

Searching for the economic value of nature; a return on investment  
analysis of promotion and preservation of hedges in Neckertal,  
Switzerland.

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## Abstract

Economic language has been a predominant influence in the area of valuation of nature in public policies all around the globe (McMullen, 2016). Incorporating other values that are not easily translated in economic language can however reduce externalities and improve sustainable trade-off analysis. The recognition and importance of non-economic values highlights the flaws within currently used economic valuation tools since such methods do not capture the expanse and nuances and intricacies of different types of values (Kumar & Kumar, 2008).

This thesis combines a semantic approach of the concept of value from Jackendoff (2006) and contingent valuation methodology to assess the return on investment of a landscape quality project in Neckertal, Switzerland, that concerns promoting and preserving hedges. I advocate including a lexicographic preference option of valuing in contingent valuation for those who reject economic logic. Findings indicated that 10% of the respondents held lexicographic preferences. On average respondents were willing to pay  $\pm$  169, whereas the investment costs per capita were  $\pm$  4 Swiss Francs. This study found that different actor groups put different weighing of particular value sources. The most important value sources were affective value, quality value, followed by resource value.

This study offers new insights in acknowledging and operationalizing value pluralism in monetary terms and advocates the inclusion of lexicographic preferences. By finding out how value is perceived by relevant actors and how this differs between different actor groups, economic analysis might regain some of its former importance as a means to understand and evaluate policies.

*Key words:* values, valuation, hedges, direct payment system, agriculture, Switzerland

## Table of content

Acknowledgements.....	2
Abstract.....	3
1. Introduction.....	7
1.1 The problem.....	7
1.2 The context.....	9
1.3 The need for a solution.....	11
2. Theoretical Framework.....	13
2.1 Dissecting value.....	13
2.2 Contingent valuation.....	16
2.2.1 Merits.....	17
2.2.2 Critiques.....	19
2.3 Hypotheses.....	26
2.4 Broadening of the horizon.....	27
3. Case study background.....	28
3.1 Swiss Landscape.....	28
3.2 Direct payments system.....	29
4. Methodological framework.....	33
4.1 Social Return on Investment.....	33
4.1.1 Establishing scope and identifying key stakeholders.....	35
4.1.2 Mapping outcomes.....	39
4.1.5 Evidencing outcomes and giving them a value.....	43

5. Results.....	47
5.1 General findings.....	47
5.2 Importance of value sources .....	50
5.3 Correlations between dependent and independent variables .....	52
5.3.1 Differences between gender.....	52
5.3.2 Differences between actor groups.....	52
5.3.3 Differences between knowledge groups .....	55
5.3.4 Differences between age groups .....	56
5.4 Putting the findings in perspective.....	57
5.5 Establishing impact and calculating the SROI.....	58
5.6 Reporting, using and embedding .....	59
5.7 Stakeholder responses.....	61
5.8 Reflecting on Critical System Heuristics.....	61
6. Conclusion .....	63
7. References.....	66
8. Appendix.....	75
8.1 Survey (translated).....	75
8.2 Appendix of the survey: indicating a willingness to pay .....	88
8.3 Appendix of the survey: identifying costs and benefits in time.....	89



# Chapter One

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## Introduction

This chapter concerns itself with introducing the problem concerning agricultural land-use. The chapter is divided in a problem description, a context and the need for a solution.

### 1.1 The problem

Land-use activities are becoming an increasingly dominant force in transforming the planet's land surface (Foley et al., 2005). The impact of anthropogenic activities (Kumar & Kumar, 2008) and increasing competition for land-uses are cause for the rising need for valuation of activities on land with regard to social, environmental and economic costs and benefits (Farber, Costanza, & Wilson, 2002). Consequentially trade-offs between anthropogenic activities and nature should also incorporate social, environmental and economic costs and benefits in order to enhance human welfare in a sustainable manner

Valuing anthropogenic activities and their impacts has proved difficult over the last decades to say the least. Most of those difficulties are related to the definition of value, i.e. the conceptualization, and the methods to measure value. Value is meant here in the broadest sense of the word: the importance, worth or usefulness of something.

Difficulties with the conceptualization of value are partially caused by the complex interrelatedness of the coupled human and natural system (J. Liu et al., 2007). This interrelatedness results in the inherent partiality of system boundaries (Ulrich 1983, Midgley 2000). These inevitably partial and value laden system boundary judgments frame what is counted and what isn't in the valuation process. Valuation is meant here in the broadest sense of the word, namely; an estimation of the worth of something. The imperfect knowledge has

direct consequences for perceived causation of different processes and ultimately influences the perceived value of processes or objects within human and natural systems.

Difficulties with valuation methodologies mostly relate to either moral arguments or the more practical inability to systematically value of complex entities or processes in human and natural systems. Moral arguments often pertain to how the concept of value is operationalized and the choices that go with that.

Economic language has been a predominant influence in the area of valuation of nature in public policies all around the globe (McMullen, 2016). This economic language, and the dominance of economic value has flourished under neoliberal ideologies. Within this economic language, a significant factor in government decision making – regarding public policies – has been economic value. There is however a trend of increasingly recognizing other sorts of values that become increasingly relevant. The recognition and importance of other values highlights the flaws within economic valuation tools since such methods do not capture the expanse and nuances and intricacies of different types of values (Kumar & Kumar, 2008).

Economic valuation is complicated by the intangibility and incommensurability of cultural, ecological and social values, which have often lead to the exclusion of such values in economic valuations (Chan et al., 2013). The intangibility of such values makes measuring changes within such values difficult and the incommensurability of such values make trade-offs difficult (Sharpe, 2010). Because of the exclusion of various types of values, Bockstael, Freeman, Kopp, Portney and Smith (2000) rightly state that contemporary decision making in public areas where such values could be important is thwarted by (1) a conflation of services, wherein values and benefits are packed together and measured on the wrong proxies, and (2) the failure to appropriately treat diverse kinds of values.



## 1.2 The context

Painting the picture, it becomes obvious that there is a strong need for proper valuation of nature and at the same time there is significant scientific disagreement concerning the possibility and justification of using economic valuation methods for estimating non-monetary values such as ecological and social values.

An illustrative example of trade-offs within public decision making are trade-offs concerning agricultural land-use versus conservation of nature and biodiversity. Combined pressures of population growth and environmental change mean that globally societies are increasingly struggling to meet rising demands for food while protecting their natural resources (Hazell & Wood, 2007). With global food demand still on the rise, agricultural sectors are therefore becoming an *increasingly* dominant influence in the shaping of future Earth surfaces (Tilman, Balzer, Hill, & Befort, 2011; Tilman, Cassman, Matson, Naylor, & Polasky, 2002). Almost consequentially, the environmental impacts of agricultural practices around the world are intensifying, increasingly negatively impacting the environment through nitrogen leaching or phosphorus-driven eutrophication of fresh water sources, carbon emissions and loss of biodiversity through land use change. On a less global scale, rural areas around the world are also heavily impacted by agricultural practices (Abler, 2004; Dachary-Bernard & Rambonilaza, 2012).

A more specific and contemporary relevant example of a trade-off between agricultural land-use and the preservation of nature is the removal of hedges and hedgerows (henceforth referred to by ‘hedges’) by industrialized agriculture. Often such hedges form physical obstructions to efficient/industrialized farming and occupy potential farmland. These are clearly economic values which are often still predominant forces in contemporary decision making.

Hedges also entail cultural and ecological values. Rural landscapes – and consequentially hedges, if these are present in those landscapes - can be considered a cultural

and social benefit to society as well (Dachary-Bernard & Rambonilaza, 2012; Waltert, Schulz, & Schläpfer, 2011). The value of hedges also consists of the aesthetic appreciation of the landscape and the possible attraction of tourism and/or migrants (Van Berkel & Verburg, 2014; Waltert et al., 2011). A culturally historical value of rural landscapes can evolve over hundreds of years and are consequentially intricately connected to the identity of local populations (Antrop, 2005). Hedges can therefore also have a value related to the local identity.

Hedges can also have important local ecological functions such as the provision of foraging or habitat for birds (Hinsley & Bellamy, 2000), insects such as bees (Hannon & Sisk, 2009) and small mammals (Aschwanden, Holzgang, & Jenni, 2007). Additionally, hedges or hedgerows can provide a buffer for disturbances in the ecosystem and consequentially promotes species abundance and diversity (Stoate et al., 2009). Furthermore, hedges or hedgerows control and prevent to some degree soil erosion, break winds and modify field microclimates and provide corridors for species movement (Burel & Baudry, 1995).

Despite these non-economic arguments, hedges could have been considered as the most threatened agricultural landscapes of western Europe in the 20<sup>th</sup> century (Burel & Baudry, 1995). Perhaps the most famous example concerning the loss of hedges due to agricultural expansion is the United Kingdom during the 20<sup>th</sup> century (Barr & Gillespie, 2000).

I argue that this decline of hedges in the United Kingdom has been at least partly due to the predominance of economic valuations and the lack of inclusion of social and environmental costs and benefits within the trade-offs. Likely, the contemporary recognition of the natural landscape as cultural heritage - a non-monetary value - in the United Kingdom

(Barr & Gillespie, 2000; Lowenthal, 1991; Oreszczyn & Lane, 2000) has played a determining role in the contemporary preservation and promotion efforts regarding hedges.

Although contemporary public policies around the world focus more on non-monetary values, the valuation of such values is commonly still treated as a ‘black-box’ when highlighting the importance of non-economic values (Centemeri, 2015). The transparency, explanation and justification of the treatment of non-monetary values are essential parts of ecosystem assessments (de Groot, Alkemade, Braat, Hein, & Willemen, 2010). The identification and recognition of different values and the valuation are regarded as the last step of relating ecosystems with human wellbeing and making educated trade-offs prior to policy development [Figure 1].

### 1.3 The need for a solution

There is a need for a better understanding of values and at the same time to better equip current valuation methodologies to measure different typologies of values. This could lead to more ethical and transparent decisions and also enable the policy makers to make better informed decisions concerning trade-offs.

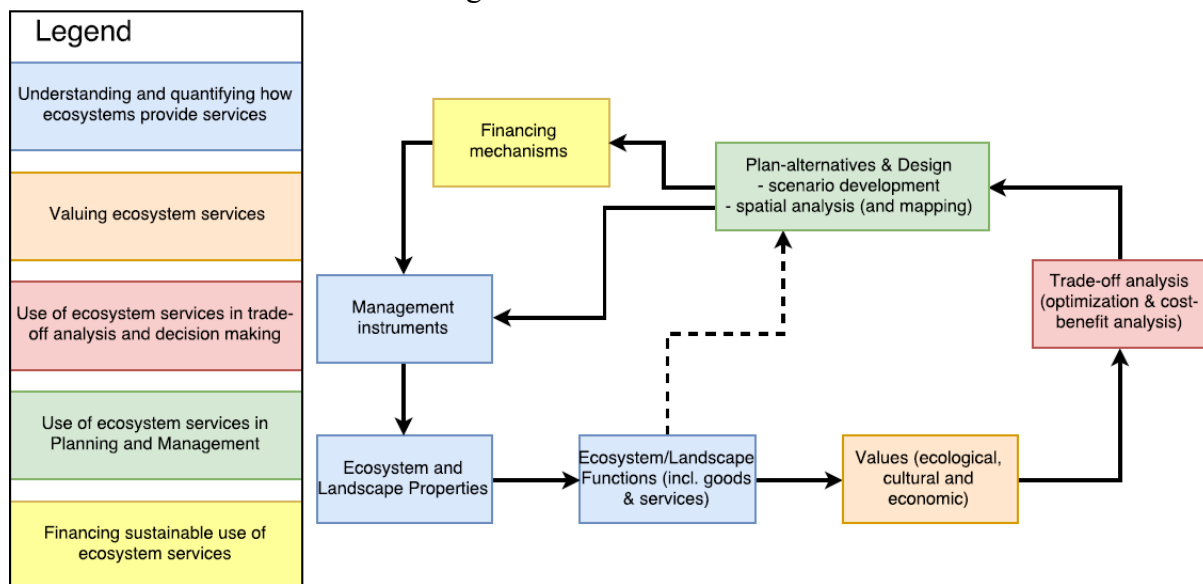


Figure 1 Framework for integrated assessment of ecosystem and landscape services. Edited from (de Groot et al., 2010)

In order to place the broader conceptual context in relation to values, system of value and value, a coherent theoretical and methodological framework will be developed in this thesis, so to improve the conceptualization and valuation of values and thereby improving trade-off analysis. These two topics are the second and third step of integrated assessments of ecosystem and landscape services as identified by de Groot, Alkemade, Braat, Hein and Willemen (2010) [Figure 1].

# Chapter Two

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## Theoretical Framework

This chapter elaborates on the theoretical framework that underlies this study. The chapter starts with description of the concept of value as it is used in the study. Next, the chapter discusses the merits and critiques of the method that is used for data collection in this study (i.e. contingent valuation).

### 2.1 Dissecting value

Values are inherently intertwined with rational decision making. A rational decision evaluates two or more potential scenarios based upon their merits (i.e. value). Hence, values constitute the foundation of rational trade-offs. The existence of multiple types of values (value pluralism) has long since recognized as an important aspect of valuing interrelations between humankind and nature. This theoretical framework is dedicated to identifying various types of values and uses the approach of (Jackendoff, 2006) to uncover sources of values from a semantics point of view. In this thesis I use the words types of value and sources of value interchangeably.

There is continuous disagreement within and outside of the scientific community over what *constitutes* values. A more recent paper concludes that there is a growing need for a richer conceptual pallet of value in order to systematically and transparently integrate the concept of value in decision making (James, 2016).

I argue that conceptual pallet should be on the one hand rich by recognizing value plurality (i.e. the existence of multiple types of values), and on the other hand be practical and understandable by acknowledging this value plurality in relatively simplistic categories. This practicality of value plurality can improve measurements of types of values through questionnaires/participatory approaches and thereby improve (public) decision making.

Maybe one of the most rigorous attempts to dissect the concept of value into more tangible pieces is Jackendoff's (2006) 'The peculiar logic of value'. Through a semantic analysis, Jackendoff (2006) traces the use of the concept value into categorical sources of value in our language. Jackendoff (2006) states that rather than asking what values are in the real world, his attempt is an answer to the question of how humans "*conceptualize values and how values play a role in governing people's judgements and behavior*" (Jackendoff, 2006: p. 376). Jackendoff (2006) identifies the following six categories of values: affective value, resource value, value of quality, value of prowess, normative value, and value of esteem. The following paragraphs elaborates upon these categories of values and illustrate them with examples similar to those of Jackendoff (2006), but adapted to hedges.

The affective value is construed with the valuation of the positive/negative effect of an event or situation on that person. An example: A hedge has good/bad effects on person X or A hedge provides shade for person X in the summer. It is important to note that one event might have both negative and positive effects on various people. Therefore affective value is rather the value of the affecting relations that situation has on person X.

Resource value refers to the value of an object if it is good for someone to have or put simply, if it is valuable. A reason for the value of this object might be that it offers the potential (or affordance) for an event with affective value. An example: A is very valuable to person X. The sole fact that A is very valuable to person X does not necessarily mean that another person would agree with this value. An example: this particular hedge is valuable to person X (since he/she has many childhood memories connected to that hedge) but perhaps not to person Y.

The value of quality refers to the quality of an object or event, relative to other objects or events of the same type. Jackendoff (2006) notes that when objects are rated for quality, often the ratings concern specific uses of the object. An example: this hedge is a good/bad

habitat for weasels to live in. Even if the part ‘for weasels to live in’ in the example is left out, the sentence still implies that the hedge has a specific purpose and is relatively good/bad for executing that purpose.

The value of prowess refers to the quality of an actor’s performance. Unlike quality value, prowess concerns the action of persons rather than the (latent) capabilities of an object. An example: person X is good/bad at trimming a hedge. I would like to extend this example by suggesting that the value of prowess can also relate to an organization. An example: A government is good/bad at promoting and preserving hedges.

Normative value is rather complex and refers to the conformance of an action, event or situation to social norms. Normative values contain - among other subdomains - the domains of moral/ethical values, religious values, and valuations according to standards of etiquette. However, Jackendoff (2006) lumps these values together under the concept of normative value since the system of norms can be considered as an object of life-lasting studies. An example: it is (inherently) good/bad to have hedges in your municipality. In this example, the attribution of the normative value is focused on a (implicit) relationship between a person and an event or situation similar to affective value. However, the event must intentionally set in motion. Jackendoff (2006) notes that often an positive normative value often relates to a positive affective value.

Lastly, the value of esteem refers to a reputation which is often sought out by others of the same group for cooperative interactions of mutual benefit. Esteem value often pertains a sense of hierarchy in social context. Jackendoff (2006) states that esteem could be considered a personal resource value. An example: A program that concerns itself with promoting and preserving hedges is prestigious/well-respected.

Different cultures might perceive different sources of value in gradients of importance (Jackendoff, 2006).

Although there are numerous attempts of providing an increased understanding of the concept of value, Jackendoff's (2006) categorization is extremely useful in evaluating policy effectiveness. There is more to goods and/or services than their physical properties or effects (Castree, 2003) and by using Jackendoff's (2006) values one can broaden that valuation by including comprehensive sources of the concept of value. Using different types of the concept of value further enables policy makers and researchers to obtain more precise data concerning the perceived value of objects, persons, events or situations. By focusing on multiple sources of value, the nature of perceived value can be explored. For example, if a participant indicates a relatively high normative value and a relatively low affective value, it might indicate that the normative quality is regarded more valuable or more understood than the affective qualities of the event, situation or person.

## **2.2 Contingent valuation**

This study incorporates Jackendoff's (2006) value sources in economic valuation methodologies. This incorporation could improve public decision making by enabling conventional tools of policy analysis (economic valuation) to systematically incorporate non-economic values.

There are three main categories of techniques of economic valuation methodologies that can be distinguished; (1) market based valuation, (2) surrogate market based valuation and (3) simulated market based valuation. Each of these valuation methodologies has its merits and shortcomings. This research will further focus on the surrogate market based valuation technique of contingent valuation method (CVM), because this is the best economic valuation method that is equipped to deal with non-monetary sources of value for goods or services that do not have a manifested market price. Because of the absence of markets for the goods, services or even proxies thereof, CVM is compelled to resort to stated preference.



Within stated preference evaluations, individuals are asked to value a particular hypothetical situation which describes the object under investigation or a proxy thereof.

CVM is generally used as an economic valuation tool and makes use of utilitarian assumptions for value. CVM is utilitarian in the sense that it aims to measure the utility - the total satisfaction received from consuming a good or service - gains and losses from individuals through the use of questionnaires. The reason why CVM and other similar methods measure utility is because utility represent a unidimensional denominator by which all wants and needs are reviewed (Dachary-Bernard & Rambonilaza, 2012). Under the assumption that consumers will strive to maximize their utility (i.e. become maximally satisfied with the resources to your disposal) the concept of utility can be considered an indication of a price or value of the good or service in question (Dachary-Bernard & Rambonilaza, 2012).

In capitalist societies monetary terms are used in utilitarian frameworks to represent costs and benefits. Monetary terms thereby render all things in that same taxonomic class of goods commensurable (Harvey & Braun, 1996). Although using a monetary term as a proxy for utility is more often than not used for valuations (Costa, Caldas, Coelho, Ferreira, & Gonçalves, 2016; Dachary-Bernard & Rambonilaza, 2012; Hanley, Spash, & Walker, 1995), it is not a prerequisite of CVM to express utility in such a manner (Dachary-Bernard & Rambonilaza, 2012). Moreover, the purpose of economic evaluation is not to solely put an economic value on nature, but to translate the value of gains and losses under one denominator that will allow comparison with other societal issues using an economic rationale.

### **2.2.1 Merits**

There are various advantages for using CVM for assessing the value of natural resources. First, there are no markets in economic terms for what this thesis aims to measure,

namely; the value of hedges. As of now, there is no defined value of hedges in Switzerland, which might induce similar environmental destruction or negligence similar to the earlier mentioned situation in the 20th century United Kingdom. This thesis uses CVM to investigate such a value and to highlight the importance of hedges in agricultural areas in Switzerland. In continuation of this argument Hanemann (1994) argues that it worse to not measure non-monetary values at all than to measure them through CVM, despite raised critiques that this thesis discusses later on.

Second, CVM allows translation of non-economic values in monetary terms. This translation allows for a (subconscious) comparison of different utility levels that can be achieved with the financial means at one's disposal. Under the assumption that individuals are to a degree driven by an economic rational, respondents will deliberate over the fact whether a payment for the protection and promotion of hedges maximizes their utility with the resources (i.e. financial means) at their disposal. Furthermore, by using monetary terms, individuals instantly and perhaps unconsciously compare the perceived value of the good/service in question to all other methods those individuals have of obtaining utility. In this sense inquiring after value in monetary terms create numerous hypothetical alternative situations, which are all instantaneously evaluated.

Third, although CVM is heavily critiqued upon, numerous practical failings of the methodology can be overcome with small adjustments to the 'common' design of CVM. This will be discussed in the next section. Improving CVM in such a way would mean its capabilities to measure value of non-monetary goods would greatly improve.

Fourth, CVM is also critiqued upon the moral assumption that underlie the method. CVM however uses the same moral assumptions (i.e. a utilitarian framework) as the target organization uses (i.e. the federal government of Switzerland). Subsequently, CVM (combined with the social return on investment methodology) produces results in a monetary

fashion that fit the economic and utilitarian rationale that underlies contemporary policy analysis Hackett (2010) while still emphasizing the importance of non-economic values.

### **2.2.2 Critiques**

The use of CVM however, has been often critiqued for assessing the monetary value of natural resources. These critiques can be roughly categorized in the following types: (1) it commodifies nature through the use of a monetary denominator (Castree, 2003; Dendoncker, Keune, Jacobs, & Gómez-Baggethun, 2013; Farber et al., 2002; Kallis, Gómez-Baggethun, & Zografos, 2013; Potter & Tilzey, 2005; Salles, 2011), (2) the utilitarian framework pertains a bias towards utilitarian ideology and preferences through the use of a monetary terms as a homogenizing denominator (Kallis et al., 2013; Kumar & Kumar, 2008; Rosenberger, Peterson, Clarke, & Brown, 2003; Salles, 2011; Spash, 1993, 1997), (3) the use of a monetary denominator represents a bias of human interests in nature and ignores the intrinsic values and rights of nature itself (Bockstael et al., 2000; Costa et al., 2016; de Groot et al., 2010; Dendoncker et al., 2013; Farrell, 2007; Laurans, Rankovic, Billé, Pirard, & Mermet, 2013; Salles, 2011; Spash, 1997; Tagliafierro, Longo, Van Eetvelde, Antrop, & Hutchinson, 2013). In this section such critiques will be elaborated upon and, when possible, the barriers that such critiques constitute will be overcome by adjustments of the CVM.

#### ***Regarding the commodification of nature***

There is a trend of increasingly commodifying nature to assess the economic and social costs of anthropogenic activities (Castree, 2003). Sectors in which nature is commonly commodified are bioprospecting and ecotourism among others. Evidently, this study also commodifies nature in the sense that a hypothetical market price is put upon a natural object; in this case hedges.

The hypothetical market price of the difference value sources under investigation is in this study captured by the concept Willingness To Pay (WTP). Although the use of WTP is rather common in economic valuation of nature, various concerns have been expressed concerning the validity of WTP. The main concerns refers to the uncertainty of respondents regarding WTP and the observed differences between WTP and Willingness To Accept Compensation (WTAC),

Although CVM depends on stated preference, it can be argued that even the stated preferences can be considered unreliable. One of the more famous critiques upon CVM for translating non-monetary values in monetary terms is perhaps the article of Diamond and Hausman (1994). The authors stated that CVM should not be used as a basis for policy, because respondents are uncertainty of their answers regarding WTP questions. In continuation of this argument Diamond and Hausman (1994) observe that there are differences between WTP and WTAC, which gives rise to skepticism regarding the inconsistencies in replications of CVM studies.

Despite the fact that Diamond and Hausman (1994) arguments are based upon a biased selection of works that concern WTP studies (W. M. Hanemann, 2003), this thesis will elaborate on how to overcome the issue of uncertainty and to understand the differences between WTP and WTAC in CVM.

Respondents themselves might be uncertain what exactly their utility derived from a hypothetical situation is and how to state this preference (Hitlin & Piliavin, 2004; Shaikh, Sun, & Van Kooten, 2007; Voltaire, Pirrone, & Bailly, 2013). This uncertainty is argued to have five different sources (Shaikh et al., 2007). First there is a lack of experience or unfamiliarity with the good being evaluated. Second there might be uncertainty regarding prices of both substitutes and complementary goods. Third, there might be insufficient information about the hypothetical situation. Fourth, uncertainty might be caused by the

inability to make a tradeoff between the good or service in question and money expenditures. Fifth, there might be difficulty of understanding the hypothetical situation and the policy therein proposed.

In order to deal with uncertainty in responses, Voltaire et al. (2013) provides respondents in his survey with one of two possible ways in which to value the situation in question. The first possible valuation method is to state an exact maximum willingness to pay. The second possible valuation method is to state an interval of WTP by means of a minimum WTP and a maximum WTP. Within this method it is assumed that all individuals have a certain specific WTP, but some of those individuals are incapable of exactly pinpointing this WTP due to uncertainty. The result is that individuals who are certain of their WTP choose the first option, whereas individuals that could not indicate an exact WTP will indicate an interval. (Voltaire et al., 2013)

In order to arrive at an estimate of the WTP of uncertain individuals, Voltaire et al. (2013) use a degree of uncertainty which formulated as:

*Equation 1 The degree of a respondents uncertainty (Voltaire et al., 2013)*

$$Uncertainty = \frac{Upper\ bound - Lower\ bound}{Upper\ bound} * 100$$

By enabling respondents to portray their uncertainty concerning the questions in their answers, the survey on the one hand tries to improve reliability and on the other enables the survey itself to ‘tell a story’ concerning the uncertainty of respondents. By capturing uncertainty in this manner, the uncertainty becomes the likelihood that a respondent will **not** pay their maximum amount. Similarly, the certainty of a respondent becomes the likelihood that he/she will pay their maximum WTP. When translating this into a singular WTP, this research will use the following formula to arrive at an estimated WTP that includes the uncertainty marge:

*Equation 2 Estimated Willingness To Pay using a measure of uncertainty (Voltaire et al., 2013)*

$$WTP (estimated) = \text{Upperbound} - \frac{\text{Upper bound} - \text{Lower bound}}{1} * \text{Uncertainty}$$

By using such a formula, uncertainty becomes a negative influence the willingness to pay. It must be mentioned that the estimated WTP is not the stated preference but rather, as the name suggests, an estimation of the WTP. It is important to make such a distinction because this also means that the results must not be regarded as a stated preference.

Regarding the continuation of the argument made by Diamond and Hausman (1994), there are differences between WTP and WTAC in CVM studies (Knetsch & Sinden, 1984; (W. M. Hanemann, 2003; Isoni, 2011; Kling, List, & Zhao, 2013; Kolstad & Guzman, 1999; Parks & Gowdy, 2013; Whittington, Adamowicz, & Lloyd-Smith, 2016). Under utilitarian assumptions, the hypothetical WTP should (at least) approximate a hypothetical WTAC for the same good. Individuals who display large differences between WTA and WTAC are either undervaluing potential gains or overvaluing potential losses and thus behave irrationally and consequently also achieve a lower level of well-being than if they behave according to utility maximization theory (Knetsch & Sinden, 1984). In actual markets (i.e. a carton of milk for example) WTP and WTAC are often quite similar, whereas hypothetical markets, such as economic valuation of nature, are more likely to exhibit disparities between WTP and WTAC (Kolstad & Guzman, 1999).

A multitude of explanations has been given concerning the disparities between WTP and WTAC. Perhaps the most notable of such explanations is the endowment-effect or the substitution-effect. The endowment-effect is often explained as follows: In a valuation paradigm, people will tend to pay more to retain something they own than to obtain something they do not own – even when there is no cause for attachment, or even if the item was only obtained minutes ago (Morewedge & Giblin, 2015). This leads to think that increases in utility are weighted by a relatively small marginal utility, whereas decreases in

utility are weighted by a much larger marginal utility (Knetsch & Sinden, 1984). The substitution-effect refers to the degree of substitution between goods or services. The degree of substitution is lower when it concerns the WTP and WTAC for nonmarket goods with imperfect substitutes, for example reduced health risk (Shogren, Shin, Hayes, & Kliebenstein, 1994). Therefore one can expect larger difference when participants are put in a valuation paradigm concerning environmental trade-offs.

Rather than concluding like Diamond and Hausman (1994) that the observed differences between WTP and WTAC determine the unsuitability of CVM for policy analysis, I argue that the endowment effect and substitution effect can explain such differences and does not make CVM unsuitable for policy analysis. For example, farmers who do receive a direct payment concerning the promotion and preservation of hedges, maintain the hedges and have the hedges in close proximity, might feel a sense of ownership over those hedges, even though they contribute to public goods such as landscape aesthetics. Furthermore, there is no real substitution for the policy that is investigated, meaning that the policy might be overvalued or undervalued due to the sole reason that respondents are unable to perceive a substitute for such a policy. This however has to be taken into account when interpreting the results.

In the theoretical framework the moral problematics of using a monetary denominator were elaborated upon. Since this research values trade-offs and change, monetary terms provide the most practical possible denominator (Bockstael et al., 2000). Using a monetary denominator in CVM is very common in such a valuation and has significant legal precedence (Bockstael et al., 2000) as well as experienced extensive critique that identified it flaws (Carson, 2012; S. Liu, 2006). WTP will be used to as an indicator for the value of different value sources. In order to deal with the possible uncertainty of respondents regarding the questions, the calculations of Voltaire et al. (2013) will be employed.

### ***Regarding human interests***

It is argued that utilitarian frameworks and especially CVM methodology only captures human interests as values due to the prevalence of monetary assessments in such methodologies (Salles, 2011) and monetary assessments are an utterly human construct. Arguably, intrinsic values and rights such as the rights of species or future generations are not included in utilitarian frameworks, or at least not enough. This is because such interests are still not voiced since the beneficiaries are not existent yet or have no way to communicate a demand and thereby influence the price of something. However the prevalence of monetary assessments does not mean that only human values and interests are represented because through human interests also environmental values can be incorporated within economic valuation (Salles, 2011). This study therefore incorporates a selection of ‘responsible men and women’ that are expected to exhibit non-anthropocentric value beliefs in order to cancel out the anthropocentric bias of human interest within the results.

### ***Regarding the utilitarian bias***

Utilitarian frameworks for valuation methodologies assume that individuals are able and willing to consider tradeoffs that are comparable to the quantity and quality of the good/service in question in order to maximize their utility through preferences and thus follow a utilitarian philosophy (Kumar & Kumar, 2008; Spash, 1997). Perhaps this issue is the most problematic in the sense that it pertains a very specific and practical manifestation of a bias of worldviews that is not easily accounted for within economic valuation.

Utilitarian frameworks of economic valuation are inherently philosophically at odds with individuals holding deontological ethical values (Spash, 1993). This debate is often referred to as the incommensurability debate, which revolves around the issue whether nature can be compared and traded with anthropogenic activities.



On one side of this debate, proponents of utilitarian frameworks assume individuals to be rational and allow substitutability between values and market values. This concept is often described by the colloquialism of ‘everybody has their price’ (Spash, 1997). This is a consequentialist approach of the word value in the sense that the justification of potentially replacing nature with anthropogenic activities is judged upon the consequences (i.e. when the benefits outweigh the costs). Thus such proponents also allow a comparison between natural resources and anthropogenic activities, often done through monetary assessment of values.

On the other end of the spectrum are the proponents of deontological worldviews. Deontological environmental positions have their roots in Kantian morality and express a belief in the inherent and inviolable value of nature. Such proponents deem replacing nature with anthropogenic activities wrong not on the consequences of such a replacement but rather on the act of replacement itself. In other words, a deontological worldview denies the substitutability between natural and human good and/or services and thereby in a practical sense the monetary valuation of natural resources.

It is because of this philosophical difference - that expresses itself in the deontological rejection of economic logic - that often people who have deontological beliefs are regarded as unsuitable for economic analysis and therefore are left out of the analysis (Kontoleon, Macrory & Swanson, 2002). Deontological beliefs express themselves in economic valuations as lexicographic preferences (Hanley et al., 1995). Lexicographic preferences describe a preference of an economic agent of any amount of one good or service (X) over any amount of another good or service (Y). This provides a problem for economic valuation since economic analysis is based upon the earlier mentioned principle of commensurability (Centemeri, 2015). For an economic agent that shows a lexicographic preference, good or service X is infinitely more worth than good or service Y. Strictly speaking, such a preference would dwarf any ‘realistic’ preference of payment for good or service Y which is considered

as irrational and ‘undemocratic’ in economic valuation methodologies (Spash, 1997). Economic valuation is therefore unable to systematically account for lexicographic preferences. There is a vast amount of evidence indicating that (perhaps especially) in valuing natural goods or services actors are neither rational according to economic logic nor do they have consistent preferences (Chunling, 2016; Fishburn, 1975; Giarlotta & Watson, 2014; Lee, 2016; Petri & Voorneveld, 2016; Rosenberger et al., 2003; Saban & Sethuraman, 2014; Tetlock, 1986).

This research has therefore included a lexicographic preference option in the survey. If selected, such an option would purposefully indicate a lexicographic preference rather than to exclude it. If a significant number of respondents indicates a lexicographic preference towards the value paradigm, the methodology could rule itself out on the basis of CVM being unsuitable to deal with the type of responses. The critical threshold of incompatibility of the methodology is however to be identified by a political process of relevant stakeholders, thereby acknowledging the political nature multi-actor value identification and valuation

### **2.3 Hypotheses**

It is expected that the results of this study will indicate that valuing in such a manner (i.e. by accommodating value pluralism) increases the recognized value of natural resources compared to a base-case scenario that uses narrower perceptions of the concept value. In continuation of this argument this study will expect the benefit cost ratio – compared to the base-case scenario – to be much larger, due to the added value of otherwise neglected value sources.

It is also expected that the importance or weighing of different value sources varies between actor groups. Most likely, the weighing of different value sources coincides with the interests particular actor groups have in protecting or promoting the natural resource in question.

## 2.4 Broadening of the horizon

CVM is a heavily critiqued and debated methodology. One could argue that economic valuations do not support public policies in counteracting ecological degradation and biodiversity loss (Laurans et al., 2013) as well as one might expected. Furthermore, economic valuation of natural resources with CVM might enhance the ecological degradation by wrongly placing *a value* or by placing the wrong value on nature.

Although narrow economic valuations are widely considered to be inappropriate to deal with non-monetary values (W. M. Hanemann, 2003), it must be said that many authors also recognize that economic valuation methods could also be improved to wield more justified results (M. W. Hanemann, 1994; Laurans et al., 2013). CVM is in this case a practical alternative for a assessing policies that deal with the valuation of natural resources but remains to this day however far from perfect (Carson, 2012).

Improvement and applying perhaps imperfect methodologies that are capable to deal with ‘real world issues’ is exactly what this study hopes to achieve. Slowly but surely, the incommensurability debate is stagnating and “*mainstreaming a new culture of valuation can only be achieved by moving the scientific field beyond heuristic interdisciplinary debates, by learning from real world applications [...] and explicitly choosing for transformative research for sustainability*” (Jacobs et al., 2016: p. 2).

# Chapter Three

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## Case study background

Having set apart the theoretical framework concerning the concept of value and the art of valuation, this section continues with a description of the case study in which the theoretical (and later the methodological) framework is applied to. This chapter starts with a description of the state of the Swiss agricultural sector in relation to its landscape and explains the direct payment system under investigation.

### 3.1 Swiss Landscape

With the rise of environmental politics in Switzerland, the natural resources of the landscape are increasingly recognized as part of the landscape (Kienast, Frick & Steiger, 2013). The Swiss population identifies itself with that same landscape, in living spheres as well in working spheres (Kienast, Frick & Steiger, 2013). The landscape is possibly one of Switzerland's most precious assets (Hofmann et al., 2015). A national landscape observation program (LABES) regularly documents and assesses the state and development of the Swiss landscape based on a number of indicators. LABES investigates the state and development of the landscape quality in Switzerland with 34 indicators, of which 'uniqueness of the landscape', 'beauty of the landscape in the area of residence' and 'perceived landscape quality in the area of residence' are but a few among more quantitative indicators. When sustainably developing the landscape, it is important to observe and preserve both the physical components as the qualitative perception of the landscape (Kienast, Frick & Steiger, 2013).

Over the past 70 years the Swiss landscape however has altered markedly as a result of anthropogenic activity and increasing competition for land-uses (Hofmann et al., 2015; Roth, Schwick & Spichtig, 2010). Especially Switzerland's biodiversity is in a poor state (Hofmann et al., 2015). Habitats for fauna are substantially reduced and a high number of

endangered animals, plants, lichen and fungi constitute a loss of genetic biodiversity. Other environmental problems are the large numbers of alien invasive species, landscape fragmentation, soil sealing, water and air pollution, and deterioration of ecosystem services.

The responsibility for large parts of the above mentioned problems are mainly caused by an increasingly expanding and intensifying agricultural sector. Farmland constitutes a third of the national territory and consequentially shapes the Swiss landscape to a relatively large degree. 13% of that agricultural land is farmed and managed as extensive and low intensive agriculture. (Hofmann et al., 2015)

Because agriculture gives cause for the loss of biodiversity and ecosystem services, cross sectoral approaches were needed to improve the conservation and/or creation of landscape elements in agricultural areas. With the agricultural policy 2014-2017 the federal authorities aim to achieve a more efficient use of resources and the use of production methods that are better adapted to local conditions in order to minimize those negative environmental effects (Hofmann et al., 2015). Because there is no legal basis in Switzerland that regulates or promotes the development of landscape quality on a federal level, the federal government aims to combine municipal, regional, cantonal and federal regulations in order to create a coherent landscape quality policy and in this way attain (and preserve) an optimum landscape quality for the Swiss population.

### **3.2 Direct payments system**

There are a suite of agro-ecological practices designed to mitigate the negative impacts of agriculture on the environment. A popular contemporary neoliberal market instrument to influence agro-ecological practices from a policy perspective are direct payment systems (DPS) in combination with cross-compliance. A commonly known example of such a DPS is the Common Agricultural Policy in the European Union. A DPS is a policy scheme that provides direct monetary payments and other benefits to beneficiaries. Cross-

compliance prescribes the terms on which participants receive designated benefits. There are two types of cross-compliance; voluntary cross-compliance, which enables participants to choose between fulfilling the criteria – and thus receiving benefits – or not and compulsory cross-compliance, which sets the baseline for agricultural practices in the jurisdiction of the policy and consequentially provides no choice between fulfilling the prescribed criteria or not. Especially the direct payments in combination with voluntary cross-compliance is a relatively popular market measure to stimulate voluntary sustainable practice within agricultural sectors. In a sense, these payments compensate the beneficiaries for any individual profits that they might forego in order to prevent negative environmental externalities that impact the whole of society.

Switzerland made a transition from the market support, i.e. production coupled payments, in 1990's (Curry & Stucki, 1997) towards a DPS coupled payment system with cross compliance. In a referendum in 1996 several objectives for the future agricultural policy of Switzerland were identified, namely; resource and landscape protection, food security and encouraging settlements in rural areas (Mann & Lanz, 2014). Such policy objectives with a high democratic legitimacy and clear-cut definitions made the foundation for the DPS for the Swiss agricultural sector of today (Mann & Lanz, 2014).

Every four years the entire payment system is reviewed and adapted. This review takes place in semi-structured expert meetings, wherein (new) targets and goals are (re)formulated.

What makes the Swiss DPS special, is that – in contrast to the Common Agricultural Policy from the European Union – it socially constructed values such as ‘cultural landscapes’ and ‘landscape quality’ uses as integral parts of the DPS. Although the federal government of Switzerland uses various instruments to attain an optimum landscape quality, this research looks specifically towards the direct payment of Landscape Quality payment (LQP) since this

payment puts more emphasis on non-economic appreciation of the landscape. Subsidies for promoting the landscape and biodiversity in cultivated landscapes accounted for 30% of all direct payments in 2014 and are expected to rise to 36% by 2017 (Hofmann et al., 2015). This projected rise in landscape quality related payments indicates an increasing importance of such payments. The LQP is organized in a project-fashion on the cantonal level. One specific project is the subject of this research; the project that concerns itself with hedge sustenance and promotion in the region Neckertal, Sankt Gallen, Switzerland. Therefore the region Neckertal (which is located in the canton Sankt Gallen) will be the geographical delineation of this research.

As described in the introductory chapter, hedges have various apparent relationships with their direct environment. This interconnection between the human systems (agricultural and societal land-uses) and natural systems (ecosystem services of hedges) suggest that their value assessments is based upon value plurality. Therefore this project is rather suitable for testing a valuation methodology that is accommodates value plurality .

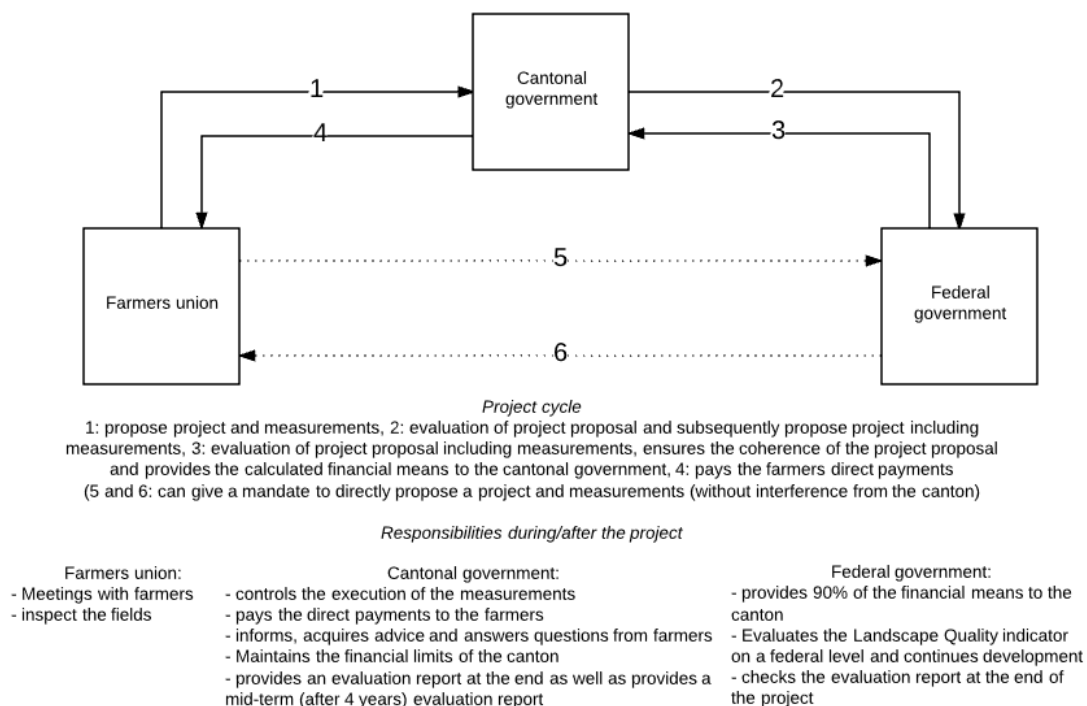


Figure 2 The project structure and responsibilities of different stakeholder groups of the direct payment Landscape Quality indicator (adapted from a figure provided by the Federal Office of Agriculture).

Due to federalism, Switzerland knows a complex division of responsibilities concerning the federally organized LQP. This division of responsibilities is shown in Figure 2. The project cycle starts with a request of the farmers union towards the cantonal government, asking for a project to improve or conserve the landscape. In case of accord, the cantonal government further works out technicalities and specifics of the project and additionally works on future projections of the project. The cantonal government then requests financial means from the federal government. When the financial means are promised by the federal government, the cantonal government will use these means to implement a project on a cantonal level. The details of the program itself will be elaborated upon in the next chapter (Chapter Four).



# Chapter Four

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## **Methodological framework**

This chapter explains the methodology that is used (Social Return On Investment) and follows the first three steps of the methodology that precede the data analysis.

It becomes clear that a methodology is needed that on the one hand can deal with value pluralism and on the other hand could provide an economic rationale. As mentioned earlier, many trade-offs in public land-uses utilize economic valuation methodologies that provide relatively simple decision-making criteria. This thesis uses the same decision rationale (i.e. economic rationale) because the aim of this thesis is to improve valuation for the federal and/or cantonal government of Switzerland. Because these governments generally use such a rationale for decision-making, results following a similar rationale are therefore relatively easy to understand and the method easy to adopt. The methodology used in this research preferably also contributes to an understanding of appreciation regarding the policy. By exploring which value sources are prevalent with which actor groups, it becomes clear what types of values are regarded as important in the policy. Organizational learning is important due to the fact that it is often associated with good governance and sustainable development (Filatotchev, Wright, Uhlenbruck, Tihanyi, & Hoskisson, 2003; Kemp, Parto, & Gibson, 2005).

### **4.1 Social Return on Investment**

There is one methodology that fits the criteria described above rather well, namely; the Social Return On Investment methodology (SROI). SROI is a principle-based methodology that aims to measure value in the broader sense of the word and not just in economic measures. A more inclusive definition of value is believed to eventually change decision making and ultimately decrease inequality and environmental degradation (Nicholls, Lawlor, Neitzert, & Goodspeed, 2012). In this sense, SROI seems to fulfill our criteria

perfectly since it allows for broader uses of the concept of value, is aimed at influencing decision-making and promotes process-learning. Furthermore, although SROI allows a broader use of the concept of value – i.e. social and environmental values are included - , there is still an emphasis on the use of financial proxies which are commonly used by public governance bodies within decision-making rationale. Thus SROI recognizes and identifies various needs and interests of various stakeholders through a monetized language (Arvidson, Lyon, McKay, & Moro, 2013). As Nicholls et al. (2012: p. 8) put it, SROI “tells the story of how change is being created by measuring social, environmental and economic outcomes and uses monetary values to represent them”. This ‘story’ enables decision-makers to learn from potential mistakes and further improve their knowledge concerning the subject as well as the process of making trade-offs. The learning facet in SROI strengthens the emphasis on the learning facilitated through the earlier mentioned investigation of the nature of value.

The SROI-methodology is based upon seven principles (Nicholls et al., 2012), namely; (1) involving stakeholders, (2) understanding what changes, (3) value the things that matter, (4) only include what is material, (5) do not over-claim, (6) be transparent and (7) verify the results. The principles of the methodology refer to issues that require biased decisions throughout the analysis. Some of these principles are rather straight-forward whereas others might need further clarification. According to the third principle, objects valued in the research should matter in the sense that they are deemed relevant by the identified stakeholders. In this manner the research is bounded by the interest of stakeholders instead of that of the researcher. According to the fourth principle, the research should only include ‘material’ things. Material is meant here as information that has the potential to affect the readers’ or stakeholders’ decision and consequently their actions. The fifth principle shows a similarity with CBA methodology since it warns about so-called ‘double counting’ in which certain effects are overvalued due to their indirect influences on other effects. The

principle of over-claiming is therefore a warning and a plea for a strict identification of the studied. (Nicholls et al., 2012)

There are two types of SROI's; evaluative SROIs which are conducted retrospectively based upon actual outcomes that have already taken place and forecast SROI which predicts how much social value will be created if the activities meet their intended outcomes. This research will conduct an evaluative SROI for the obvious reason that the policy program which is to be evaluated already is in place since three years.

An SROI analysis makes use of six specific phases (Nicholls et al., 2012), namely; (1) establishing scope and identifying key stakeholders, (2) mapping outcomes, (3) evidencing outcomes and giving them a value, (4) establishing impact, (5) calculating the SROI and (6) reporting, using and embedding. In the following sections (the results of) these steps will be elaborate upon.

#### **4.1.1 Establishing scope and identifying key stakeholders**

The first step of SROI is to establish the boundaries which your SROI analysis will cover, who will be involved in the process and how (Nicholls et al., 2012). In order to successfully generate reasonable boundaries, this study has used Critical System Heuristics (CSH) method.

“CSH is a framework for reflective practice based on practical philosophy and system thinking” (Ulrich, 2005: p. 1). Using CSH is often used to explore the unavoidable selectivity of claims in the boundary judgements of a research through systemic triangulation by exploring and distinguishing observations, evaluations and boundary judgements. Such selectivity of claims is unavoidable since one cannot research an issue or situation within (implicitly) implying boundary judgements. The unavoidable selectivity of boundary judgements that surface through this methodology cannot be right or wrong. The

methodology rather improves the transparency of the implicit choices made by the researcher. (Ulrich, 2005)

Through a series of questions (Table 1), CSH reveals the anatomy of the purposefulness of a research (Ulrich & Reynolds, 2010) by exploring the sources of motivation, power, knowledge and legitimation of the issue or research. In the following section these questions are answered and the sources of motivation, power, knowledge and legitimation of this research explored.

Table 1 The boundary categories and questions of CSH adapted from Ulrich & Reynolds (2010)

<b>SOURCES OF INFLUENCE</b>	<b>STAKEHOLDERS</b>	<b>STAKES</b>	<b>STAKEHOLDER ISSUES</b>
<b>MOTIVATION</b>	<b>Beneficiary</b> What ought to be the intended beneficiary of the system (S)?	<b>Purpose</b> What ought to be the purpose of the S?	<b>Measure of improvement</b> What ought to be the measure of success of S?
<b>POWER</b>	<b>Decision maker</b> Who ought to be in control of the conditions of success of S?	<b>Resources</b> What conditions of success ought to be under the control of S?	<b>Decision environment</b> What ought to be the intended beneficiary of the system (S)?
<b>KNOWLEDGE</b>	<b>Expert</b> Who ought to be providing relevant knowledge and skills for S?	<b>Expertise</b> What ought to be relevant new knowledge and skills for S?	<b>Guarantor</b> What ought to be regarded as assurances of successful implementation?
<b>LEGITIMACY</b>	<b>Witness</b> Who ought to be representing the interests of those negatively affected by but not involved with S?	<b>Emancipation</b> What ought to be the opportunities for the interests of those negatively affected to have expression and freedom from the worldview of S?	<b>Worldview</b> What space ought to be available for reconciling differing worldviews regarding S among those involved and affected?

### *Sources of motivation*

The beneficiaries of this research are the federal and cantonal government of Switzerland. Therefore, this research has established contact with both parties and inquired after their interests to contribute to this research. The measure of success of this research can be considered the measure in which respondents and policymakers from the federal and cantonal governments feel comfortable with the results of the research. Therefore a follow-up interview was set up with every respondent who indicated a willingness to participate in such a follow-up interview. Respondents are then asked why they think the findings (the perceived value) are higher than the investments, what they would like to change about the project and

if they would be willing to participate in a participatory workshop that could help identify a commonly agreed value of hedges.

### *Sources of power*

Although in the case study the decision maker is obviously a renowned source of power, the measure of success as described above can be indicated by every participant of the survey. The research will not be used for solely estimating the effectiveness of the policy, but also – and perhaps more importantly – to evaluate the legitimacy and effectiveness of the methodology developed from a civil society point-of-view. An unavoidable consequence of this interplay between the measure of success and the decision makers that identify potential improvements of this success is however that roughly the same people who provide data for the case study will consequentially also be the judges of the success of this methodology. In a sense, strategic answers on the survey could not only undermine the representation of reality of this research but also undermine the legitimacy of the methodology. In order to deal with this issue, the survey contains an appeal on the honesty of the respondent as well as an elaboration of the absence of ‘right and wrong’ answers in this survey.

### *Sources of knowledge*

With regard to knowledgeable actors, this research will only use experts for providing contextual information concerning the structure and organization of the public policy under investigation in this research. Open interviews were taken with policy makers and academics that are currently employed at the federal or cantonal level in a capacity that is relevant for this study. By using such an approach, this research aims to avoid more normative sources of knowledge.

The guarantor of success in this research is based upon several factors. First, consensus among experts concerning the validity of the methodology and its application is considered to be a success in the sense that this methodology in that case would have

successfully contributed to a greater understanding of the concept of value and improved economic valuation tools for public decision making. Second, involving all stakeholders is considered a guarantor of success in the sense that all stakeholders then actively participate in the creation of value concerning hedges in St. Gallen.

### ***Sources of legitimation***

Various exploratory open interviews revealed the following relevant actor groups (Table 2):

*Table 2 Identified relevant actor groups*

<b>Actor groups</b>	<b>Actor level</b>	<b>Identified actors</b>
Policy makers	Federal	Federal Office of Agriculture (FOAG) Federal Office for the Environment (FOEN)
	Cantonal	Canton of Sankt Gallen
Environmental Pressure Groups	Federal	Stiftung Landschaftsschutz Schweiz
Academics	Cantonal	The institute for Economy and Ecology at the University of Sankt Gallen
Farmers union	Federal	Schweizer Bauernverband
Civil society	Individual	Farmers Inhabitants of Neckertal, Sankt Gallen

The actor groups were identified on the basis of several exploratory interviews. This research carefully selected employees of organizations – such as the FOAG, FOEN, cantonal government or farmers union – to represent these groups.

The most ‘vulnerable’ actor group that is affected by the policy in place and have the least impact on the development of the policy is most likely civil society. Within that society,

farmers are most directly impacted since the policy concerns their income and change takes place in their vicinity, whereas inhabitants are most likely affected through the change in landscape.

Within CSH an important aspect is also the representation of groups that cannot be heard, i.e. future generations. Therefore the interests of non-human nature and futures generations are consciously included in this research through the involvement of “responsible men and women” in the form of environmental action groups.

The legitimacy of this research lies in the participation of relevant policy makers in shaping the research, the transparency of calculations as well as normative assumptions and clarifications in the decision process. The worldviews that dominate this research are represented by the system boundary judgements and value systems across stakeholders that are apparent in their responses in the data collection. This research deliberately includes a multitude of stakeholder groups with diverse interests and worldviews. By giving equal weighing of various stakeholder groups, the worldviews that underlie responses can be considered equal as well.

#### **4.1.2 Mapping outcomes**

This section of the SROI is aimed at creating an understanding of the relationship between the inputs, outputs and outcomes through stakeholder engagement. This phase was again based upon the earlier mentioned exploratory interviews.

##### ***Organization***

The most relevant organization for this particular policy is the canton of St. Gallen, since the LQP under investigation is governed on the cantonal level.

##### ***Objectives***

The objectives regarding hedges of the policy are the promotion and preservation of natural structures in ‘open country’. Open country refers to wildland areas that are dominated

by wood-like vegetation but are not of the ‘forest’ typology (Burkart, 2005). By promoting and preserving such structure, St. Gallen hopes to increase the attractiveness of hiking trails, recreation facilities and preserve the historic landscape (Hug, Gerlach, & Matjaz, 2014).

### *Scope*

Within the project description of the LQP in St. Gallen, a specific focus will be put on the area of Neckertal, Canton Sankt Gallen, Switzerland, since this area is the geographical focus area of the LQP. Since overarching actors on a nation-wide level such the federal government, cantonal government, environmental pressure groups and academics are also relevant for the development of the LQP, this research includes such actors. The municipality of Neckertal can be considered a pilot study for evaluating this direct payment policy within Switzerland.

Neckertal is one of the more inhabited municipalities in St. Gallen with a total surface area of 4.903 hectares of which 53,4% of that area – as of 2008 - is used for agricultural purposes. The total population of Neckertal is 4.061 with a population density of 81 people per square kilometer. (STADA2, 2017)

In the project description, hedges are defined as border structures between agricultural acreages or hedges with intertwined branches or boards that function as fences (Hug, 2015). Criteria for such hedges are the following (Hug, 2015):



Table 3 Identification criteria for hedges and hedgerows (Hug, 2015)

Breadth: ca. 0.5m – 1m (measured from the base, ca. 0.5m from the ground)

Height: ca. 1m

Has a fence character

Last cut was max. 4 years past

Contains almost exclusively one of the following types: hazelnut (*Coryllus avellane*), ash-tree (*Fraxinus excelsior*) or hornbeam (*Carpinus betulus*)

#### ***4.1.3 Relation between inputs, outputs and outcomes***

The federal government provides 90% of the requested financial means to the cantonal government – which subsequently pays the last 10% of the budget -. The cantonal government then continues by providing such payments to farmers who voluntarily apply for the direct payments program at the cantonal government. This research limits itself to only the direct inputs and the perceived direct outputs and outcomes, meaning that the inputs refer to cantonal budget for the execution of the LQP in Neckertal (supplied by the federal government and the cantonal government), whereas the outputs refer to the perceived value of hedges in Neckertal (the average WTP among respondents). This research thereby takes a societal welfare perspective whereby the outcome is not affected by the distribution of utility (i.e. welfare) within society itself. Individual costs made by individual farmers for maintaining hedges are therefore not taken into account in this research because of the fact that the direct payment is received on a voluntary basis, thereby assuming that farmers are compensated for their extra effort through the direct payment. Including such costs thereby would contribute to double counting from a societal welfare perspective. The inputs and outputs of this research are measured in static monetary terms per year, since test surveys revealed that respondents would be unable to indicate numerical, dynamic and changing

values over time for specific aspects of hedges. The outcome refers to the cost-effectiveness or cost-effectiveness ratio of the policy.

The next step in the SROI is to value the input of this research and translate this into the same unit of analysis as the outputs: i.e. Swiss Francs (CHF) per capita per year. The landscape quality indicator as prescribed by the cantonal government allows for the compensation of 3,- CHF per linear meter hedge per year for preserving and maintaining a hedge or hedgerow as described above (p. 42 – 43). Furthermore, the LWA SG expected that none of these direct payments could be combined with other direct payments. (Hug et al., 2014)

The budget of the Landscape Quality project in Neckertal was estimated of 437.366,- CHF per year by the Agricultural Office of St. Gallen (LWA SG). 15.000,- CHF of the total budget was allotted to the promotion and preservation of hedges in Neckertal. The LWA SG estimated a total of 10.000 linear meter of hedges resided in Neckertal of which 5.000 linear meter of hedges was expected to apply for the direct payment and consequentially receive the direct payment. (Hug et al., 2014)

Therefore the LWA SG projected the costs of this particular indicator on the basis of the following calculation:

*Equation 3 Total cantonal budget in Swiss Francs*

$$\text{Total CHF per year} = \text{Nominated hedges and hedgerows (lm)} \times 3 \text{ (CHF)} = 15.000$$

To allow comparison between the investment and the perceived return the population of Neckertal must be calculated in order to obtain a budget per capita. The formula used for this is:

*Equation 4 CHF per capita per year.*

$$\begin{aligned} \text{CHF per capita} &= \frac{\text{investment cost (i)}}{\text{population (i)}} \\ &= \frac{\text{investment cost (2014)}}{\text{population (2014)}} + \frac{\text{investment cost (2015)}}{\text{population (2015)}} + \frac{\text{investment cost (2016)}}{\text{population (2016)}} \end{aligned}$$

*Equation 5 Average CHF per capita per year. Data retrieved from STADA2, (2017)*

$$\text{Average CHF per capita per year} = \frac{\frac{15.000}{4053} + \frac{15.000}{4061} + \frac{15.000}{4059}}{3} \approx 3,70 \text{ CHF}$$

The cantonal government of St. Gallen was invited on numerous occasions to give further clarification and elaboration on the projected scenarios by the LWA SG, which was to be used as a base case scenario for this research. The cantonal government has however not participated in this study. Therefore a more detailed description of the investments or the development of a base-case scenario remains absent.

#### **4.1.5 Evidencing outcomes and giving them a value**

The outcomes of this research refers to the answers (Willigness-To-Pay) of respondents of the survey. The survey was constructed in collaboration with an expert at the Pädagogische Hochschule, Bern, Switzerland, in order to balance the lengthiness of the survey and the information provided and required in the survey. Further collaboration tailored the survey to Swiss expectations and practices of commonly used CVM formats.

#### ***Sample and code of conduct***

Due to the refusal of several actor groups that were invited to participate in the survey, the following categories of the respondents can be identified; federal level actors (federal government, farmer's union and environmental pressure organizations) and individual level actors (civil society). The actors on a federal level were selected due to their relevance to this study. The individual level actors were sampled by doing door to door surveys in the villages Brunnadern and in Mogelsberg. Both the villages of Brunnadern and Mogelsberg reside in

the municipality of Neckertal, canton Sankt Gallen, Switzerland. Brunnadern and Mogelsberg are henceforth referred to as Neckertal. Students from the University of Bern and the Pädagogische Hochschule Bern helped with taking the interviews in Neckertal. Each second door was surveyed because of the relatively small size of the village. Additionally, in order to create the maximize response to the survey, the surveys were conducted on a Saturday, because this research estimated most people willing and able to do the survey. To interview respondents at home also provides a safe and calm environment for the respondents so that they can consider their answers carefully (W. M. Hanemann, 2003).

### *Survey*

One could argue that the higher the familiarity of an individual is or the better informed an individual is, the more sensible (and possibly higher) an individual's willingness to pay will be (Hanley et al., 1995; Kolstad & Guzman, 1999). Because this research relies on perceived value of the WTP, information is expected to influence the WTP. Therefore, two sections concerning information about the research and the policy were added to provide respondents with at least the same basis of information. The survey incorporated also generic questions about personal characteristics in the survey that were partly made to make the participant feel relaxed and partly to provide this study of descriptions of the sample population.

The second section of the survey contained questions regarding the WTP for each of the value sources identified by Jackendoff (2006). For each source the respondent could provide their WTP in three ways; (1) indicating a precise WTP, (2) indicating a range of WTP and thereby indicated a measure of uncertainty and (3) the option of 'priceless'. The incompatibility option of payment is specifically incorporated for those persons who hold deontological views/lexicographic preference. The survey will thereby generate a percentage of respondents that indicates both the measure of pricelessness as well as the appropriability

of the survey for measuring this value. Before each question inquiring after the WTP for a value source, control-questions inquired in a qualitative manner after if people had a WTP for this particular value source. This was done through a statement whereby the respondent had to fill in the appropriate word(s) that were organized in a Likert-scale fashion.

At the end of the survey the various WTP's of the value sources were aggregated and respondents were asked if they agreed with the aggregated total. If not, participants were asked to review their payments and change them accordingly. Such a manner of aggregating value sources in such a way has two distinct advantages. First, although respondents are informed prior to the WTP-questions that the results will be aggregated, respondents still had the option to change the total in case the aggregation of individual value sources delivered an unexpected result. Second, in this manner of aggregation respondents were encouraged to relate the WTP of the value sources between each other as well as between the individual source and the total. In other words: respondents were encouraged to think about the competition and relation between the sources of values. And it is often the case when dealing with value plurality, that values are in competition with one another (Rokeach, 1973). This competition might distort valuations in the sense that through competitions certain values might be enhanced or enlarged (Midgley & Richardson, 2007).

To improve the understanding and the response rate to the inquired payments, examples of waterbodies were included in the question that illustrated the value sources in the questions. Examples of waterbodies were taken since waterbodies have to some degree similar benefits and costs as hedges regarding cultural -, ecological - and social values. The survey thereby refrains from presenting possible answer that relate directly to hedges and at the same time provides an example of the question. Test surveys indicated that without such examples the survey is too abstract and most respondents preferred to ignore WTP related questions.

The survey includes a question regarding the willingness to respond to a follow-up. The aim is to reflect the initial findings to those who are willing to respond, creating a feedback for the survey.

At the end of every interview, respondents are asked to comment on the survey and indicate any problems they encountered during the survey.

# Chapter Five

## Results

This chapter elaborates on the findings and their consecutive analysis. In terms of the SROI methodology, this part can be regarded as the last three stages of the research, namely; establishing impact, calculating the SROI and reporting, using and embedding the results.

### 5.1 General findings

The respondents of the survey (N=34) comprise both randomly selected inhabitants of the municipality of Neckertal and selected experts at the federal government, environmental pressure groups and the farmers union. The total response rate of the survey was 30,15%.

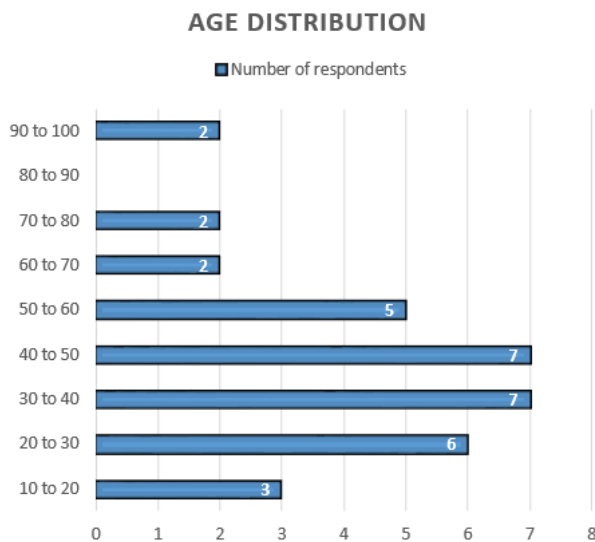


Figure 4 The age distribution within the sample

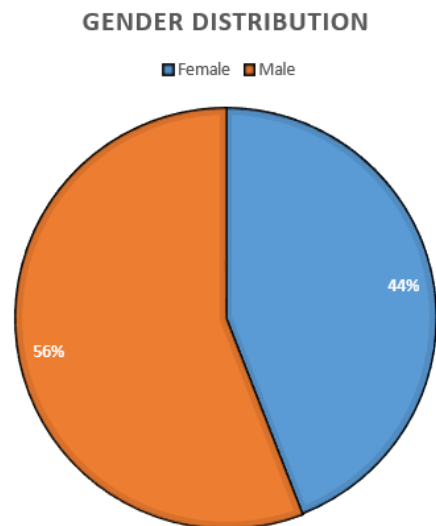


Figure 3 The gender distribution within the sample

The gender distribution of the sample is relatively even considering the sample-size. The age distribution of the sample is however different than the population in the municipality of Neckertal. STADA2 (2017) reports that more than 60% in the municipality is either under 18 years old or older than 65. This survey therefore portrays findings from a much younger population. This difference in age might be explained by the fact that the surveys were conducted in relatively larger towns in Neckertal where the population is expected to be

younger. The larger towns were selected as sample locations due to the lack of mobility and time to do otherwise.

After finishing the survey, 21% of the respondents stated that the survey was complicated. Most difficulties were as expected found in the questions that deal with identifying future costs and benefits of hedges (questions 7 – 9).

Roughly 10% of all respondents indicated such lexicographic preferences and therefore their responses were left out of the analysis. As mentioned earlier, the absence of such responses should be taken into account when interpreting the findings of this survey. This finding indicates that for 10% of all respondents, this survey and presumably the translation of value to monetary terms was an inappropriate manner to document the worth or value of hedges in Neckertal.

The average perceived value of hedges and hedgerows in Neckertal was CHF 169,49 per year with a standard deviation of 164,76. The central limit theorem allows assumptions of a normal distribution when a sample is  $\geq 30$ . Using random number generation based upon the average and the standard deviation, a normal distribution of a hypothetical larger population (Figure 5) could be visualized. Figure 5 indicates that the bulk of the payments would be between 4,- CHF and 334,25 CHF per year.



### Assumed normal distribution of sample population (N = 10.000)

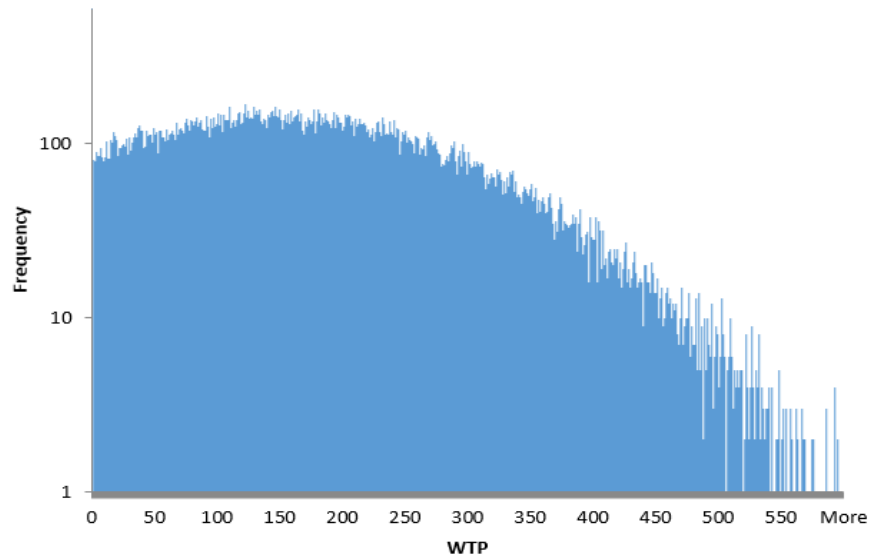


Figure 5 The frequency of WTP of a population of 10.000 by randomly generating respondents based upon an assumed normal distribution of the survey sample (n=34)

The average of the perceived value of hedges is approximately 47 times higher than the investments per capita in Neckertal. Although this relatively high appreciation might be contributed to the novelty of this methodology, the following other explanations cannot be excluded. First, a possible explanation is that in their estimation of costs, the cantonal government was mainly interested in the effects of the policy, disregarding other sources of value. This research was however designed to accommodate value pluralism and could therefore emphasize such a difference. Second, in the survey there is no postulated time horizon for the object to be valued (i.e. a hedge). Respondents are therefore asked to name their perceived value of hedges in a yearly monetary term. Because the landscape quality project is reviewed every four years, it might be possible that the cantonal government expected the project will at least break even in four years. Respondents however might have thought about their yearly WTP for an infinite time-horizon. Third, the respondents in the interview might have diluted the responses on purpose by strategic answering or accidentally diluted the responses by overvaluation (or undervaluation) through poor translations of the

perceived value into monetary terms. Despite the fact that respondents were encouraged to answer as honestly and precisely as possible during the interview, such explanations will always remain with contingent valuation methods. Fourth, ownership and substitutability might explain the relatively large WTP because people either maintain the hedges or know the communities that do that, thereby creating a sense of ownership. As observed in the United Kingdom, hedges can also constitute part of the local cultural identity (Barr & Gillespie, 2000; Oreszczyn & Lane, 2000). Because of this constitution, hedges might not be regarded as substitutable and are therefore particularly highly valued by local residents.

### 5.2 Importance of value sources

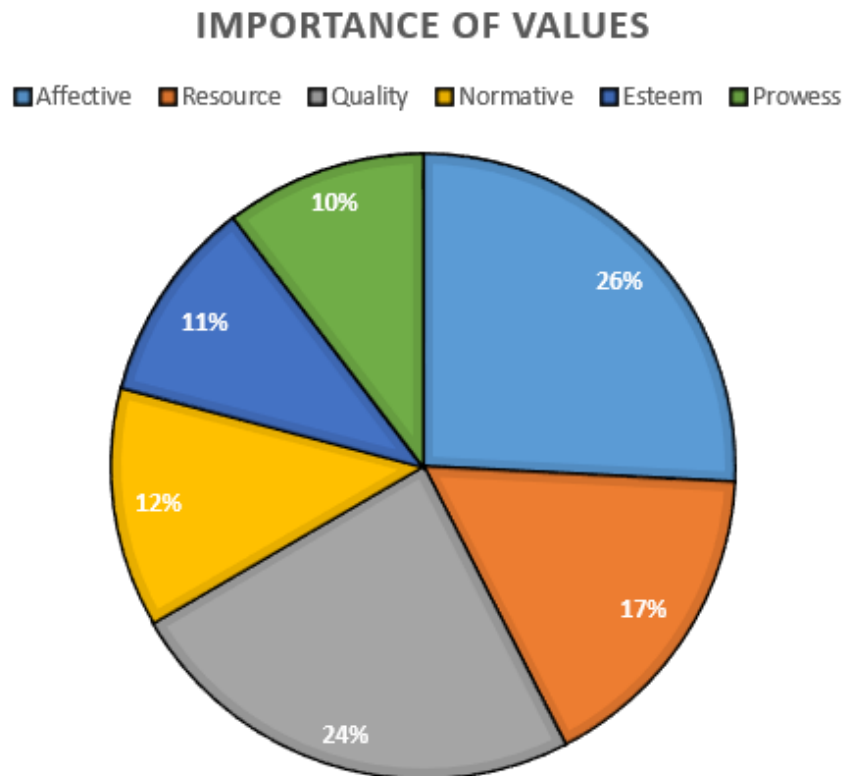


Figure 6 The importance (total value of value source divided by the sum of all value sources) of the value sources identified by Jackendoff (2006).

Within the sample the affective value and quality value seem to be the most important, with a prevalence of 26% and 24% respectively. Resource value is not deemed very important nor

very unimportant in the sample (17%). Normative value (12%), esteem value (11%) and prowess value (10%) constitute the lower bounds of importance.

A likely explanation for these results could be that the tangibility of the value source has a positive relation with the average perceived value. In this sample, the most tangible value sources (i.e. affective value, quality value and resource value) are perceived as most important whereas the less tangible value sources that deal with more abstract concepts constitute the least important value sources. The higher tangible value sources perhaps also are easier to comprehend, thereby reducing the need for rough estimations of the value source and the tendency to overvalue or undervalue.

This hypothesis concerning the relation between tangibility and perceived value is supported by the identified positive and negative effects of hedges on their environment (Figure 7).

Respondents mostly identified cultural services and habitat or supporting services as positive effects. Less tangible ecosystem services such as regulating services were hardly recognized by the respondents. Provisioning services were not much recognized due to the likely unimportance or neglectable quantity of provisions such as firewood or berries/nuts. Most respondents recognized economic effects as the negative affective effects of hedges, strengthening the hypothesis that tangibility has a positive relation with perceived value.

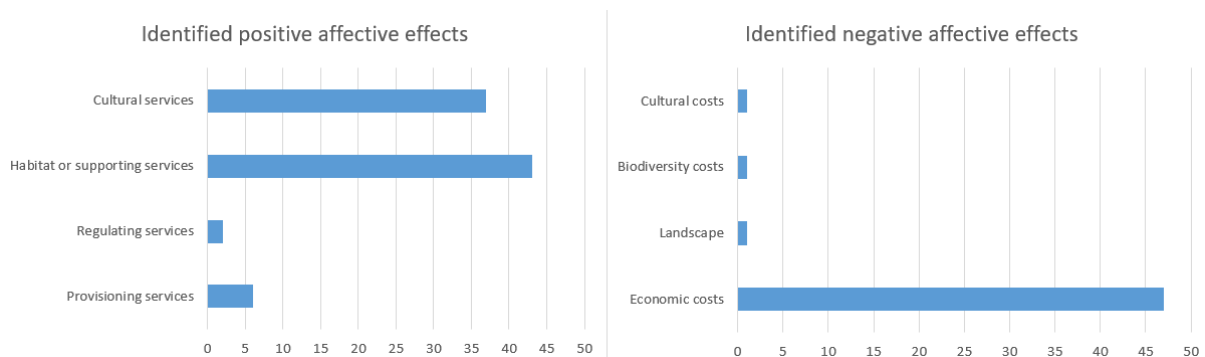


Figure 7 The number of identified positive and negative affective effects of hedges on their environment according to respondents. The positive affective effects have been categorized using the main four categories for ecosystem services by *The Economics of Ecosystems and Biodiversity (TEEB)*

Another possible explanation is that as Jackendoff (2006) indicates, the weighing of value sources is culture dependent and that the Swiss society as a Western capitalist society tends to value affective- and quality values most of the identified value sources.

It could however also be that respondents did not have a particular strong view about hedges, thereby undervaluing (or overvaluing) the value sources that deal with worldviews (normative value and esteem value).

### 5.3 Correlations between dependent and independent variables

In this section I will discuss the characteristics of the sample that potentially influence the WTP, both the average WTP of a respondent as well as the individual value sources. The independent variables that are investigated are gender, actor group, knowledge and age. This study takes a significance level of  $\alpha = 0,1$  due to the sample size of this study. Significant relations are highlighted in **bold green** in the table displaying the relevant significance function. The significance functions varies between Cramer's  $\Phi$  when discussing nominal variables and Spearman's  $\rho$  when discussing ordinal variables.

#### 5.3.1 Differences between gender

VALUE SOURCES	AFFECTIVE	RESOURCE	QUALITY	NORMATIVE	PROWESS	ESTEEM	TOTAL
<b>CRAMERS <math>\Phi</math></b>							
<b>VALUE</b>	0,716	0,632	0,653	0,595	0,648	0,727	0,948
<b>SIGNIFICANCE</b>	0,531	0,415	0,689	0,592	0,111	0,235	0,366

Statistical analysis reveals that gender has no significant influence. Possibly, neither the topic nor the WTP is significantly influenced by gender due to the fact that the discussion concerning the promotion and preservation of hedges is not exclusively dominated by one gender.

#### 5.3.2 Differences between actor groups

Much of the reason why value plurality is relevant in the cases of singular, unidimensional denominators for portraying value, is the possibility to identify different

sources of value that constitute the total value. Despite numerous efforts of this research to engage all relevant stakeholders, two stakeholder groups have declined to participate in this research, namely; the cantonal government of Sankt Gallen and academics from the University of Sankt Gallen. Therefore, only four of the identified relevant stakeholders could be interviewed (Figure 8).

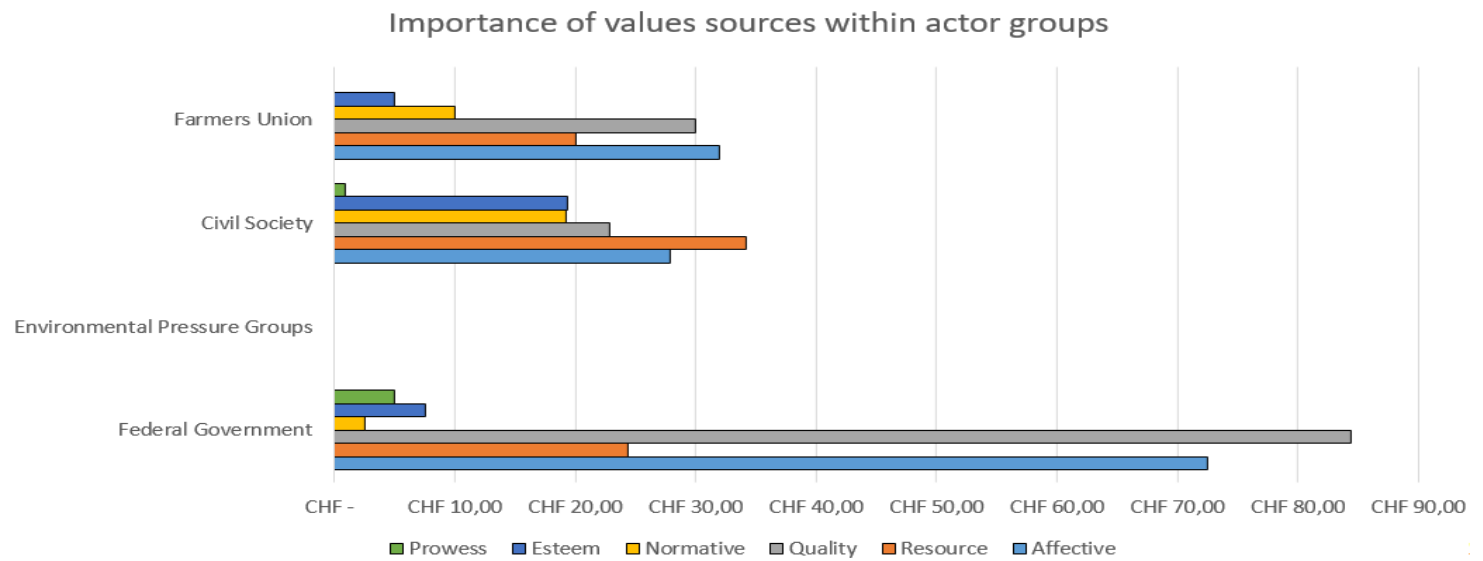


Figure 8 The importance (total value of value source divided by the sum of all value sources) of the value sources per actor group

Table 4 Value and significance of statistical analysis between the actor groups and the WTP of value sources

VALUE SOURCES	AFFECTIVE	RESOURCE	QUALITY	NORMATIVE	PROWESS	ESTEEM	TOTAL
CRAMERS $\Phi$							
VALUE	0,868	0,764	0,632	0,483	0,458	0,540	0,928
SIGNIFICANCE	<b>0,072</b>	<b>0,053</b>	0,845	0,956	0,672	0,801	0,421

The perceived value of hedges according to Environmental Pressure Groups is absent rather than zero. This group indicated that hedges are considered priceless and thereby specifically uphold lexicographic preferences.

The farmers union considers the quality – and affective value most important, while other values are relatively low. This is most likely due to the fact that this group represents the farmers that receive the direct payments and are thus consider the tangible changes most

important. The low importance of normative value in this group suggests that farmers themselves do not consider the normative goal of the direct payments (i.e. the promotion and preservation of hedges) important. This supports various observations that farmers are said to participate in the landscape quality projects mainly because of the financial incentive.

The civil society groups considers the resource value as the most important, followed by the affective – and quality value. This strengthens the earlier mentioned theory that hedges contribute to the identity of local residents. An explanation why affective – and quality value are considered important and the other values are not so much, is because of the levels of tangibility of the value sources.

The federal government consider quality – and affective value the most important by far. Most likely, the government is mainly preoccupied to obtain measurable success of the landscape quality project. Interestingly, the resource value is relatively low compared to the other values. One could argue that such a value should be more present with governing stakeholder groups since the landscape quality project aims to promote and preserve national natural resources, indicating an emphasis on the resource value of hedges. Another unexpected finding is that the prowess value is not considered important. The prowess value however refers to the value of the effectiveness of the project and is likely to be of interest for the government.

Overall, affective value and quality value seem to have strong significant relations with the actor groups, in contrast to the other values. A possible explanation for this fact might be the influenced by the tangibility of different value sources. Affective value and quality value are the most tangible sources of the six. Perhaps the dominance of those two values over the others highlights their significance in actor groups and overshadows the significance of other groups.

### 5.3.3 Differences between knowledge groups

Average WTP per knowledge category

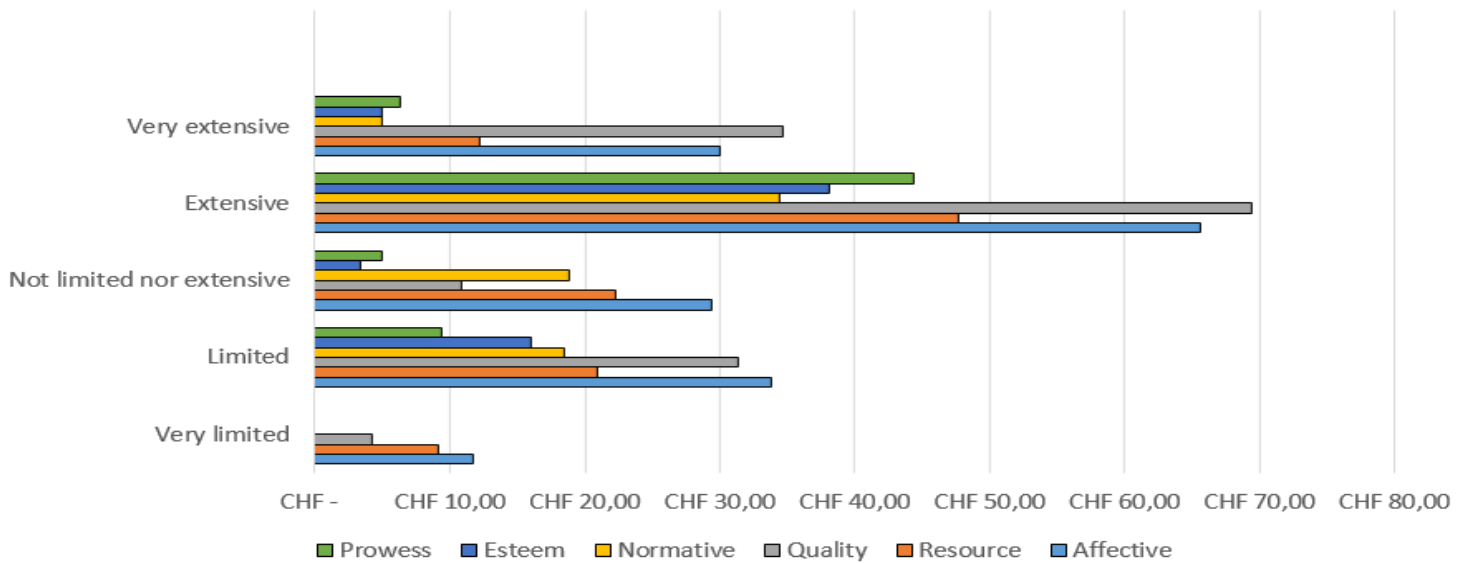


Figure 9 The importance (total value of value source divided by the sum of all value sources) of the value sources per knowledge category

Table 5 Value and significance of statistical analysis between the knowledge and the WTP of value sources

VALUE SOURCES	AFFECTIVE	RESOURCE	QUALITY	NORMATIVE	PROWESS	ESTEEM	TOTAL
SPEARMAN'S P							
VALUE	0,483	0,346	0,512	0,290	0,360	0,185	0,589
SIGNIFICANCE	<b>0,006</b>	<b>0,057</b>	<b>0,004</b>	0,127	<b>0,047</b>	0,409	<b>0,000</b>

When asked how knowledgeable respondents were considering the topic of investigation, it seems that that the more knowledgeable respondents also showed a higher WTP for the promotion and preservation of hedges. This is conform many theories that knowledge has a positive influence on WTP. More specifically, knowledge seems to have a strong positive relation with affective- and quality value, the more tangible value sources. Normative value and esteem value refer more to an individual's worldview due to the fact that these values are far more subjective than the other. Unsurprisingly, these values are therefore also less affected by knowledge and do not show a significant relation between knowledge and those value sources.

### 5.3.4 Differences between age groups

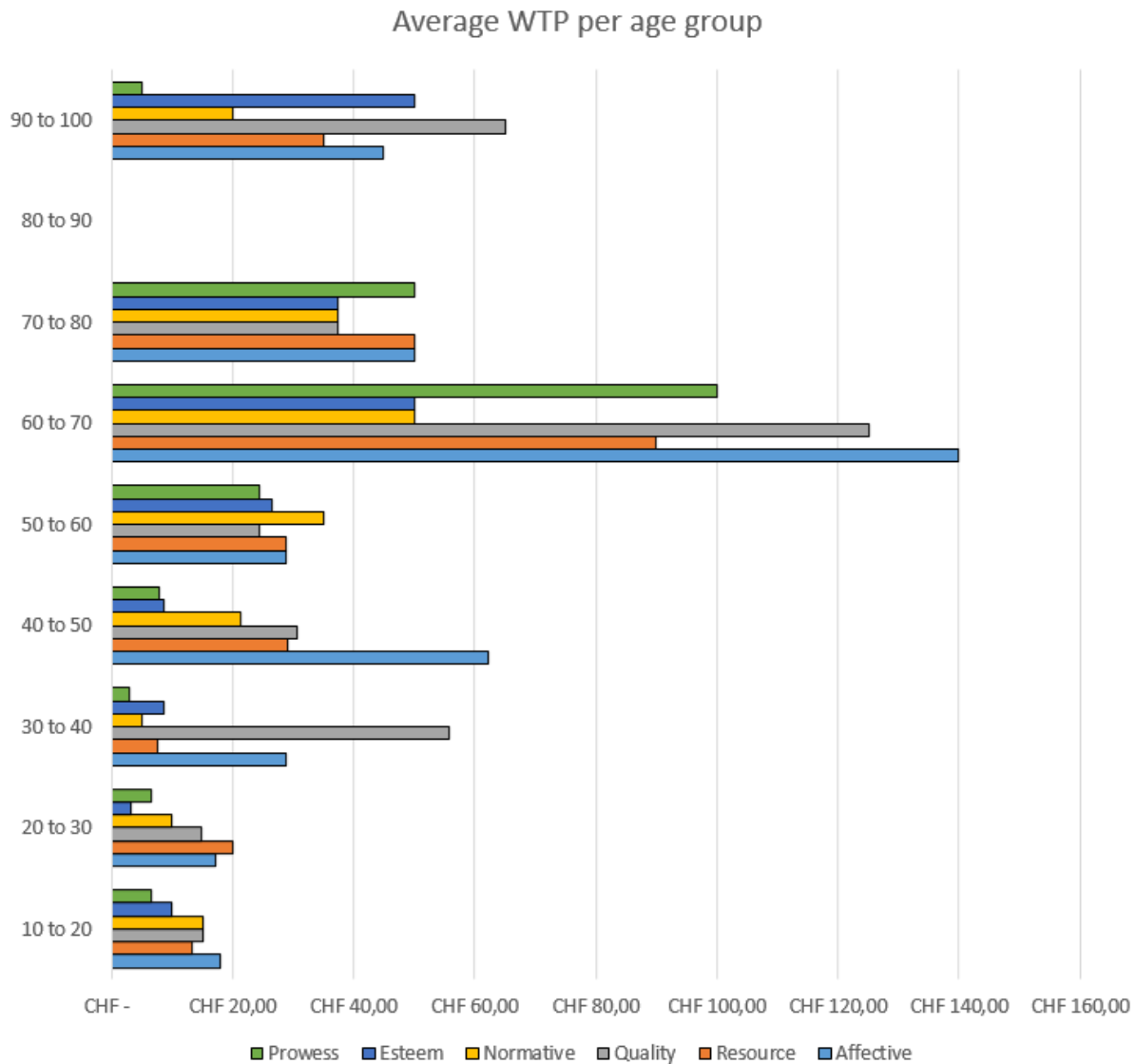


Figure 10 The importance (total value of value source divided by the sum of all value sources) of the value sources per age group

Table 6 Value and significance of statistical analysis between the age groups and the WTP of value sources

VALUE SOURCES	AFFECTIVE	RESOURCE	QUALITY	NORMATIVE	PROWESS	ESTEEM	TOTAL
<b>SPEARMAN'S P</b>							
<b>VALUE</b>	0,507	0,363	0,541	0,380	0,415	0,508	0,616
<b>SIGNIFICANCE</b>	<b>0,004</b>	<b>0,045</b>	<b>0,002</b>	<b>0,042</b>	<b>0,020</b>	<b>0,016</b>	<b>0,000</b>

As indicated by Figure 10 and Table 6, age has a significant positive relation with the WTP for individual value sources and the total WTP. This could have three explanations. First, as



one gets older, an individual also tends to earn more. When considering the marginal utility achieved by an increasing income, it is expected that respondents are willing to pay more in absolute measures when they earn more. Second, as the age increases, respondents can become more knowledgeable considering hedges and consequentially, as earlier explained, could be willing to pay more for the preservation and promotion of hedges. Third, when considering the civil society (that made up for the bulk of the respondents), the attachment to the local identity (which is constituted by the presence of hedges in some rural areas) can increase with an increasing age. This local identity is then important or valuable for respondents and therefore respondents are willing to pay more.

#### **5.4 Putting the findings in perspective**

Concluding, it becomes obvious that the perceived value of hedges per capita per year in Neckertal is significantly higher than the investments per capita per year. However, the hypothesis that this manner of valuation increases the valued perception of hedges cannot be compared to the base-case scenario. Neither can the impact of the policy be estimated, due to that lack of base-case scenario and thus remains the successfulness of the policy to be seen. Therefore it remains to be investigated whether or not this manner of valuation adds to the perceived value of natural resources. The result does however indicate that this particular policy is extremely relevant for the relevant stakeholders.

The hypothesis that concerned the weighing of different value sources is confirmed. The different actor groups have displayed differences between the affective and resource value. A probable explanation for the lack of significance of the other value sources can be linked to the small size of the sample population.

## 5.5 Establishing impact and calculating the SROI

According to the prescribed steps in an SROI, this section of the results should entail the establishing of the impact of the policy and the calculations concerning the return on the investments of the policy (Nicholls et al., 2012). Such calculations however require data collections at two or more moments in time and a base case. Exploratory interviews and test interviews revealed that individuals had extreme difficulties with identifying a dynamic value for specific aspects of hedges over time. In the test interviews it became clear that incorporating such a timescale for estimating the WTP tripled the time to fill out the survey and significantly increased non-response. Therefore, the survey has been developed in such a way that respondents were invited to think of the dynamic nature of value, but ultimately had to identify a static WTP.

Because of the static WTP this research is unable to perform the last steps of the SROI. However, this fact does not mean that this research cannot be considered a legitimate social valuation technique. This research will comment on the lack of this data and recommend changes for possible further research.

A solution to the inability of respondents to identify dynamic values over time could be overcome by using participatory approaches to value creation much like Chaudhury, Helfgott, Thornton, & Sova (2016), Lynam, de Jong, Sheil, Kusumanto, & Evans (2007) and Muro & Jeffrey (2008).

Lopes and Videira (2013) for example describe such a participatory approach. The authors argue that participatory approaches can play a supporting role in create a comprehensive integration of a value system . Lopes and Videira (2013) identify three general steps in using participatory approaches for attributing values to ecosystem services. The first step is called 'set the scene' and conceptualizes the institutional context that underlies possible decisions. The rules that govern the decision are mapped. The outcome of

this step is a list with institutions or rules that could affect or be affected by the decision, a list of stakeholders that should be involved in the deliberative valuation process and the mapping of a network that connects these stakeholders. The second step is ‘deepen understanding’ and aims to develop a shared understanding of the implications of the decision and how the decision in questions affects the services. Discussion is stimulated and facilitated by the use of focus groups and systems mapping workshops with causal loop diagrams in which the relevant stakeholders participate. The third step is ‘articulating values’ and aims to confront stakeholders with the differences between the value perceptions and their effects on the decision making process. Framing of the discussion around the values of ecosystem services is stimulated, since it supports learning, awareness and exchanges of different perceptions. This in turn can lead to a deeper understanding of the topic, its contents and the process. (Lopes & Videira, 2013)

It must be noted however that such participatory approaches are often costly in terms of time, organization and financial allocation for the data collection. The potential costs of such exercises might be perceived as problematic by governing organizations such as federal – or cantonal governments.

## **5.6 Reporting, using and embedding**

From the above becomes clear that the results of this study are sadly not complete in the sense that additional data could be recovered through the use of participatory approaches and collaboration with the federal and cantonal government. This study has therefore been significantly hampered in its ability to process the results and give a complete overview of the value of hedges. Furthermore, due to the relatively small size of the sample population, the relations between the different sources of values might be relatively extreme. Perhaps a study with a larger sample population might retrieve results that are more nuanced.

Important to note is that the results of this study should not form the basis of a cost-benefit analysis or similar economic valuation methods for evaluating the effectiveness of the policy at hand. Although this statement is much like the earlier mentioned comment on the unreliability CVM from Diamond and Hausman (1994), this note is rather related to the incompleteness of the data.

That said, the study does provide a new way of approaching the value of natural resources and more importantly; a new way of evaluating policies that concern the promotion and/or preservation of the landscape. By implementing a semantic approach of the concept of value into economic valuation methodologies, this research has broadened the horizon of the policy evaluation and made one more step towards more inclusive economic valuation that is essential for sustainable development.

In what way should these results then be interpreted? As Ullainathan (2000) rightly points out, the results of a subjective surveys should always be interpreted with care. First, the weighing of different value sources among stakeholder groups is relevant since it highlights the nature of value among respondents. The different value sources could also be closely linked to the interests of various groups in the project. For example, the environmental pressure groups hold deontological worldviews and reject economic valuation of the natural resources, whereas the federal government is mostly concerned with the tangible effects of the policy at hand. Second, using participatory approaches in value creation are of high importance when identifying dynamic values of natural resources over time. Additionally, this research strongly recommends to get in contact with the direct governing organization (i.e. the cantonal government) to complete the data collection, since this has been the largest handicap of this study.

Overall, this research is most powerful in its potential for organizational learning. The emphasis of SROI on stakeholders, the nature of value within actor groups and the monetary

translation of various value sources could enhance the understanding of *how* the policy at hand impacts its societal environment.

### **5.7 Stakeholder responses**

In the follow up interview merely 3% of the respondents provide their views on the initial results. Asked what in their view could explain the discrepancy between the investments in hedges and the perceived value of hedges, a respondent answered that this might be similar in other cases of natural resource protection. The WTP is generally observed to be much higher than the actual investments, due to the prescribed cantonal taxation limits. Therefore an increase in the contribution to this project is also excluded. However, in the evaluation of the policy the governments might shift the emphasis of support. Until now, mostly farmers are supported with this policy. Perhaps biodiversity will enjoy more direct support from the policy after evaluation. For this shift however the government will need a thorough qualitative analysis of how hedges influence biodiversity and the farmers in St. Gallen.

### **5.8 Reflecting on Critical System Heuristics**

In the previous chapter (Chapter 4) this research has used CSH to reveal the anatomy of the research and also the criteria for success. Looking back, this research has successfully included the interests of relevant actors by incorporating ‘responsible men and women’ to represent nature’s interests or that of future generations. By doing this, this research can be considered legitimate because it successfully represented and accounted various worldviews, by acknowledging and identifying deontological preferences within the respondents. Further strengthening the legitimacy of this research is the transparency of the methodology, calculations, researcher dependent choices and the results.

However, this study must also be viewed as unsuccessful due to the inability of this research to include all relevant actors, most notably the cantonal government of St. Gallen.

Furthermore, neither the federal government nor the cantonal government showed interest in shaping this research. Both these factors undermine the legitimacy of this research. The measure of success (i.e. the acceptance of this methodology with the governments has to be seen, since both governments have not participated in shaping this research and have yet to see the results.

# Chapter Six

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## Conclusion

This research has attempted to improve economic valuation methodologies and in particular the contingent valuation method in two manners. First, this research has used a semantic approach of the concept of value from Jackendoff (2006) and incorporated this into the methodology. Jackendoff (2006) identifies six sources of value which we use in daily life; (1) affective value, (2) resource value, (3) quality value, (4) normative value, (5) esteem value and (6) prowess value. Using these types of values allows a comprehensive categorization of different types of values, thereby acknowledging the existence of multiple sources or types of values. Second, this research has incorporated a 'lexicographic preference' option in the survey, which allowed respondents to deliberately indicate a preference that is incompatible with economic rationale that is often disregarded in economic analysis.

This research has constructed a survey inquiring after the willingness-to-pay (WTP) for the Landscape Quality Project in Neckertal, Sankt Gallen, Switzerland. The Landscape Quality Project concerned the promotion and preservation of hedges and hedgerows in Neckertal. Respondents were asked what their WTP was in aiding this project. WTP questions concerned the various sources of values as identified by Jackendoff (2006). The respondents consisted of relevant actor groups such as the federal government, the farmers union, environmental pressure groups and civil society.

10% of all respondents indicated a lexicographic preference and are thereby assumed to believe that a WTP-study is unable to capture the true value of the hedges the project concerns.

The findings indicated an average WTP of  $\pm$  169 Swiss Francs in the form of a cantonal tax for the protection and promotion of hedges in Sankt Gallen, whereas the

investment costs of the Landscape Quality Project were  $\pm 4$  Swiss Francs. The most valued value sources were affective value, quality value, followed by resource value. There were significant differences between the different stakeholder groups. The environmental pressure group indicated a lexicographic preferences. The federal government put relatively large weighing to the affective value and the quality value. Other groups has put significant emphasis on affective value, resource value and quality value and have indicated a very low WTP for the value of prowess.

Further research should indicate whether such a methodology is a good way to evaluate policies that concern the value of natural resources, because of the limited data this study was able to obtain. First and foremost, this research was unable to establish a base case and has thereby been unable to establish the impact of the policy. Second, respondents of the survey were unable to identify dynamic values over time. This results in static WTP findings per year per capita, rather than a changing WTP over time. These findings do not accommodate the likely dynamic nature of the value of natural resource protection. It is therefore highly recommended to use more participatory approaches to estimate such values, since individuals are unlikely to be able to properly value the dynamic value of natural resources over time.

This research has made an attempt to improve valuation methodologies that are commonly used in decision making processes. The valuation of environmental change remains one most the most significant and fastest evolving areas of research in environmental and ecological economics (Salles, 2011). Herein “*valuation is not a solution or an end in itself, but firstly a conceptual and methodological framework for organizing information as a guide for decision-making*” (Salles, 2011: p. 22). The methodology of this research can be first and foremost used as a learning tool and a guide for decision-making. The methodology



offers insights in how value is generated from the policy and how this differs between different actor groups.

# Chapter Seven

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## References

- Abler, D. (2004). Multifunctionality, agricultural policy, and environmental policy. *Agricultural and Resource Economics Review*, 33(1), 8–17.
- Antrop, M. (2005). Why landscapes of the past are important for the future. *Landscape and Urban Planning*, 70(1–2), 21–34.
- Arvidson, M., Lyon, F., McKay, S., & Moro, D. (2013). Valuing the social? The nature and controversies of measuring social return on investment (SROI). *Voluntary Sector Review*, 4(1), 3–18.
- Aschwanden, J., Holzgang, O., & Jenni, L. (2007). Importance of ecological compensation areas for small mammals in intensively farmed areas. *Wildlife Biology*, 13(2), 150–158.
- Barr, C. ., & Gillespie, M. . (2000). Estimating hedgerow length and pattern characteristics in Great Britain using Countryside Survey data. *Journal of Environmental Management*, 60(1), 23–32.
- Bockstael, N. E., Freeman, a. M., Kopp, R. J., Portney, P. R., & Smith, V. K. (2000). On Measuring Economic Values for Nature†. *Environmental Science & Technology*, 34(8), 1384–1389.
- Burel, F., & Baudry, J. (1995). Social, aesthetic and ecological aspects of hedgerows in rural landscapes as a framework for greenways. *Landscape and Urban Planning*, 33(1–3), 327–340.
- Carson, R. T. (2012). Contingent Valuation: A Practical Alternative When Prices Aren't Available. *Journal of Economic Perspectives*, 26(4), 27–42.
- Castree, N. (2003). Commodifying what nature? *Progress in Human Geography*, 27(3), 273–297.
- Centemeri, L. (2015). Reframing problems of incommensurability in environmental conflicts

- through pragmatic sociology: From value pluralism to the plurality of modes of engagement with the environment. *Environmental Values*, 24(3), 299–320.
- Chan, K. M. A., Satterfield, T., Goldstein, J., Columbia, B., Mall, M., State, C., & Collins, F. (2013). Rethinking Ecosystem Services to Better Address and Navigate Cultural Values, 4, 1–41.
- Chaudhury, A. S., Helfgott, A., Thornton, T. F., & Sova, C. (2016). Participatory adaptation planning and costing. Applications in agricultural adaptation in western Kenya. *Mitigation and Adaptation Strategies for Global Change*, 21(3), 301–322.
- Chunling, Z. (2016). Election of Workers ' Representatives : Based on Lexicographic Preferences Ordering Method. *Cross-Cultural Communication*, 12(9), 50–53.
- Costa, A., Caldas, J. C., Coelho, R., Ferreiro, M. D. F., & Gonçalves, V. (2016). The building of a dam: Value conflicts in public decision-making. *Environmental Values*, 25(2), 215–234.
- Curry, N., & Stucki, E. (1997). Swiss agricultural policy and the environment: An example... *Journal of Environmental Planning & Management*, 40(4), 465.
- Dachary-Bernard, J., & Rambonilaza, T. (2012). Choice experiment, multiple programmes contingent valuation and landscape preferences: How can we support the land use decision making process? *Land Use Policy*, 29(4), 846–854.
- de Groot, R. S., Alkemade, R., Braat, L., Hein, L., & Willemen, L. (2010). Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity*, 7(3), 260–272.
- Dendoncker, N., Keune, H., Jacobs, S., & Gómez-Baggethun, E. (2013). Inclusive Ecosystem Services Valuation. *Ecosystem Services: Global Issues, Local Practices*, 3–12.
- Diamond, P. A., & Hausman, J. A. (1994). Contingent Valuation: is some number better than no number? *The Journal of Economic Perspectives*, 8(4), 45–64.

- Farber, S. C., Costanza, R., & Wilson, M. A. (2002). Economic and ecological concepts for valuing ecosystem services. *Ecological Economics*, 41(3), 375–392.
- Farrell, K. N. (2007). Living with living systems: The co-evolution of values and valuation. *International Journal of Sustainable Development & World Ecology*, 14(1), 14–26.
- Filatotchev, I., Wright, M., Uhlenbruck, K., Tihanyi, L., & Hoskisson, R. E. (2003). Governance, organizational capabilities, and restructuring in transition economies. *Journal of World Business*, 38(4), 331–347.
- Fishburn, P. C. (1975). Axioms for Lexicographic Preferences. *Review of Economic Studies*, 42(3), 415.
- Foley, J. A., De Fries, R., Asner, G. P., Barford, C., Bonan, G., Carpenter, S. R., ... Snyder, P. K. (2005). Global Consequences of Land Use. *Science*, 309(5734), 570–574.
- Giarlotta, A., & Watson, S. (2014). Lexicographic preferences representable by real-branching trees with countable height: A dichotomy result. *Indagationes Mathematicae*, 25(1), 78–92.
- Hackett, S. C. (2010). Environmental and natural resources economics: Theory, policy, and the sustainable society. ME Sharpe.
- Hanemann, M. W. (1994). Valuing the environment through contingent valuation. *The Journal of Economic Perspectives*, 8(4), 19–43.
- Hanemann, W. M. (2003). Willingness to pay and willingness to accept: How much can they differ? comment. *American Economic Review*, 93(1), 458–463.
- Hanley, N., Spash, C., & Walker, L. (1995). Problems in valuing the benefits of biodiversity protection. *Environmental and Resource Economics*, 5, 249–272.
- Hannon, L. E., & Sisk, T. D. (2009). Hedgerows in an agri-natural landscape: Potential habitat value for native bees. *Biological Conservation*, 142(10), 2140–2154.
- Harvey, D., & Braun, B. (1996). Justice, nature and the geography of difference, 468. Oxford:

Blackwell.

- Hazell, P., & Wood, S. (2007). Drivers of change in global agriculture. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1), 495–515.
- Hinsley, S. ., & Bellamy, P. . (2000). The influence of hedge structure, management and landscape context on the value of hedgerows to birds: A review. *Journal of Environmental Management*, 60(1), 33–49.
- Hitlin, S., & Piliavin, J. A. (2004). Values: Reviving a Dormant Concept. *Annual Review of Sociology*, 30(1), 359–393.
- Hofmann, C., Göttin, T., Stadler, T., Wüest, M., Reutter, B., Fink, K., Junge, A., Ledergerber, G., Maret, E., Amacker H., Badertscher, G., Bonomi, D., Camin, P., Oberholzer, I. C., Gever, P., Gross, C., Gujer, H. U., Hammer, B., Hauser, A., Hohmann, R., Hunziker, S., Junker, I., Kammer, K., Kläy, P., Merky, N., Moor, C., Ochsner, D., Perritaz, N., Perroud, M., Rauch, S., Reichenbach, A., Reusser, C., Schaffer, H. P., Schaffner, M., Schmocker-Fackel, P., Stamatiadis, C., Truffer, S., Wuest-Saucy, A., Camenzind, R., Kellenberger, M., Kowald, M., Pillonel, Y., Trocmé, M., Gubler, A., Bareit, M., Zundel, C., Croci-Maspoli, M., König, S., Schmutz, C. & Stübi, R. (2015), Environment Switzerland 2015. Report. Swiss Federal Council.
- Hug, D. (2015). *Handbuch für Landschaftsqualitätsbeiträge: Massnahmenkatalog des Volkswirtschaftsdepartementes, Erläuterung Beitragssystem, Hinweise für Projektorganisation, Projecterarbeitung und Jahresablauf*. Sankt Gallen.
- Hug, D., Gerlach, S., & Matjaz, A. (2014). *Landschaftsqualitätsprojekt Neckertal*. Sankt Gallen.
- Isoni, A. (2011). The willingness-to-accept/willingness-to-pay disparity in repeated markets: Loss aversion or “bad-deal” aversion? *Theory and Decision*, 71(3), 409–430.
- Jackendoff, R. (2006). The peculiar logic of value. *Journal of Cognition and Culture*, 6, 375–

407.

- James, S. P. (2016). The trouble with environmental values. *Environmental Values*, 25(2), 131–144
- Kallis, G., Gómez-Baggethun, E., & Zografos, C. (2013). To value or not to value? That is not the question. *Ecological Economics*, 94, 97–105.
- Kemp, R., Parto, S., & Gibson, R. (2005). Governance for sustainable development: Moving from theory to practice. *International Journal of Sustainable Development*, 8(1–2), 12–30.
- Kienast, F., Frick, J. & Steiger, U. (2013), Neue Ansätze zur Erfassung der Landschaftsqualität. Zwischenbericht Landschaftsbeobachtung Schweiz (LABES). *Umwelt-Wissen*, 1325. Bundesamt für Umwelt, Bern und Eidgenössische Forschungsanstalt für Wald, Schnee und Landschaft, Birmensdorf.
- Kling, C. L., List, J. A., & Zhao, J. (2013). A dynamic explanation of the willingness to pay and willingness to accept disparity. *Economic Inquiry*, 51(1), 909–921.
- Knetsch, J. L., & Sinden, J. A. (1984). Willingness to pay and compensation demanded: Experimental evidence of an unexpected disparity in measures of value. *The Quarterly Journal of Economics*, 99(3), 507-521.
- Kolstad, C. D., & Guzman, R. M. (1999). Information and the Divergence Between Willingness-to-Accept and Willingness-to-Pay. *Journal of Environmental Economics and Management*, 38(1), 66–80.
- Kumar, M., & Kumar, P. (2008). Valuation of the ecosystem services: A psycho-cultural perspective. *Ecological Economics*, 64(4), 808–819.
- Laurans, Y., Rankovic, A., Billé, R., Pirard, R., & Mermet, L. (2013). Use of ecosystem services economic valuation for decision making: Questioning a literature blindspot. *Journal of Environmental Management*, 119, 208–219.

- Lee, B. S. (2016). A space of lexicographic preferences. *Journal of Mathematical Economics*, 65, 16–25.
- Liu, J., Dietz, T., Carpenter, S. R., Alberti, M., Folke, C., Moran, E., ... Taylor, W. W. (2007). Complexity of Coupled Human and Natural Systems. *Science*, 317(5844), 1513–1516.
- Liu, S. (2006). *Valuing Ecosystem Services: An Ecological Economic Approach*. University of Vermont.
- Lopes, R., & Videira, N. (2013). Valuing marine and coastal ecosystem services: An integrated participatory framework. *Ocean and Coastal Management*, 84, 153–162.
- Lowenthal, D. (1991). British National Identity and the English Landscape. *Rural History*, 2(2), 205–230.
- Lynam, T., de Jong, W., Sheil, D., Kusumanto, T., & Evans, K. (2007). A review of tools for incorporating community knowledge, preferences, and values into decision making in natural resources management. *Ecology and Society*, 12(1).
- Kontoleon, A., Macrory, R., & Swanson, T. (2002). Individual preference-based values and environmental decision making: should valuation have its day in court?. In *An Introduction to the Law and Economics of Environmental Policy: Issues in Institutional Design* (pp. 177-214). Emerald Group Publishing Limited.
- Mann, S., & Lanz, S. (2014). Happy Tinbergen: Switzerland 's New Direct Payment System. *The Agricultural Economics Society and the European Association of Agricultural Economists*, 12(3), 24–28.
- McMullen, S. (2016). *Animals and the Economy*. Springer.
- Midgley, G., & Richardson, K. a. (2007). Systems Thinking for Community Involvement in Policy Analysis. *Forum American Bar Association*, 9, 167–183.
- Morewedge, C. K., & Giblin, C. E. (2015). Explanations of the endowment effect: An integrative review. *Trends in Cognitive Sciences*, 19(6), 339–348.

- Muro, M., & Jeffrey, P. (2008). A critical review of the theory and application of social learning in participatory natural resource management processes. *Journal of Environmental Planning and Management*, 51(3), 325–344.
- Nicholls, J., Lawlor, E., Neitzert, E., & Goodspeed, T. (2012). A guide to Social Return on Investment. The SROI Network.
- Oreszczyn, S., & Lane, A. (2000). The meaning of hedgerows in the English landscape: Different stakeholder perspectives and the implications for future hedge management. *Journal of Environmental Management*, 60(1), 101–118.
- Parks, S., & Gowdy, J. (2013). What have economists learned about valuing nature? A review essay. *Ecosystem Services*, 3, 1-10
- Petri, H., & Voorneveld, M. (2016). Characterizing lexicographic preferences. *Journal of Mathematical Economics*, 63, 54–61.
- Potter, C., & Tilzey, M. (2005). Agricultural policy discourses in the European post-Fordist transition: neoliberalism, neomercantilism and multifunctionality. *Progress in Human Geography*, 29(5), 581–600.
- Rokeach, M. (1973). The nature of human values. Free press.
- Roth, U., Schwick, C. & Spichtig, F. (2010). Zustand der Landschaft in der Schweiz. Zwischenbericht landschaftsbeobachtung Schweiz (LABES). *Umwelt-Zustand, 2010*. Bundesamt für Umwelt, Bern.
- Rosenberger, R. S., Peterson, G. L., Clarke, A., & Brown, T. C. (2003). Measuring dispositions for lexicographic preferences of environmental goods: Integrating economics, psychology and ethics. *Ecological Economics*, 44(1), 63–76.
- Saban, D., & Sethuraman, J. (2014). A note on object allocation under lexicographic preferences. *Journal of Mathematical Economics*, 50(1), 283–289.
- Salles, J. M. (2011). Valuing biodiversity and ecosystem services: Why put economic values



- on Nature?. *Comptes rendus biologiques*, 334(5), 469-482.
- Jacobs, S., Dendoncker, N., Martín-López, B., Barton, D. N., Gomez-Baggethun, E., Boeraeve, F., ... & Pipart, N. (2016). A new valuation school: Integrating diverse values of nature in resource and land use decisions. *Ecosystem Services*, 22, 213-220.
- Shaikh, S. L., Sun, L., & Van Kooten, C. G. (2007). Treating respondent uncertainty in contingent valuation: A comparison of empirical treatments. *Ecological Economics*, 62(1), 115–125.
- Sharpe, B. (2010). *Economies of Life: Patterns of health and wealth*. Triarchy Press Limited.
- Shogren, F., Shin, S. Y., Hayes, D. J., & Kliebenstein, J. B. (1994). Resolving Differences in Willingness to Pay and Willingness to Accept. *The American Economic Review*, 84(1), 255–270.
- Spash, C. L. (1993). Economics, ethics, and long-term environmental damages. *Environmental Ethics*, 15(2), 117-132.
- Spash, C. L. (1997). Ethics and Environmental Attitudes With Implications for Economic Valuation. *Journal of Environmental Management*, 50(4), 403–416.
- STADA2 (2017). Database. Retrieved from <http://stada2.sg.ch/> on 31-1-2017
- Steiger, U. (2016). Den Landschaftswandel gestalten. Überblick über landschaftspolitische Instrumente. *Umwelt-Wissen*, 1611. Bundesamt für Umwelt, Bern.
- Stoate, C., Báldi, A., Beja, P., Boatman, N. D., Herzog, I., van Doorn, A., ... Ramwell, C. (2009). Ecological impacts of early 21st century agricultural change in Europe - A review. *Journal of Environmental Management*, 91(1), 22–46.
- Tagliaferro, C., Longo, A., Van Eetvelde, V., Antrop, M., & Hutchinson, W. G. (2013). Landscape economic valuation by integrating landscape ecology into landscape economics. *Environmental Science and Policy*, 32, 26–36.
- Tetlock, P. E. (1986). A Value Pluralism Model of Ideological Reasoning. *Journal of*

*Personality and Social Psychology*, 50(4), 819–827.

- Tilman, D., Balzer, C., Hill, J., & Befort, B. L. (2011). Global food demand and the sustainable intensification of agriculture. *Proceedings of the National Academy of Sciences of the United States of America of the United States of America*, 108(50), 20260–20264.
- Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R., & Polasky, S. (2002). Agricultural sustainability and intensive production practices. *Nature*, 418(6898), 671–677.
- Ullainathan, S. E. M. (2000). Do People Mean What They Say ? Implications for Subjective Survey Data. *Economics & Social Behaviour*, 91(2), 67–72.
- Ulrich, W. (1983). Critical heuristics of social planning: A new approach to practical philosophy.
- Ulrich, W. (2005). A brief introduction to critical systems heuristics (CSH). ECOSENSUS project site.
- Ulrich, W., & Reynolds, M. (2010). *Systems Approaches to Managing Change: A Practical Guide. Systems Approaches to Managing Change: A Practical Guide.*
- Van Berkel, D. B., & Verburg, P. H. (2014). Spatial quantification and valuation of cultural ecosystem services in an agricultural landscape. *Ecological Indicators*, 37(A), 163–174.
- Voltaire, L., Pirrone, C., & Bailly, D. (2013). Dealing with preference uncertainty in contingent willingness to pay for a nature protection program: A new approach. *Ecological Economics*, 88, 76–85.
- Waltert, F., Schulz, T., & Schläpfer, F. (2011). The role of landscape amenities in regional development: Evidence from Swiss municipality data. *Land Use Policy*, 28(4), 748–761.
- Whittington, D., Adamowicz, W., & Lloyd-Smith, P. (2017). Asking Willingness-to-Accept Questions in Stated Preference Surveys: A Review and Research Agenda. *Annual Review of Resource Economics*, 9(1).

# Chapter Eight

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## Appendix

### 8.1 Survey (translated)

*University of Utrecht  
Faculty of Geosciences  
Sustainable Development*

Utrecht, 2016

### Introduction

To Whom It May Concern,

I would hereby like to invite you to participate in a research conducted by the Copernicus Institute of the University of Utrecht. The Swiss Government currently has a framework for allocating direct payments to farmers for agricultural practices which preserve or promote social, cultural and natural heritage in Switzerland. The amount of funds allocated to yearly payments for maintenance of such practices is currently made in a largely top down manner. This survey aims to test the cost effectiveness of this payment system, by incorporating the values of local stakeholders in payment allocation. This survey will ask you to estimate the value of a specific landscape practice, namely hedgerows, so that the funding allocated to direct payments for this purpose matches your personal values. The willingness to pay technique will be used to translate personal values into monetary terms so that these local values can be incorporated into national decision making for funding allocations.

In this survey your willingness to pay for hedges is asked, thereby generating a monetary estimate of the perceived value of hedges. You will *not* actually be making any payments of taxes. I would like to take a moment to express that there are no wrong answers in this survey as this survey is a reflection of a personal opinion.

The results of this survey will be anonymously used for a master thesis at the University of Utrecht, the Netherlands. Furthermore, your contact details will not be shared with anyone. These details are solely needed for a follow-up phone call in which the researcher tells his preliminary results and asks for a response.



This survey will start with a problem description and will continue **with 20 questions**. The survey itself will take approximately **15 minutes**. If you have **any questions or remarks**, feel free to contact me through one of the following methods:

E-mail address: [p.h.j.vanderhem@students.uu.nl](mailto:p.h.j.vanderhem@students.uu.nl)

Mobile cellphone number: 0031 6 43 55 44 59

Thank you for your cooperation in advance,

Peter van der Hem,

Master student *Sustainable Development* at the University of Utrecht, the Netherlands

## Problem description

An example of ecological degradation caused by the ever increasing land-use agriculture is the removal of hedges and hedgerows. Hedges or hedgerows (depicted in Figure 11 and 2) are removed because they form physical obstructions to efficient farming and occupy potential farmland. Hedges and hedgerows could have been considered as the most threatened agricultural landscapes of western Europe. Hedges and hedgerows however can have important local ecological functions such as habitat provision and cultural services such as aesthetic beauty.

Between 2014 and 2016, the Canton of St. Gallen has supported the promotion and preservation of hedges and hedgerows of farmers. An often used market instrument for stimulating sustainable agricultural production is an agricultural payment system or direct payments

system. The direct payments system strengthens the competitiveness and sustainability of Swiss agricultural sector through direct payments which are vital parts of the direct income of farmers in the European Union. In short, the cantonal government established a series of norms, indicators and criteria which farmers can fulfill on voluntary basis. When farmers fulfill such criteria they receive direct monetary payments.



Figure 11 A landscape with hedges and hedgerows



Figure 12 Hedgerow in an agricultural field

## Q1

Your age:

- 10 – 20     30 – 40     50 – 60     70 – 80     90 – 100  
 20 – 30     40 – 50     60 – 70     80 - 90

## Q2

*Cross the appropriate answer:*

I live in an urban area  Ja    No

## Q3

*Cross the appropriate answer:*

My knowledge regarding hedges is \_\_\_\_\_

- very limited    limited    not limited nor extensive    extensive    very extensive  
 I do not know

## Q4

*I have had the following experiences with hedges in Neckertal:*

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## Q5

*Cross the appropriate answer:*

I am \_\_\_\_\_ proud of the rural landscape in Neckertal.

- absolutely not    not very    neither not proud nor very    very    absolutely  
 I do not know

## Q6

*Cross the appropriate answer:*

Do you think that the landscape quality project for the promotion and preservation of hedges in Neckertal was succesfull in the years 2014-2016?

**Ja**    **No**    **I do not know**

## Q7

Make a list of all the negative and positive effects of hedges on their environment.

Ecological costs:  1.	Social costs:  1.	Economic costs:  1.
-----------------------------	-------------------------	---------------------------

Ecological benefits:  1.	Social benefits:  1.	Economic benefits:  1.
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## Q8

Please circle the effect (Q7) that directly affect you

*Some effects of hedges can arise later in time. For example: In the case of the construction of a pond, it could take up to a year until the water-quality is of such a level that it provides a good habitat birds. It might be possible that during the construction of that pond, birds would not like to live in the pond.*

## Q9

Please note down the identified positive and negative effects that you circled in the timeframe on the next page. See appendix 8.2 for an example.

Start	2014	2015	2016	2017
	2018	2019	2020	2021



*The next questions (Q10-Q19) revolve around various different aspects of hedges and your willingness to pay for such aspects. Every aspect is elaborated upon through an example. Every questions regards a different aspect of hedges. You will be asked what your willingness to pay is in the form of an extra yearly cantonal tax to support the project that concerns the promotion and preservation of hedges and hedgerows in Neckertal, Sankt Gallen. You can choose the height of the payment yourself. There are three options for indicating a willingness to pay (See appendix 8.3 for an example):*

- *Cross an amount: cross the preferred amount in the row 'maximum' and leave the row 'minimum' empty.*
- *Cross an amount: cross the preferred minimal amount in the upper row ('minimum') and the preferred maximal amount in the row directly under that ('maximum').*
- *Indicate pricelessness: When you believe that hedges are priceless or their worth can not be assessed in monetary terms, you can cross the bottom row 'priceless'.*

**The various willingness to pay's will be aggregated in the end. The total will be your personal willingness to pay for hedges in Neckertal.**

**Important to note: various questions might seem strikingly similar, but are in fact not. Please take the time or ask questions to understand the difference.**

## Q10

Cross a willingness to pay per year for all the positive and negative effects of hedges that directly concern you (Q9).

If you are unsure about the height of the payment, please use the range as described on the previous page.

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>													

## Q11

Please cross the appropriate answer: I am willing to pay the following yearly amount to support the program of hedges in Neckertal **regardless of any effects it might have on me.**

*An example: There is a pond in the region of St. Gallen. I am willing to pay X to have this pond, regardless if it gives me any benefits*

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>													

## Q12

Please cross the appropriate answer: I am willing to pay the following yearly amount to support the the program of hedges in Neckertal to ensure that hedges in Neckertal are of **good quality**.

*An example: There is a pond in the region of St. Gallen. It is possible that for example the water quality of the pond effects has on the services it provides. To be more specific, a pond with crystal clear water might attract various bird species, whereas a pond with a bad water quality might not attract those bird species. Therefore I am Willing to pay X to ensure that the quality of this pond is good.*

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>													

## Q13

Please cross the appropriate answer:

The fact that the Swiss government executes a program that concerns the promotion and preservation of hedges gives me \_\_\_\_\_ satisfaction.

**very limited**  **limited**  **not limited nor much**  **much**  **very much**

**I do not know**

If you crossed „I do not know“, please skip Q14.

## Q14

Please cross the appropriate answer: I am willing to pay the following yearly amount to support the program of hedges in Neckertal only because it grants me **a feeling of satisfaction**.

*An example: There is a pond in the region of St. Gallen, which is protected by a program. Because the existence of this program gives me a satisfaction or happiness, I would be willing to pay X extra, to ensure that the existence of this program continues that grant me a feeling of satisfaction.*

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>													

## Q15

Please cross the appropriate answer:

The program of promoting and preserving hedges in Neckertal is \_\_\_\_ in reaching its goals:

- very ineffective  
  ineffective  
  not ineffective nor effective  
  effective  
 very effective  
  I do not know

If you crossed „I do not know“, please skip Q16.

## Q16

Please cross the appropriate answer: I am willing to pay the following yearly amount to support the program of hedges in Neckertal to ensure that the program **attains its goal effectively**.

*An example: There is a pond in the region of St. Gallen, which is protected by a program. It is possible that although this program protects the pond, the program might reach its goals in an ineffective manner. It might take the program therefore relatively much financial injections or more time consumption to reach the goals, which could be attained more effectively in another way.*

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>													

## Q17

Please cross the appropriate answer:

I am \_\_\_\_ proud of the fact that the cantonal government of St. Gallen protects hedges as described in the introduction.

**absolutely not**  **not very**  **neither not proud nor very**  **very**  **absolutely**

**I do not know**

If you crossed „I do not know“, please skip Q18.

# Q18

Please cross the appropriate answer: I am willing to pay the following yearly amount to support the program of hedges in Neckertal only because it grants me **a feeling of proudness.**

*An example: There is a pond in the region of St. Gallen, which is protected by a program. It is possible that having such a program in Switzerland grants me a measure of proudness of Switzerland. That is why I am willing to pay X to ensure that the existence of this program continues that grant me a feeling of proudness.*

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>													

## Q19

In this survey we have tried to investigate your personal perceived value of hedges.

The aggregation of the following questions will be regarded as your willingness to pay for the protection and promotion of hedges in Neckertal, Sankt Gallen:

<i>Question</i>	<i>Topic</i>	<i>Payment (CHF)</i>
<i>Q10</i>	<i>Direct positive and negative effects</i>	
<i>Q11</i>	<i>Regardless of any effects</i>	
<i>Q12</i>	<i>Quality</i>	
<i>Q14</i>	<i>Satisfaction</i>	
<i>Q16</i>	<i>Attaining goals effectively</i>	
<i>Q18</i>	<i>Proudness</i>	

### **TOTAL PAYMENT**

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Do you agree with the total payment as your willingness to pay that amount per year in the form of an extra cantonal tax?

Yes    No

If not, please take your time to review and change the payments in the table above until the total payment is to your satisfaction.

## Q20

For this research we would like to report to respondents our initial findings. Would you be willing to receive an email or a phone call in May, 2017, wherein you are asked what you think of the initial findings?

If yes, please fill out your contact information below:

E-Mail-Address

---

Phone number

---

## 8.2 Appendix of the survey: indicating a willingness to pay

*Cross an amount: cross the preferred amount in the row 'maximum' and leave the row 'minimum' empty.*

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-		50,-	60,-	70,-	80,-	90,-	100,-	Other amount
				X										
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-		50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>														

*Cross an amount: cross the preferred minimal amount in the upper row ('minimum') and the preferred maximal amount in the row directly under that ('maximum').*

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
				X									
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
								X					
<i>Priceless:</i>													

<i>Minimum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Maximum</i>	0,-	5,-	10,-	20,-	30,-	40,-	50,-	60,-	70,-	80,-	90,-	100,-	Other amount
<i>Priceless:</i>													



**X**

*Indicate pricelessness: When you believe that hedges are priceless or their worth can not be assessed in monetary terms, you can cross the bottom row 'priceless'.*

### 8.3 Appendix of the survey: identifying costs and benefits in time

Start	Benefit 1	Benefit 1	Benefit 1	
	Benefit 2		Benefit 3	
	2014	2015	2016	2017
	Cost 1	Cost 2	Cost 2	
	Cost 2	Cost 3	Cost 3	
	Cost 3			
	2018	2019	2020	2021