groups contribute different types of knowledge, Widmark & Sandstrom (2012)) and the greater the support for the subsequent decision. However, more meetings and consultations also increase costs. In addition, involving more stakeholders increases the diversity of views and interests and may increase or decrease costs for conflict management **(T, U)**.

TCs of agencies for information distribution could be reduced if all relevant advice was provided through advisory services (**Q**). However, farmers tend not to demand advice that does not immediately increase profits such as agri-environmental or soil conservation advice, hence this advice would have to be subsidised to increase its uptake.

The more legislation that needs implementation and the higher the requirements of monitoring and data, the more TCs occur (**A, C, E, F, G, L, X**). If more staff were available or existing personnel had better capacity to check enforcement, we could assume improved policy implementation (**D, X**); however, this would come with an increase in staff costs and higher costs for coordination between staff and organisations (**N, O, S**). Informal networks and trust (e.g. between senior managers and staff, between agency staff and non-governmental stakeholders) can facilitate the use of informal (direct) communication channels, which can increase information flow and reduce TCs (**Q, R**). However, if too much information is passed through informal channels, there will be a risk of a loss of accountability and information overload. Control intensity (and related TCs (**E, G**)) can be reduced by providing adequate advice which would invest in awareness-raising for soil functions and methods of soil protection (**H**).

The analysis shows that no classification of TCs is clear cut. Using existing typologies of TCs (e.g. McCann et al., 2005) would have created similar ambiguities caused by overlap between types. There can be several (perhaps even unintended) benefits from spending resources on one transaction. For example, the costs for a consultation event may support information distribution, information acquisition, enforcement and conflict resolution at the same time. Due to the overlap in benefits of one event, it may turn out that defining specific transactions is preferable to the chronology of the policy cycle suggested by McCann et al. (2005).

A different context could create large differences in costs, depending on the actors, their interests and the organisational, political and institutional structures within which they are embedded, as well

as the natural environment. Care-intensity regarding soil-related transactions is high. This underlines the influence of asset specificity on TCs in assessing policy implementation.

4.2 Displacement of transaction costs over time and place

Based on the empirical data and established framework, we can identify opportunities to reduce TCs in policy implementation for responsible authorities, but these are likely to create an increase in costs elsewhere (Coggan et al., 2010), for NGOs, advisors, farmers, other departments, and – not least – the environment. Hence, discussions regarding reducing TCs must be about optimising and not minimising TCs in all of the three categories established in our framework (Table 2). Furthermore the asset specificity must be taken into account (Coggan, Buitelaar, Whitten & Bennett 2013), which is especially high when it comes to soil functions. If more information distribution is undertaken by advisory services, it reduces the authorities' costs but requires subsidies for soil-related advice. This means the risk of merely displacing costs makes the identification of true savings for TCs overall difficult, if not impossible.

While it is possible to measure TCs empirically if a study is limited to public administration (Mann, 2000), or to landowner's environmental management in a well-defined geographical area (Mburu, Birner & Zeller, 2003), TC measurement is much more challenging if a broader perspective is adopted. A related issue is the displacement of TCs in time (Kuperan, Abdullah, Pomeroy, Genio & Salamanca, 2008). If we suggest that cooperation and exchange between relevant actors at the local and regional scale lead to better targeted soil conservation measures in AES and regionally relevant provisions in a state soil protection legislation, this would increase TCs for information distribution and coordination in the short term but would reduce them in the medium to long term, coupled with increased societal benefits due to better protection of soils. Mutual learning processes from cooperation and exchange potentially decrease TCs in the long term, assuming that they reduce information collection costs, as well as later monitoring and enforcement costs (Falconer, Dupraz, & Whitby, 2001).

4.3 Conclusions

In contrast to typical economic approaches, our aim was not to identify 'the most efficient' of all possible governance structures, instead, we emphasise the difficulties and trade-offs that have to be taken into account, if the factors that influence TCs in policy implementation are to be analysed and measured comprehensively. The TCs categories and the list of determinants that we identified for the implementation phase of soil conservation policies (Table 2) are comprehensive for this phase and administrative actors. Similar costs can be expected for other areas across Germany, countries with a similar administrative structure and policies which try to address wicked problems relating to the natural environment.

At the same time, we stress the importance of gathering data and information on TCs *in-situ*. Following predefined categories such as the ones suggested by McCann et al. (2005) or Coggan et al. (2010) would have led us to miss the TCs caused by internal conflicts in the administration, barriers to information flow, and costs associated with false alerts regarding breaches of soil conservation policy.

Some of the decisions affecting TCs are made earlier in the policy cycle (policy formulation and decision-making phase) such as the sometimes ill-defined requirements for actions farmers have to take. As a consequence such aspects have to be taken up in the policy design process (see e.g. McCann 2013). Our analysis outlines these TCs together with their drivers and suggests that policy

makers should take them into account to avoid reducing policy effectiveness at the implementation stage. In addition, we emphasise that it is necessary to clarify whose TCs are being measured, over what time frame and how they might be influenced by pre-existing policies in order to avoid double counting and displacement effects. This finding resonates with McCann et al.'s (2005) emphasis on the importance of considering all policy stages for a complete efficiency analysis. Moreover, in line with the general conclusion that an enhanced uptake of sustainable land management in policy making needs to go hand-in-hand with high-level politicians' awareness for the topic (cf. Seiler, Bartke, Mienert & Schwarze, 2009), we underline that due to their critical role, the consideration of TCs should be mandatory and more explicit in policy formulation processes.

Due to the costly nature of comprehensive TCs measurements ("collecting detailed data on transaction costs is difficult and costly" McCann et al. (2005, p. 532)) across the lifetime of a policy and the caveats associated with double counting, boundaries, definitions, implicit/ explicit costs, displacement and time effects, we suggest it is more useful to take account of estimations of TCs. Estimates would potentially provide a more accurate picture of reality – rather than being precise but (often) inaccurate (Mayer, 1993) – and allow sufficient information for improved decisions on preferable policies. Such estimation would need to involve 'insiders' with knowledge about the policy area (administrators, policy makers, NGOs, land managers), be informed by an understanding of why respective TCs occur, and then allow for adjustments which increase effectiveness rather than taking cost reduction (efficiency) as the overruling goal, since even the most efficient policy may completely miss its objective.

Finally, our analysis highlights that TCs are not only constraints but long term investments, i.e. investments into information for sound and effective implementation procedures, and that stakeholder participation is a key requirement. To achieve more effective policy implementation, the existence of TCs has to be acknowledged by decision makers, and both policies and governance structures have to be designed with the aim of reducing these TCs.

Our results add empirical grounding to future research that aims to identify TCs and their implications. Future studies should explore if there is merit in separating out fixed TCs and variable TCs. The examples from the empirical studies provide insights where the potential for improving implementation procedures lies. This has to be taken into account in the policy design process where the foundations for the implementation process are established.

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645

646 **Figure 1:** Map of case study areas

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648

649 **Table 1:** Interviews conducted in Brandenburg and Saxony-Anhalt

Land	Governmental stakeholders (G)	Non-governmental stakeholders (NG)	Total
Brandenburg (BB)	10	10	20
Saxony-Anhalt (ST)	17	6	23
Total	27	16	43

650 Source: Own compilation

651

652 **Table 2:** (Transaction) Cost categories and their influencing factors in agricultural soil protection
653 policy implementation and operation in Brandenburg and Saxony-Anhalt

(Transaction) Cost type	Influencing factors	Impact*
Enforcement	• Personal capacity (D)	↘
	• Social control & peer pressure(B)	↕
	• Providing advice and instructions(H)	↕
	• Checking records (A)	↗
	• Detecting and producing evidence of offences(C)	↗
	• Gathering and analysing baseline data(E)	↗
	• Processing applications and contracts(F)	↗
	• On-site / Field checks (G)	↗
Information management	• Contribution of scientific knowledge(J)	↘
	• Ad hoc working groups (M)	↘
	• Information transfer trough existing platforms (Q)	↘
	• Informal communication and knowledge transfer (R)	↘
	• Consultations (K)	↕
	• Training for technical staff (O)	↕
	• Information events for farmers (P)	↕
	• Asymmetric information (I)	↗
	• Requesting reports (L)	↗
	• Staff rotation (N)	↗
Coordination	• Actor perceives own role to be clear and important (W)	↘
	• Higher segregation of policy organisation (S)	↗
	• High number of actors involved (T)	↗
	• Detecting and managing latent and open conflicts (U)	↗
	• Less motivated actors (V)	↗
	• Clarification and operationalization of policy instruments (X)	↗

654 Source: Own compilation
655 *Legend for impact: ↘ = factor tends to reduce (transaction) costs, ↕ = reducing or increasing
656 (transaction) cost possible, ↗ = factor tends to increase (transaction) costs.
657 Source: Own compilation