“Transboundary and inter-scale land use management: A qualitative analysis of potential conflicts among Stakeholders in the Okavango River Basin, southern Africa”

By

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Thesis

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Plagiarism Statement

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ABSTRACT

The transnational management of watersheds is conflict-prone: asymmetries in aims and power can lead to mismanagement of the land and water resources and possibly to conflicts among countries sharing a watershed. Yet, far from being an issue of national divergences only, the management of trans-boundary resources results from the complex interaction of actors at different scales and from various sectors.

To address this gap, we present a case study analysing cross-scale interactions and scale-, country-, sector-bound perceptions of stakeholders in the Okavango River Basin (ORB) in southern Africa, where fast developments in Namibia, Botswana and especially Angola may trigger rapid changes in the river basin, until now in a rare state of pristineness. Thereby, we aim to identify key differences and (potential) conflicts in the trans-boundary integrated management, as well as similarities among actors of a given scale, which may strengthen transboundary management. Data consists of perceptions of 80 stakeholders of all scales and sectors about the ORB land and water use system in the present and in the future, as well as factors characterizing stakeholders, and was collected in 2012 and 2013 via semi-structured, recorded, face to face interviews. Transcripts were analysed using MAXQDA following a deductive/inductive approach.

We found evidence for six types of stakeholder perceptions about the ORB land use system. The types prioritize specific aspects (e.g. conservation, equity, economic development), linked to the country, sector and scale characterizing a stakeholder. The main difference lies in the idea of development that stakeholders embrace. More specifically, the development process the national scale has in mind for the people, namely a quick transition to a cash market and industrial economy, does not correspond to the one the people have for themselves. Regional scale actors accept the transition as a fatality but are frustrated by the lack of tools, support and empowerment they face to guide the people through this transition. This results in a mosaic of latent and manifest conflicts, occurring at specific scales and involving specific stakeholder groups. Their analysis reveals the dimension of complexity which the sustainable management of the ORB will require.

Key words: River basin, southern Africa, scale, qualitative analysis, trans-boundary land use system, system thinking, land use conflicts

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TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

Tables

Figures

1. Introduction

This master thesis is part of the research project *The Future Okavango* (TFO) which aims to provide an interdisciplinary assessment of ecosystem services and well-being, their value and their management at the local and basin scale in the Okavango River Basin (ORB). In order to do so, it takes a closer look at the land use in the river basin, as most ecosystem services are affected by land use. Land use is the result of several forces and especially of the decision of policy makers, administrations and local actors. In the context of the ORB, stakeholders active at four scales play a role in land use: local, regional, national and the basin or transboundary scale; comprising of three countries making up the ORB – Angola, Namibia and Botswana.

There are two main challenges ahead for the Okavango catchment and its riparian states. Namely, the water demand increase – mostly driven by population growth and economic development, and the shifting power relations. The latter addresses Angola especially, whose political stabilization and strengthening economic power after the end of its civil war, allow the country to now actively take part in decision making over the management of the ORB and advocate to increase its water share for socio-economic development in its surrounding regions (Weinzierl & Schilling, 2013). The fact that the catchment originates in Angola places particular importance on the country's land use decisions as they can beneficially or negatively affect the water downstream. Furthermore, the three riparian states sharing the ORB hold different administrative cultures as a result of their history as colonies or protectorates under different foreign powers. This factor along with basic cultural differences such as language, traditions and beliefs, coupled with different socio-economic interests over the basin as well as the challenges previously mentioned, intensify the potential for conflict between the three nations (Weinzierl & Schilling, 2013). However, conflicts of interest may also arise among different administrative regions, as well as between different institutional scales.

Scale conflicts may arise as different actors or stakeholders tend to privilege a particular approach when analysing or taking part in decision making processes. The privileged approach is usually closely related to the scale at which the stakeholder is active; their choices are influenced by the views and positions shaped by the roles they play in the different organizations and interest groups within the socio-ecological system (SES). Thus, it is necessary to take into account the different scale perceptions

of the SES for water-related decision-making to ensure that negotiations and policy making is better informed and conflicts can be prevented in a timely manner from escalation (Dore & Lebel, 2010).

1.1. Aim and objectives

Based on the latter, this thesis aims to contribute to ease the process of multi-scale resource governance by delivering insights on inter-scale differences in the perception of the land-use system. This is accomplished by reframing the land-use system as a socio-ecological system and discussing the related resource-use concepts in the Okavango River Basin. Because scale is strongly related with the perception and valuation of ecosystem services (ESS) (See Dore & Lebel, 2010; Lebel, Garden, & Imamura, 2005; Martín-López et al., 2007; Palomo, I., B. Martín-López, C. López-Santiago, 2011; Veldkamp et al., 2011; Zia & Hirsch, 2011), we believe that it also can influence the perception of the whole land-use system and the expectations about the resource and land use management. Thus, this work brings the issue of ecosystem services and the human-ecosystem relationship into the political ecological arena of transboundary resource management.

To achieve this aim, our first objective is to investigate the perceptions of stakeholders at different scales, countries and sectors, and their relationship to ESS about the land-use system and its functioning in the ORB. Our second objective is to investigate whether and which of these differences in perception and expectations already lead to (latent) conflicts.

The value added of the research resides especially in bringing the issue of scale and relationship of stakeholders to ESS in stakeholder analyses and governance analyses of transboundary resource management. It is known that the scale and the relation of stakeholders to ESS shape priorities in land-use for stakeholder. Integrating this insight in transboundary management analysis has rarely been applied to cases of management of transboundary river basins, such as the ORB. Conducting the investigation at the four different scales in each country of the basin will particularly contribute to enrich the understanding of transboundary management conflicts by considering the issue of scale as well as that of the relationship to given ESS. Additionally, it reveals scale-bound source of conflicts in the management of natural resources and land–use.

For this purpose, data was collected from November 2012 to June 2013 in Namibia, Botswana and Angola at the local, the district/regional/provincial scale, the national scale and the basin scale. The data consists of transcribed-interview records from 80 interviews, all in English or translated into English.

1.2. Research questions

The management of natural resources in river basins often transcends community and regional boundaries, as Leeuwis (2004) explains. If one wishes to improve, from a sustainability point of view, the management of natural resources, the fostering of new agreements, modes of coordination and organization among all involved stakeholders is essential. Furthermore, Leeuwis (2004) argues that some of the environmental problems faced by the world such as climate change or water shortage can only be solved if coordination is achieved on a transnational or even global level. This implies that all global ecological issues have local and regional implications, just as local and regional ecological issues can have global implications. We can apply the latter to the Okavango River Basin, where the cumulated local practices of its users (derived from the knowledge system they have inherited/acquired over time) have an impact on the ORB as a whole. Veldkamp et al. (2011) further explains this from the environmental sciences perspective, which tells us that the interactions between societies and natural systems create dynamic feedback loops in which humans influence, and are influenced by natural systems. The resulting behaviours cannot be understood without analysing both man and nature together. Thus, the ORB can be perceived as a complex socio-ecological system with a variety of actors, land-uses and a diversity of natural resources (Seidel, H., Gröngröft, A., Pröpper, 2012).

Social-ecological systems (SES) are defined as structures composed of a common-pool resource, its users, and an associated governance system (Veldkamp et al., 2011). As Brand Jax (2007) puts it: “SES are coupled systems of people and nature”. These are determined by the combined extent of spatial entity and actors (including institutions), which means that every actor is directly linked to spatial units, and her decisions connect the units managed (Veldkamp et al., 2011). Our study focuses on human actors and their perception and does not account for other species among the actors SES considers; we consider them rather as part of the natural subsystem. Thus, for a sustainable management of these resources and to prevent

potential conflicts over land-use decision-making, it is essential that all actors involved are aware of each other's perspectives and interests. This is especially important for actors across higher levels of governance who hold the mandate to influence ecosystem management (Falk et al., 2012, Chapter 7). In this regard, we perceive land-use as a social process: Indeed, through land-use decisions, some people can become marginalized, others empowered. We believe land-use is the expression of conflicts of interest and how these are resolved in a given location, society. They reflect all interest, power, attitudes and organization of actors in a given socio-ecological system. Thus, in a first step, we look at the constellation of actors and how their characteristics shape their perception of the SES and land-use system and their needs/priorities for land and resource use in the area of interest. Based on the latter, the following research questions were derived:

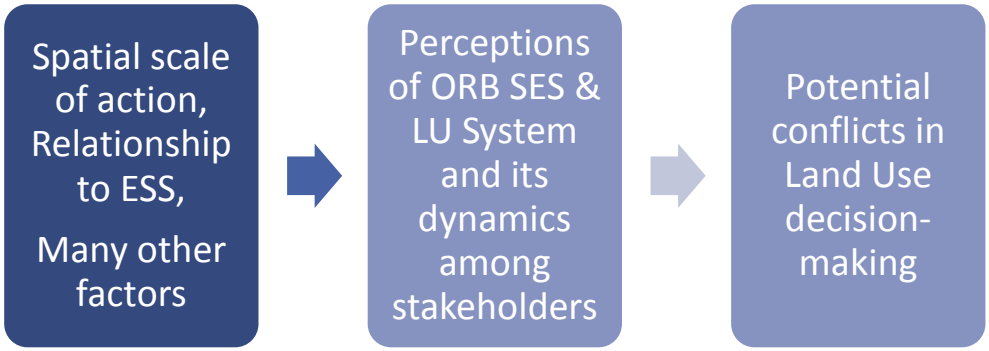
1. Do stakeholders' perceptions of the socio-ecological system of the Okavango river basin reveal different positions on optimal[1] resource management (priorities)?
2. At which level do these differences lie (Scale/country/sector)? Is this also related to the ESS preference?
3. Can we find conflicts (between scales) from these detected differences in positions? If so, at which stage?

These research questions seek to explore the relationship between scale and perceptions of the social-ecological systems considered, as it is believed that differences in perception and prioritization (value) may fuel inter-scale trade-offs leading to conflicts in land use decision making (Domptail, et al., 2013).

Figure 1 below depicts the main causal assumptions structuring the research objectives, questions and plan.

[1] The word "optimal" does not refer to the term used in economics, but rather focuses on what the stakeholders consider the ideal form of managing the natural resources provided by the ORB.

Figure 1. Main causal assumptions structuring the research objectives



Source: Own research. The potential conflicts in land use decision making can be influenced by the different perceptions the stakeholders among the River Basin have. Whereas the different perceptions are influenced by the spatial scale of action in which the stakeholder is active and the relationship they have to the ESS the basin provides, among many other factors. Similarly, it is believed perceptions of the stakeholders can change or deform as a conflict escalates (Glasl, 1994) (As no in depth analysis of conflicts was carried, the latter could not be confirmed).

2. Conceptual framework

2.1. Factors influencing stakeholders perception of land use and their expectations

Several sources express the importance of the spatial scales at which stakeholders develop to the values/prioritization they give to the different ESS provided by the ecosystem (Hein et al., 2006; Liu et al., 2010; Martín-López & García-Llorente, 2011; Veldkamp et al., 2011). We also know from Fisher, Turner, & Morling (2009) that the nature of the ecosystem services and especially the relationship to the stakeholders (affecting/benefiting/bearing costs) with a given ESS is important for the ESS management.

Scale and costs/benefits are concepts which are increasingly put in relation with the study of ESS and the management of the providing ecosystem. Thus, we seek to explore how these elements affect the perception not only of the ESSs, but rather of the entire social-ecological system of the ORB and its drivers.

Other factors that are also mentioned in literature to affect stakeholder positions, priorities, perceptions or actions in the domain of natural resource management include the evaluative frame of reference (Leeuwis, 2004) or individual

characteristics of the stakeholder (Fischer & Young, 2007; Parris et al., 2013); the aim (motivations) of the stakeholder (Fischer & Young, 2007; Parris et al., 2013); his/her shaping environments, that is, whether their socio-economic environment is supportive, as well as the social relationships, interests groups and perceived social pressure (Leeuwis, 2004); and lastly, the socio-economic sector of the stakeholder (Cinner & Pollnac, 2004).

Freeman (1984, cited in Hein et al. 2006) defines a stakeholder as "any group or individual who can affect or is affected by the achievement of the organization's objective". Stakeholders or actors are usually part of a social network that consists of different hierarchies and scales that interplay and affect one another when making decisions over shared resource use (Hein et al., 2006). The decisions they make over how to use the resources provided by the ecosystem surrounding them are usually based on the different values (economic and non-economic) they have over them (Liu et al., 2010; Martín-López et al., 2011). That is, they decide how to use these resources based on the benefits they obtain from the services provided by the ecosystem. Ecosystem services (ESS) are subdivided into i) provisioning services (i.e. food and water); ii) regulating services (i.e. regulation of floods, drought and disease); iii) supporting services (i.e. soil formation and nutrient cycling); and iv) cultural services such as recreational, spiritual and other non-material beliefs (Millennium Ecosystem Assessment, 2005). As the values differ from actor to actor or scale to scale, conflicts between the perceptions of actors of what are best uses of the resources today and in the future may occur. For instance, Liu et al., (2010) find that actors at the local scale prefer provisioning services, while global scale actors prioritize regulating services. Martín-López et al., (2011) support this in their study results indicating that stakeholders put a higher value on services affecting them directly and occurring within their scale of action. Following these insights, we make the assumption that priorities for ESS are linked to the scale at which an ESS occurs and at which a stakeholder is active. This 'scale of action' factor might also affect the whole perception of the stakeholder about the SES.

In the following paragraphs we will expand on the concept of perception based on our literature review and briefly describe the above mentioned factors that influence it. The topic of scale and its relation to ESS valuation is also presented in detail.

Perception

The concept of perception, as well as its shaping factors and characteristics has been brought up in literature within the context of environmental resource management. On the one hand, Fischer & Young (2007) talk about perceptions as 'mental constructs' consisting of mental associations that relate a concept to other ideas and evaluations, which eventually underlie an individual's attitude towards a specific environmental issue. Leeuwis (2004), on the other hand, describes perception as the outcome of applying (acquired) knowledge to a particular situation, that is, as "a collection of interconnected schemes of interpretation that are available in our heads and that we can mobilise to give meaning to a particular situation". For the purposes of our study, Fischer & Young's definition was adopted.

Moreover, according to Parris et al. (2013), perception is influenced and shaped by individual-level and situational factors. Individual-level factors being i) characteristics (demographic, i.e. gender, race, age, nationality, or referring to positions in relation to others); ii) beliefs (cultural and political ideologies or specific value judgments) and iii) motivations (self-interested materialism, other social concerns and moral mandates). Leeuwis (2004) further explains this in his model of basic variables for understanding individual practices and responses to proposed alternatives. He discusses the evaluative frame of reference, which is closely related to the knowledge and mode of reasoning of the stakeholder about the natural, economic and/or social world based on their beliefs and aspirations. The perceived self-efficacy, that is, the level of self-confidence in their own capabilities and the validity of their acquired knowledge, is also seen by the author as an influential individual-level factor.

As situational factors, Parris et al. (2013) mention the availability of information, the amount of rewards to be distributed, the accountability of decision makers, as well as the views of others in a situation. Leeuwis (2004) places more emphasis on the individual interpretation of these factors describing them as 'perceived effectiveness of the socio-economic environment' and 'social relations and perceived social pressure'. All of the aforementioned characteristics are closely interrelated and form the individual's perceptions and attitudes towards a certain situation.

Identity and group interests

Both Leeuwis and Parris stress the importance of the different identities taken by individuals when approaching a certain situation. People's beliefs, aspirations and motivations may change depending on how they perceive themselves in relation to their social environment as well as in regards to the situation or issue at stake (Stets and Biga 2003, cited in Parris et al., 2013). For instance, the individual stakeholder may identify herself as a politician, a farmer, a parent, a citizen, or a scientist. The latter can be related to the influence that the scale of action has on the stakeholder and its effect on his or her perception and how this affects the value given to ESSs considered, which in turn can influence the stakeholder's decision-making practices.

Scale of action and the valuation of ESS

Scales, within the socio-economic context, can be described as hierarchical clusters or institutional levels at which decisions over use of capital, labour and natural resources are made. The lowest scale level consists of individuals and households, while higher scales are formed by regional, provincial, national, and international institutions (Hein et al., 2006). We found a number of studies signalling the importance of scales when valuing ESSs for improved environmental resource management (See Dore & Lebel, 2010; Lebel, Garden, & Imamura, 2005; Martín-López et al., 2007; Palomo, I., B. Martín-López, C. López-Santiago, 2011; Veldkamp et al., 2011; Zia & Hirsch, 2011). Hein et al., (2006) closely examined how stakeholders at different spatial scales value ecosystem services differently, and how this also is related to the relationship the stakeholder has with the ESS provided at a determined spatial scale. In other words, a stakeholder will value a certain ecosystem service according to whether he or she is benefiting /using, depending on, managing or bearing costs from it.

The overall conclusion drawn from these studies is that stakeholders active at larger scales do indeed value ESSs differently and tend to attach more importance (higher value) to regulation services (i.e. conservation-management programs), while smaller scales give a higher value to provisioning and cultural services, which are closely related to their livelihoods. Also, as Hein et al. (2006) and Zia et al. (2011) conclude, an analysis of the costs and benefits or cross-scale value trade-offs for stakeholders at different scales in social-ecological system management provides a basis for determining the size of potential compensation payments or benefit transfer to local users. Thus, a proper assessment of scales and stakeholders allows for an

improved, more balanced and transparent resource management that serves the interests of all involved stakeholders across the different spatial scales within the socio-ecological system, lessening potential conflicts between them (Domptail et al., 2013).

In summary, perception, defined by Fischer & Young (2007) as 'mental constructs' consisting of mental associations that relate a concept to other ideas and evaluations, which eventually underlie an individual's attitude towards a specific environmental issue, is influenced by a series of factors which may be situational (shaping environments, external factors surrounding the stakeholder) or at the individual level (individual characteristics of the stakeholder such as gender, belief system and motivations). With that said, stakeholders, based on their view and perception of their environment, tend to adopt a certain identity or interest group. These groups tend to be active at a particular scale level, and this scale level has been shown to be related to the value a stakeholder gives to ecosystem services. Based on these concepts, a methodology was developed to analyse the data collected in order to accomplish the first objective of our study: investigate the perceptions of stakeholders at different scales, countries and sectors, and their relationship to ESS about the land-use system and its functioning in the ORB. For our second objective, focused on finding whether and which of these differences in perception and expectations lead to (latent) conflicts, we will look into the theory of conflict management.

2.2. Conflict management and theory

Glasl (1994) outlines—in a very detailed and clear manner—the subject of conflict management. His insights and integrated approach are well presented in his literature. We therefore present below a brief summary of the findings and concepts concerning our third research question based mainly on his book and the contributions from Yasmi, Schanz, & Salim (2006) which integrate conflict escalation within natural resource management.

Social conflicts

Glasl (1994) defines a social conflict as an interaction between actors (individuals, groups, organisations, etc.), where at least one actor experiences inconsistencies in his thinking/imagining/perception and/or feeling/desires in regards to another actor, creating a feeling of undermining or impairment of his/hers/their successes. Conflict emerges if stakeholders have differences or incompatibilities in

interests, values, power, perception and goals (Yasmi et al., 2006). It is argued that conflicts do not just appear suddenly, but are actually gradually increasing in intensity (Ibid). Thus, conflicts tend to not be recognized when perceived as low intensity, but only until they have reached higher intensity levels. Glasl (1994) further argues that "*Small events suffice to resolve major conflicts*".

Conflict typology

Three main characteristics of conflicts are used by Glasl (1994) to typify them (based on his literature review on the subject): 1) The *subject of dispute*, 2) the *form of manifestation* of the conflict and 3) *characteristics of the conflicting parties, their position and inter-relationships.*

For the case of the *dispute subject*, a number of sub-classifications can be observed, such as conflicts of interest against conflicts of values (Aubert, 1963 & 1972; Bernard 1957) or justice disputes against conflicts of interest (Kahn-Freund, 1969).

The *forms of conflict manifestation* are also several. Dahrendorf (1958) and Pondy (1967) talk about latent and manifest conflicts. Latent conflicts being those in which the parties hold different positions that constraint each other's aims but have not led them to a hostile conduct. Manifest conflicts are characterized by behaviour from one or more of the conflict parties that is disadvantageous or even harmful for the counterparty. Other examples of sub-classification are the one from Mack and Snyder (1957), namely institutionalized and non-institutionalized conflicts, as well as 'extreme-non-violent' conflicts (Coser, 1956 and Kerr, 1954).

Lastly, for the category according to *characteristics of the conflicting parties*, Chase (1951) und Le Vine (1961) classify conflicts as interpersonal- between groups, etc. up to intercontinental. Rapoport (1974), on the other hand, classifies them as symmetric and asymmetric conflicts in terms of power relations, symmetric conflicts being those between individuals, groups or organizations with the same power degree, while asymmetric conflicts are distinguished by inequality in power relations. Mack and Snyder (1957) use the term 'personal, subjective' against 'impersonal, objective'. The latter are conflicts handled normally between representatives, delegates or mandatories in a more diplomatic manner. For a more detailed overview of the different existing conflict typology see Glasl (1994, p.p. 53).

It may occur that a conflict involves several of the characteristics mentioned at the same time and might not seem clear in the beginning (Leeuwis, 2004). Only a

detailed assessment of the issues, stakeholders and surrounding environment can clarify the type of conflict presented.

Conflict diagnosis

Glasl (1994) mentions the importance of the diagnosis of a conflict. The diagnosis and determination of the type of conflict taking place allows for a more effective resolution process. During the diagnosis phase, it is important to consider from which sphere the conflict can be observed and approached. There are two spheres from which the conflict can take place: the objective and subjective sphere. The *objective* sphere largely concentrates on the external factors surrounding the conflicting parties, such as the organizational structure where the stakeholders are active as well as procedures and processes concerning the issue at stake. The *subjective* sphere, on the other hand, focuses on the personal traits of the conflicting parties and how these mutually influence each other. However, Glasl suggests a 'socio-ecological approach' to conflict diagnosis where these two spheres are analysed as a whole along with other influential factors.

Indeed, conflicts are typically composed by several factors. As a result, isolating any single factor when attempting to solve or prevent a conflict is impossible, hence the necessity of integrating and relating all possible factors, whether interpersonal or not into the diagnosis. For instance, in the case of an organization, it may occur that the processes taking place in it are not fair for a certain group of people; yet, this does not imply that a conflict exists, but merely signals a conflict possibility. Other factors also play a role in determining this, such as the stakeholders and the perceptions they have of the situation and their counterparty, their attitudes and desired aims and goals.

Lastly, the behaviours of the potentially conflicting parties may also determine whether an actual conflict will occur (i.e. aggressive or hurtful). This behaviour may also be unconsciously expressed, as a result of even more subjective reasons such as the knowledge system of the individual. Glasl argues that the perception of the situation is deformed as the conflict escalates. The stakeholder loses herself in the conflict, seeing the other party usually as non-cooperative. It gets harder to see the positive side of the confrontation or any steps made towards solving the conflict. This perception deformation leads to bad attitudes and behaviour towards the other party or situation.

Here, both of the before mentioned spheres can be observed with an emphasis on the cognitive functions of the stakeholders. However, Yasmi et al. (2006) explain that in some cultures conflict is still considered negative and thus avoidance might be over-emphasized. In such situations, conflict escalation is normally difficult to observe as conflicts for the most part stay latent and do not escalate.

Substantive dimensions of conflict diagnosis

Conflict diagnosis begins with realizing/perceiving the conflict phenomena and further contributes with the recognition of conflict mechanisms active within the conflicting parties and their inter-relationships. These mechanisms drive the conflict to a certain degree of escalation or allow it to further expand. Whether this occurs relies on the consciousness of the individuals and parties involved. The less in control they are over their individual behaviour, the less control they will also have over the issue at stake.

The above mentioned factors are also crucial when diagnosing an existing conflict or the potential formation of one. Glasl (2004) presents five important aspects of conflict diagnosis that should answer the question "what?" in our diagnosis (Table 1). Each aspect is presented with a line of questions that should be asked when performing the conflict diagnosis.

Table 1. Substantive dimensions of conflict diagnosis, adapted from Glasl (2004).

1. Conflict issues – being the points of conflict and reasons of dispute.	*a. Which issues do the different parties bring up?* *b. Which issues are interrelated between the parties?* *c. How well do the parties know the issues of their opposites? Is empathy observable?* *d. How are the issues interrelated with each other? In this case it is recommended to divide the big issues from smaller more concrete ones. The more interrelated the issues are, the more rigid the attitude of the parties will be and vice versa.* *e. How strongly are the parties fixed on their issues? Do they believe there is no alternative to solve the problem? Is it a question of honour rather than the issue itself?*
2. Course of conflict – How the conflict started and evolves/escalates over a period of time.	*a. What do the conflicting parties experience as decisive and critical moments within the course of the conflict?* *b. What are the crucial events within the conflict process?* *c. Did the conflict extend/expand?* *d. Did the conflict become more intensive? Is there more engagement between the parties?* *e. Is the conflict stable or unstable?*
3. The conflicting parties –	*a. Who are the parties? Are they groups, individuals, etc?*

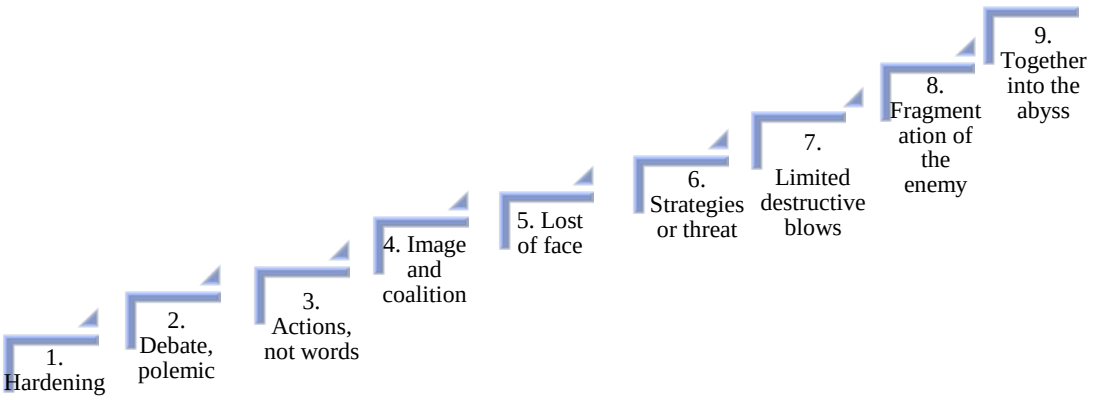
Whether the parties consist of groups, individuals or a wider social structure.	*b. Are the parties organized or unstructured? Is one of them "official" (officially recognized) while the other one isn't?* *c. Who are the key actors within the parties? (with the highest influence and representation)* *d. What type of relationship do the representatives have with their own group/party? Do they influence/motivate/communicate effectively with their team?* *e. Are the parties sharply defined against each other? Or can one observe overlaps between ideals and the issues presented?* *f. How is the cohesion within the party? The relationship and behaviour observed between the members of the group.* *g. How big is the arena of the conflict? (Micro, meso or macro arena) How do the conflicts within the meso and macro arena influence or affect the micro social conflicts observed? Does this also apply vice versa?*
4. The positions and relationships of the parties	*The constellation of roles observed their formal and informal relationships.*
5. The basic attitudes towards the conflict	*To what extent the parties see the issue(s) as solvable and what expectations they have in regards to solutions.*

It is important to mention that not all aspects can be observed during the first diagnosis, as it may also follow that not all aspects are relevant to the conflict in question.

Conflict escalation

It is believed that a conflict can evolve over time into different stages if not properly or timely addressed. Conflicts do not just appear, they gradually intensify within a period of time. Low intensity conflicts tend to be overlooked until they have severely intensified (Yasmi et al., 2006). Glasl (1994) argues that understanding escalation allows for the constructive anticipation and management of conflict. He illustrates nine stages in which conflict can escalate (Fig. 2).

Fig. 2. Stage model of conflict escalation, adapted from Glasl (1994)



However, these are mainly focused on inter-individual conflicts experienced within organisations in urban developed settings. Yasmi et al. (2006) propose a reconceptualised escalation stage model and their sequence in Natural Resource Management (NRM) based on a comparative analysis of case studies. Defining NRM is important for this purpose. The definition used by the authors in this context is broad in order to include all types of resource management such as forestry, water and fishery management, land allocation, agriculture, mining, etc. Their main assumption is that:

> *"…all natural resources in these fields exhibit some common characteristics. First, their management associate with multiple stakeholder groups who have different "stakes" and perceptions regarding resource use and conservation (e.g., FAO, 2000; Buckles, 1999; Hellstrom, 2001; Yasmi and Schanz, in preparation). Second, most of these resources are categorized as "common pool resources" with complex institutional arrangements. Third, from an economic perspective they are considered low in terms of excludability and partial in terms of rivalry (see, e.g., Ostrom, 1990, 1999; Adams et al., 2003). Fourth, they have similar forms of values attached to them including material and cultural values. Finally, they embrace some common problems and dilemmas such as free-riders, contested legitimacy of governing actors, unavoidable conflict, etc."*

The resulting stage model consists of eight stages (Table 2.): 1) feeling anxiety; 2) debate and critiques; 3) lobby and persuasion; 4) protest and campaigning;

5) access restriction; 6) court case; 7) intimidation and physical exchange; 8) nationalization and internationalization. Within each stage a series of manifestation dimensions are also identified. These forms and characteristics of conflict manifestation were adopted during the conflict analysis of our study.

Table 2. Forms of Escalation of NRM conflicts, adapted from Yasmi et al. (2006)

Stage	Manifestation dimension
1. Feeling Anxiety	Feelings of worry, complaints, rumours, unhappiness, anger, grievance, discontent, disagreement over decision/issues, fear of job lost
2. Debate and critique	Open debate, intense debate, verbal clash, accusation, quarrel, critiques to government policies
3. Lobby and persuasion	Lobbying government, lobbying for compensation, persuading government to acknowledge local rights, lobbying politicians
4. Protest and campaigning	Protest by local people, protest against logging plan, demonstration, mass protest, street rally, convoy of tractors, farmer rally, public rally, logger rally, truck convoy, marching, strike, campaigning and protest by environmental groups, media campaign, letter-writing campaign, protest by religious leaders, protest against a particular plan
5. Access restriction	Squatter invasion, picketing of companies, peaceful take-over of the park, blockading logging road, preventing from working on particular areas, imposed restriction on subsistence activities, blockading ports, removal by force, eviction, forced resettlement, displacement, relocation by force, fencing land by big land holders, invasion by landless, closing the road, occupation
6. Court	Court appeal, litigation, regional court case, federal court, lawsuit Threat,
7. Intimidation and physical exchange	Threat, death threats, intimidating, threat of boycott, confiscation, machete fight, killing, injury, shooting, ambushing, murdering, attacking, strife, fight, war, violence clashes, bandit attack, damaging district forestry office, assassination, vandalism of park officials' vehicle, burning base camp, arresting, burning opium fields, hiring gunmen, military retaliation, police arrests, putting fire on forest, destroying pipeline, detention, seizing company's equipment, mobilizing soldiers and military hardware, military action, police involvement
8. Nationalization and internationalization	Protest in national and international media (e.g., newspapers, magazine, video), National High Court, State Superior Court, national referenda, bilateral negotiation, influencing national congress, widespread international protest, appeal to International Court of Justice, fight in WTO and NAFTA

The first stage "Feeling anxiety" refers to the feelings about a particular action or decision by other stakeholders. These feelings can offer a fertile ground for conflict as it forms a perception that an action by "others" would negatively impact "my own" group's interests or performance. Typically at this level, certain emotional reactions

are expressed, such as: anger, unhappiness, complaints, rumours, etc. However, these emotional reactions are only expressed within the own group with the purpose of convincing group members and thereby creating a shared feeling that their aims are being threatened by others.

At the second stage "debate and critique", stakeholders who feel threatened engage in a series of debates where several issues are confronted, such as what should be the priority in terms of management options (e.g., conservation or production), and why is it a priority. Opponents are criticized and accused for being self-centred and for not taking the other group's priorities into account. An example mentioned by the authors involves logging companies being criticized for causing damages to local resources necessary for the livelihood of local people. If the debate intensifies, verbal clashes or quarrels can become inevitable.

As the conflict intensifies, it may reach the highest escalation stage "nationalization and internationalization", although it is not expected to follow the numbered pattern presented, but that it adopts its own specific escalation pattern. Yasmi et al., (2006) conclude within their study that escalation patterns in NRM conflicts are much more complex than inter-individual conflicts. They explain the reasoning of this based on factors such as the number of actors involved in NRM conflicts (multiple-actors) engaged in different stages of conflict and various issues and interests at stake, the empowerment strategies ("culture of conflict") and the availability of resources to address conflict, as well as the underlying causes of the conflict.

The latter is of great importance, as conflicts within this realm tend to originate beyond material incompatibilities and can be closely related to the different set of knowledge systems, understandings, perceptions and priorities among the stakeholders. Indeed, in our study, we assume that the differences in perceptions among the stakeholders at different scale levels detected will lead to manifest (on-going) or latent conflicts at different stages of escalation. However, due to the nature of the data collected (see section 3.3), we expect to detect conflicts in only in its early stages. The questionnaire outlined in the section titled substantive dimensions of conflict diagnosis (Table 1), as well as the different forms of escalation of NRM conflicts (Table 2) are the key conceptual tools utilized for the analysis of conflicts in this study. First, we seek to detect what points of conflict and reasons of dispute exist among the stakeholders of the ORB following Glasl's (1994, 2004) integrative

'social-ecological approach' to conflict diagnosis also paying close attention to the possible factors or underlying causes that originated them. Once the issues have been detected, the conflict manifestation dimensions outlined by Yasmi et al. (2006) allow us to identify at which escalation stage the (latent) conflict is, as well as the possible risks of further escalation.

3. Methodology

3.1. Research paradigm: epistemological constructivism & ontological realism

Our research paradigm is mainly based on critical realism, which consists of two different perspectives: epistemological constructivism and ontological realism, as described by Maxwell (2013).We first consider epistemological constructivism, which explains that "our understanding of this world is inevitably our construction, rather than a purely objective perception of reality and no such construction can claim absolute truth" (Ibid). In other words, our perceptions and beliefs of the world are shaped by prior experiences and assumptions and by the reality we interact with. Indeed, we base our research questions on this perspective. Nevertheless, ontological realism reminds us to keep in mind that a real world exists independently of our perceptions and theories (Ibid). Thus, in the case of the Okavango River Basin as a socio-ecological system, the different 'justified' perceptions and decisions on its resource management do not allow us to forget the current state and possible demise of its valuable natural resources.

3.2. Research method: Qualitative – Content analysis

In our research, we investigate the perception and experience of phenomena that people build. The phenomena observed/the experience investigated is the socio-ecological system and its land-use dynamics in the Okavango River Basin. All stakeholders interviewed have experienced land use as a social process as they all have stakes in the land-use of the ORB system.

Our basic assumption when carrying out the interviews was that "both the researcher and interviewee assume that their words will be understood as spoken and intended (i.e. their words will speak for themselves)" (Starks & Brown Trinidad, 2007). That is, we assume that talking directly about the subject is possible and that the content of the answers rather than the lexical realm used to answer the question

provides the needed information to answer the research question (as opposed to discourse analysis). Based on the latter, we intend to apply a specific mode of analysis to our data, namely, qualitative content analysis utilizing both inductive and deductive research processes.

Qualitative content analysis is a methodology (process) of text analysis. It was first developed as a quantitative method of analysis of qualitative data. However, it is also used as a text extraction method, which enables to reduce the qualitative data material and organize it to identify categories of meaning and patterns (Zhang & Wildemuth, 2009). The method is also called *Thematic Content Analysis* (Anderson, 2007) and several procedures have been described, all commonly involving a deconstruction in which relevant texts passages are taken out of context and isolated (following your conceptual framework) and reconstructed using a system of classification and coding which is more or less open and iterative depending on the approaches (Anderson, 2007; Gläser and Laudel, 2010; Weber, 1990). Content analysis can be used for inductive or deductive research processes. If knowledge is incomplete or fragmented, a theory is built or strengthened in an inductive process. If abundant knowledge already exists and one wants to understand whether the theory applies to a particular case, a deductive approach is recommended. The key feature of all content analysis is that the many words of the text are classified into much smaller content categories (Weber, 1990). In other words, the process is to extract from the interviews text excerpts that fit in dimensions corresponding to the concepts identified in the conceptual framework in order to find out about the relationships between these items and the dimensions of these items (Gläser & Laudel, 2010). However, in an inductive process the coding remains open: that is, the dimensions (concepts we are investigating) are defined but their attributes are not pre-defined and remain open. Attributes are added to the analysis as it goes on (ibid).

The process of content analysis

The first step for any type of content analysis (supposing your data is ready for analysis) according to De Wever et al. 2006 (cited in Zhang & Wildemuth, 2009) is to define the unit of analysis. This refers to individual themes or issues relevant to our research questions as the units of analysis. When using theme as a coding unit, we are mainly looking for the expressions of an idea (Minichiello et al., 1990 cited in Zhang & Wildemuth, 2009).

The second step is the core of our analysis and consists of developing categories and a coding scheme. This may vary depending on whether an inductive or deductive approach is applied. For this research, we attempt to apply a mixture of both approaches as we have built up our conceptual framework based on different theories from which our preliminary coding structure was born but remains open for further inductive development during the analysis phase (Miles & Huberman, 1994 cited in Maxwell, 2012). Lincoln & Guba (1985 cited in Zhang & Wildemuth, 2009) argue that the categories within the coding scheme should be internally as homogeneous as possible and externally as heterogeneous as possible to avoid confounded variables. The development of a coding manual or 'umbrella coding structure', as we call it, is recommended to ensure consistence of coding bearing in mind that new themes and concepts will be added as the data is analysed (Weber, 1990; Mayring 2000).

As a third step, the developed coding scheme should be tested with a data sample, checking for coding consistency and revising coding rules. This is an iterative process during the whole analysis phase and should continue until sufficient coding consistency is achieved (Weber, 1990 cited in Zhang & Wildemuth, 2009).

Once all of the data has been coded, conclusions must be drawn from the coded data. Inferences are made and reconstructions of meanings from the derived data are presented. In this critical step, activities involving exploring the properties and dimensions of categories, identifying relationships between categories, uncovering patters, and testing categories against the full range of data should be applied (Zhang & Wildemuth, 2009).

Lastly, methods and findings are reported. An interesting and readable report should provide "sufficient description to allow the reader to understand the basis for an interpretation, and sufficient interpretation to allow the reader to understand the description" (Patton, 2002, p. 503-504 cited in Zhang & Wildemuth, 2009). Hence, a balance between description and interpretation should be aimed for.

3.3. Material and tools of analysis

Material: the interview texts

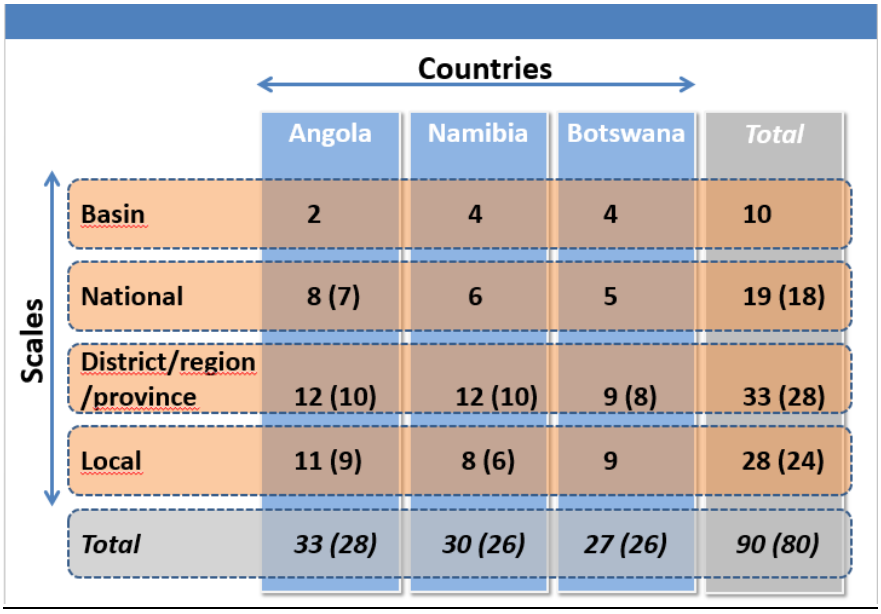
The interviews aimed to gather the knowledge of stakeholders on the land-use system as a socio-ecological system in the ORB in order to identify factors that shape their perception on the SES. Results of this analysis are to shed light on the stakeholder landscape, their priorities in term of land-use and ESS in order to highlight potential conflicts.

Selection of stakeholders

When conducting research on natural resource management, a stakeholder analysis is essential in order to 1) define aspects of social and natural phenomena to be assessed or changed, 2) identify individuals, groups, and organisations who are affected or affect the phenomena, and 3) prioritise individuals, groups and organisations to be involved in the assessment or change process (Reed, Graves, & Dandy, 2009). This has been carried out within the frame of The Future Okavango (TFO) project, where key stakeholders were identified to participate as collaborators or as information or consultation sources (Schmidt et al., 2013). The 80 interviews studied in this research were applied to selected stakeholders based on this analysis.

Stakeholders were selected so as to represent each country and each scale of analysis as depicted in figure 3 below. In each resulting category, we strove to interview stakeholders with different roles in society (government, education, civil society, land-users, businessmen), as well as from different sectors (agriculture, environment, economics, lands, tourism, environment, water management). The identification of stakeholders followed an iterative approach. Based on a coarse analysis of the landscape of actors in the ORB, key sectors and stakeholder groups for land use management in the ORB were identified. Within these categories, a more thorough analysis was conducted per country taking into account already existing inter-stakeholder platforms and other groups involved land use, resource or water management in the basin and corresponding potential interview partners were identified with help of local project partners.

Figure 3. Interviews across scale and country



Source: own. Numbers indicate the total number of valid interviews. The numbers between parentheses indicate the interviews that were successfully transcribed and used for this study (80 in total).

Interview process

Data was collected in the three countries of the Okavango River Basin (ORB) and at four different scales (Basin, national, regional and local, as shown in figure 3) by using face-to-face semi-structured qualitative interviews from November 2012 to June 2013. The interviews were recorded except in cases where participants objected. Interviews were conducted by Stephanie Domptail in Namibia and Botswana and with the help of Henrike Seidel in Angola. In fine, 122 stakeholders were contacted; among these, 9 were interviewed in pre-test interviews, 90 were formally interviewed and 23 further stakeholders were only contacted and informed about the scenario building process of TFO and the present study. From the 90 valid interviews, 80 were successfully transcribed and used as data in the present research. When carried out in another language than English (Ombundu -6, Rukwangali -6, Setswana -7, and Portuguese -12), interviews were translated live and the translation was transcribed. In the case of the interviews in Portuguese however, the translation was cross-checked with the original answers of the interviewees and corrected in the transcripts if necessary. All interviews and transcripts are anonymous.

Interview design

The interview was conducted at the scale at which the interviewee felt most knowledgeable: local (e.g. village, or this village and the surrounding ones), regional (e.g. greater Kavango region, Namibia), national (e.g. person has responsibilities at the national level and the land located in the ORB is only part of his responsibilities) or basin (e.g. the person may have a perception which is biased by its country of origin but is knowledgeable about the whole basin and looks at the international dimension in the land use problematic or understands the basin in its greater ecological scale). *All questions of the interview applied to the area of the ORB most familiar and understood by the stakeholder.* The interview followed an 'interview guide' based on our preliminary conceptual framework and was structured as follows: the first section aimed to inform the interviewee about the research carried out and the context in which the interview is being conducted. The stakeholder could ask questions about the why of the interview and the context of the research. The second section consisted of more of a questionnaire structure (also all questions were open) where not too complex questions about the stakeholder himself and his/her characteristics were asked. The third section begins with an easy question to set the interviewee into a state of imagination about the ORB ("When was the first time you ever visited a part of the ORB?") and enables the researcher to identify the geographical extent of expertize/experience of the interviewee about land use in the ORB ("Have you been to all parts of the ORB in each of the three countries of the basin?"). The aim of the section was to gather information to investigate his/her perception and attitude towards the land-use system and its development in the ORB in the future. Reconstructing elements are key system variables, strengths, weaknesses, opportunities and threats, drivers of change, trends of change in the ORB, as well as the interviewees vision (and in some cases anti-vision) for the land use in the ORB in the future (2030). The fourth section concerned ecosystem services provided in the ORB by nature to humans and aimed to provide information about why some ecosystem services are ranked by whom more highly, that is, investigate the relationship between ESS and the interviewee. Here, a simple technique of card ranking was adopted and the ranking was justified by the interviewee. The questionnaire can be found in Appendix 1.

The Tool: MAXQDA Qualitative Data Analysis Software

MAXQDA is a professional software utilized for qualitative and mixed methods data analysis. It allowed for a detailed, more structured analysis of the interview texts through categorization and codification. The use of the software contributed to reducing the coding process time.

3.4. Coding structure

The coding structure evolved during the coding process as new categories and codes were added throughout the analysis of each interview. An “umbrella structure” was created, which consisted of three main categories: 1) General data; 2) Perception and 3) Conflict. After all interviews were coded, a fourth category was added in order to code the resource management priority based on the results from category number two ‘perception’. Figure 4 below depicts this coding structure with its four main categories and subcategories. A brief description of each category and its subcategories will be presented below. For a detailed description of the complete coding structure please see Appendix 2.

Figure 4. Coding structure created during qualitative analysis

Coding Structure			
	1) General data	ESS preference	
		Relationship with ESS	
		Stakeholder group	
		Sector	
		Activity	
	2) Domain priority	Economy & livelihoods	
		Social & cultural aspects	
		Natural environment	
	3) Perception	Perception of shaping environments	
		Perception of system dynamics	
		a) Perception of natural environment	
		b) Perception of economic status & growth opportunities	
		c) Perception of livelihoods dev.	
		d) Perception of social & cultural state	
		e) Perception of governance effectiveness	
	4) Conflict	Issues	- Land use - Local/National - Efficiency of rules and economic policy - Transboundary issues
		Conflict analysis (if existent)	- Course of conflict - Conflicting parties - Positions/Relationships - Feelings & attitudes - Conflict stage

Source: own research. For the detailed coding structure please refer to Appendix 2.

1) General data: Our first category consists of the previously investigated influencing factors and main characteristics of each stakeholder interviewed. That is, the activity, sector and stakeholder group the interviewee belongs to, as well as the ESS preference and the relationship it has with the ESS. This is information that was gathered before and served as guidance during the analysis and interpretation.

2) Domain (resource management) priority: This category was created at a later stage in the process of coding the interview texts. It was found that stakeholders had indeed different priorities and expressed different positions towards optimal natural resource management. This trait was recognizable not only throughout the whole interview but more specifically when the interviewee was asked about the

stakeholder's goals and aims. Later, in the vision part of the interview, the priority of the stakeholder could be further confirmed. From this finding and based on the perceptions category described below, it was possible to determine three subcategories that we also call SES landscape domains. The first domain surrounds the *economy and livelihoods*, the second domain involves *cultural and social aspects* within the system and the third domain focuses on the *natural environment*. This category will be further clarified in the results section as it was our key tool for the main findings presented in this research.

3) Perception: Category number three is the centre of our analysis and was subcategorized based on our conceptual framework, where the perception of the shaping environments and the perception of the system dynamics contribute to a broader understanding of how the SES was perceived within each of its five subcategories as shown in figure 4. The subcategory perception of shaping environments was further subcategorized into two: identity group and intention of others. The first subcategory pointed out the profile of the interviewee (i.e. conservationist, expert, etc.), while the second subcategory coded whether the stakeholder felt supported in his goals and aims within the context of his activities related to the ORB. Furthermore, within the subcategory system dynamics, perceived key drivers running the system and affecting its dynamics were coded. For instance, some stakeholders consider climate change as a key driver of present and future dynamics in the SES, especially within the agricultural and farming sector. On-going projects and trends were also coded as supporting information.

The subcategory *a) perception of the natural environment* looks into how the stakeholders perceived the ecosystem in the present and future. That is, which characteristics of the ecosystem they are aware of, which of them do they cherish, as well as which characteristics or activities within this context were perceived as negative or as threats. An example of a well aware characteristic of the ORB ecosystem among most stakeholders was the pristineness of the river. While subcategory *b) Perception of economic status and growth opportunities* was created to determine how the stakeholders perceive the current economic status of the system as well as the different economic growth opportunities available (i.e. diversification such as ecotourism, handcrafts, etc., easier access to markets - status of production systems such as agriculture and livestock, mining, etc.), subcategory *c) perception of livelihoods development* looks into how each stakeholder perceives their livelihoods

and also at whether they perceive to have enough socio-economic development plans assisting them. This includes action plans, infrastructure, equal benefit sharing in all scales, community development, education and empowerment, investments in research and other development options, as well as disease control. Subcategory *d) perception of social and cultural state* provides an insight into how the stakeholders perceive the values, changes in attitudes and behaviours among them, as well as into tendencies towards excessive dependency on international donors, cooperation between the three riparian states and effects of post-war stabilization in Angola. Lastly, subcategory *e) perception of governance effectiveness* focuses on how the stakeholders perceive the efficiency of plans, policy and decision making of the government on all scales (transnational, national, regional and local). This includes monitoring, capacity building, institutional flexibility and political interests. Here we also analyse how OKACOM and other transboundary organisms are perceived.

For all five subcategories, further subcategories were added to differentiate the perception of the present state (positive and negative traits perceived at the time of data collection) from the future (threats, opportunities and visions).

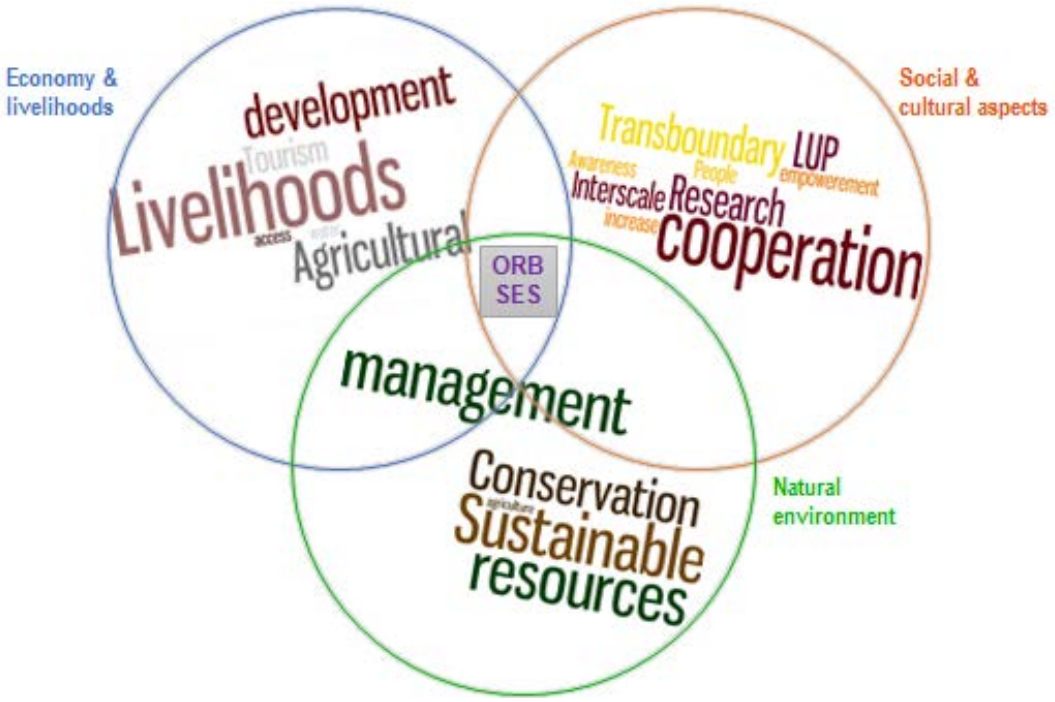
4) Conflict: The fourth and last category seeks to find latent and on-going conflicts at all scales and levels. The subcategorization was made based on our conceptual framework. A subcategory for issues was created in order to code all kinds of problematic mentioned by the stakeholders without it necessarily indicating a conflict. Issues differ themselves from the negative traits in the perceptions categorization as these are actual situations occurring (i.e. when the stakeholder brings up examples of something occurring, he is not expressing his opinion but mostly recalling a certain event(s) that are happening or happened). This supported the answering of research question number three, where latent conflicts were detected based on differences found in positions on natural resource management priorities between the stakeholders. The second subcategory consisted of the conflict analysis (if existent), where the course of conflict, conflict stage, the conflicting parties, their positions and relationships as well as their feelings and attitudes within each conflict detected was coded.

4. Results

4.1 ORB landscape domains

During the analysis of our data, we found that the socio-ecological system of the ORB can be seen as a landscape consisting of mainly three "domains" that interrelate with each other: i) the natural environment, ii) the economy and livelihoods and iii) social and cultural aspects (Figure 5). These domains emerged when coding the resource management priorities or approaches towards optimal resource management that the stakeholder mentioned. In other words, when a stakeholder mentioned throughout the interview what he perceived as possible solutions or approaches for optimal resource management, an inclination towards one domain or the other was noticeable. This is why in our coding structure we subcategorized these approaches under the three domains (see Appendix 2).

Figure 5. Landscape domains in the SES of the ORB



Source: own research. Size of trait reflects code frequency according to mixed-methods analysis (N=80 Interviews, MAXQDA software).

The domain *natural environment* comprises approaches focused on conserving the ecological integrity of the system as much as possible. The main approaches mentioned in order to achieve this were first of all the sustainable management of

resources, followed by conservation, where protectionist measures where the main focus. Conservation agriculture was also mentioned, although to a much lesser extent than the latter.

Within the domain of *social and cultural aspects* we include approaches involving governance such as inter-scale and transboundary cooperation, as well as proper land use planning and management. Additionally, topics related to education such as scientific research for proper policy making, as well as awareness increase and education and people empowerment were also mentioned by a share of the stakeholders interviewed as viable approaches towards improved (if not optimal) natural resource management. The third domain *economy and livelihoods* focuses first of all on rural livelihoods improvement in the ORB, followed by other more specific approaches to achieve this such as tourism, (sustainable) agricultural development and guaranteed access to water.

Using these domains provided us a clearer overview of the perceptions and priorities of the stakeholders and allowed us to detect differences and similarities between them in order to answer our research questions.

4.2 Research question number 1: *Do stakeholders' perceptions of the socio-ecological system of the Okavango river basin reveal different positions on optimal resource management (priorities)?*

From the beginning of our analysis it was observed that stakeholders do indeed perceive the SES of the Okavango river basin differently from one another. Nonetheless, there was a general agreement that without water and mutual cooperation between the three riparian states, this essential socio-ecological system could not survive. In order to answer our research questions in detail, special focus was given to the priorities on natural resource management that derived from the different perceptions detected in the data. We focused the qualitative content analysis on detecting differences on optimal resource management priorities among the interviewees. During the coding process, five subcategories were identified that comprehend the perception of the SES, namely: a) perception of the natural environment, b) perception of economic status and growth opportunities, c) perception of livelihoods development, d) perception of social and cultural state and e) governance: perception of effectiveness of existing administration and institutional

organisms. Within each of these subcategories, positive and negative traits observed were coded as well as threats and opportunities that the stakeholders considered.

Based on these five subcategories and the main characteristics of each stakeholder, similar traits in the view of the SES between the interviewees were considered in order to assign a related profile to each of them. These profiles can be defined according to Max Weber (1977) as "ideal types" (Idealtypus). That is, analytical constructs in which many discrete attributes are grouped into a single category by emphasizing one feature of those attributes. The interviewees typically held positions that combined elements from the different profiles but were more inclined towards a certain identity group. These characteristics could be detected in the form the stakeholder mentioned the activities he carries and in how he justified his opinion and/or position based on "who he is". For instance, when a stakeholder expressed his opinion regarding the problems of land fragmentation in Botswana, he stated: *"…because I am a conservationist, I would say increase in human, increase in these settlements, more settlements [are contributing to land fragmentation problems]"*. In sum, six profiles could be detected (in great part directly related to the sector and scale where the stakeholder is involved): 1) investor; 2) conservationist; 3) coordinator; 4) expert; 5) resource or land user and 6) civil servant (Table 3). These profiles or identity groups allowed us to detect and illustrate the different perceptions or 'mental constructs', as defined by Fischer & Young (2007), within the ORB.

Table 3. Stakeholder Profiling

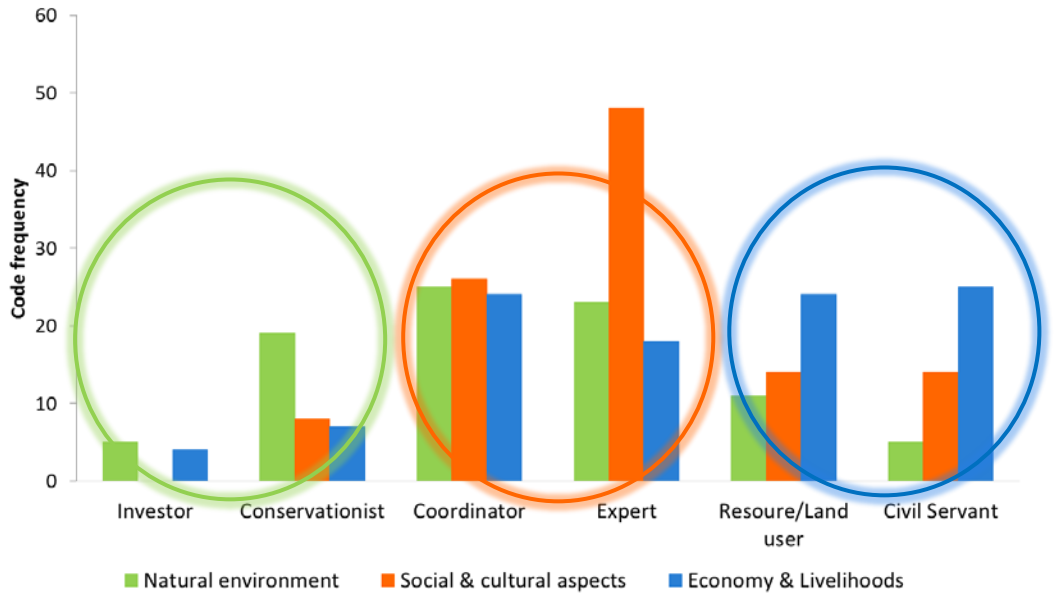
Profile	Main characteristics
Investor	• Monetary/profit driven • Mainly involved in tourism sector • Advocate of conservation
Conservationist	• Focus on maintaining ecological integrity of the ORB • Advocate of conservation and protection of natural resources and biodiversity
Coordinator	• Government member & traditional authorities • Following mandate of institution/sector he belongs to.
Expert	• Academic or specialized background • Government members, professors, consultants • Holistic perception of the SES

Resource/land user	• Direct contact with ESSs (benefits, depends and/or bears costs from ESSs) • Sees SES as livelihoods provider. Focused on "surviving".
Civil servant	• Government, civil and donor organisation members • Focused on empowering land users and helping them improve their livelihoods

Source: own research

By cross-tabulating these six stakeholder profiles against the three domains of the SES landscape described above, we were able to confirm that the social environment in which the individual develops himself does indeed shape his perception, and thus, influences the position he holds in regards to what optimal resource management entails. Figure 6 illustrates the relation between each of the profiles (perceptions) and the domain priorities (positions), where the profiles 'Investor' and 'Conservationist' are more inclined towards the domain 'natural environment', while 'Coordinators' and 'Experts' prioritize the domain 'social and cultural aspects'. 'Land and/or resource users' and 'Civil servants', on the other hand, are focused on the domain 'Economy and livelihoods development'.

Figure 6. Domain priorities according to profile



Source: Own research, based on code occurrence frequency (N=80 Interviews). Circles indicate similarities in domain priorities between the stakeholder profiles.

The investor is the stakeholder that usually has a monetary interest or reasoning behind his perception of the system. He sees the SES primarily as means of profit

generation. The stakeholders fitting this profile were involved in the tourism industry, hence the particular interest for conserving the environment. They were also involved in certain activities assisting the livelihoods of the local communities around them, and expressed the importance of the tourism industry as means of livelihoods improvement and reduction of pressure on the natural resources.

The *conservationist* is focused on maintaining the ecological integrity of the system. He perceives the SES mainly as a natural environment and is generally against any type of human development around the spatial area in question. One can say that their predominant attitude is inclined towards environmental protectionism. Their preferred management approach is thus clearly justified.

The *coordinator*, on the other hand, is the stakeholder typically involved in governmental activities related to land use or resource management. Traditional authorities also qualify in this profile. The stakeholder within this profile perceives the system more holistically but tends to follow the mandate of the institution he belongs to. This can explain why there was not a strong preference for a domain. Nonetheless, a sustainable management of resources, livelihoods development and transboundary cooperation were some of the main approaches mentioned.

The *expert* can be categorized as the stakeholder with an academic or specialized background that could also be involved in governmental or political activities. He perceives the system as a whole, tends to see the ORB as borderless and consider all elements in the SES as equally important for its sustainability. Stakeholders in this profile believe approaches within the domain in which their professional activities are carried are also the most optimal approaches towards sustainable natural resource management. For instance, most interviewees involved in research or academic activities mentioned education and raising awareness as key for optimal natural resource management, while stakeholders working for OKACOM advocate for transboundary and interscale cooperation.

The *resource or land user* is the stakeholder usually in direct contact with the natural resources. He benefits (and can also bear costs) from the services provided by the ecosystem and perceives the system primarily as a provider of livelihoods. This can be justified by the fact that the activities in which this stakeholder group is involved are predominantly natural resource-based. Their main concern is ensuring their (and their family's) well-being in the present and future. One could say that farmers, fishermen and other direct resource/land users are mainly focused on

"making a living". Thus, infrastructure development (without necessarily meaning modernisation) as means of easier access to markets and opportunities to diversify, increase their income and lessen their vulnerability and dependency on natural resources is a main priority for this profile. There was no concrete approach mentioned for optimal natural resource management, nevertheless, most land users are aware of the current environmental trends, especially of environmental hazards, natural resource exploitation and climate change as they are directly affected by them and are willing to learn about new forms of coping with these.

Lastly, the *civil servant* is the stakeholder involved in civil organisations and other donor or support groups, as well as other government related activities (consultancy, etc.). Stakeholders fitting this profile perceive the SES, like resource and land users, as a provider of services for human well-being. Their main focus lies however on contributing to the betterment of society by empowering the local communities and providing training and education for sustainable resource use, thereby ensuring the livelihoods of future generations.

Based on these findings, a comparison of the "domain priorities" against the different scales, sectors, activities, countries and ESS preference was made via cross-tabulation in order to answer our second research question.

4.3 Research question number 2: *At which level do these differences lie (Scale/country/sector)? Is this also related to the ESS preference?*

Scale level

Once we established that there are indeed significant differences in positions on optimal resource management approaches between the different stakeholder profiles, we moved on to examine whether the scale where the stakeholder is active plays a role in their perception of the SES. Indeed, as reflected in the interviews and presented in table 4 below, at the *local scale* level exist mainly land and resource users whose main priority is securing and improving their livelihoods. Although the investor is focused on conservation, his choice of approach is motivated by economic rationale, also fitting the domain priority economy & livelihoods. The main priority within this scale surrounds the issue of land access for subsistence farming, as well as local market access opportunities for additional sources of income generation (diversification of economic activities). As explained by a traditional authority: *"…the people, the community who stays here, most of them, they are just, there is lack of*

employment. Most of them, they rely on farming… but that thing, it is not enough to them. When we look about the farming, the livestock, it is not enough. What we need… the government can create some employment, so that other people, the new generation, so that they are able to have some jobs and so on…". Furthermore, local scale stakeholders expressed the importance of improvements in infrastructure, especially in regards to basic access to water, health and education. The latter, according to their view, is an important factor for achieving a sustainable use of resources, as they believe lack of education hinders their awareness over environmental protection and proper use of the natural resources they benefit from.

Continuous training for proper capacity development is another approach local stakeholders believe to be essential for providing economic growth and livelihood improvement opportunities. As expressed by a local stakeholder through a translator: *"He said that there are some hopes [in the future for the ORB]. Because this can only be stories told through teaching. There are people that are still coming in the communities to give advises and teach things… So if all these people make me think twice and try to do things then I am following the [technique] that is happening now. So he thinks this might change the mindset of the people in the community. People are coming with new ideas on how to do things…"*

Table 4. Scale comparison of positions on optimal natural resource management

Scale	Predominant Profile	Domain priority	Main approaches mentioned
Local	Resource/Land user, Investor	Economy & Livelihoods	Livelihoods securing through subsistence farming/ access to land and markets for additional income (diversification).
Regional	Conservationist, Coordinator & Civil servant	Social & Cultural aspects; Economy & Livelihoods; Natural environment	Empowerment of local communities, sustainable LUP and management of natural resources for improved livelihoods and preservation of ecological integrity of ORB.
National	Coordinator, Expert	Social & Cultural aspects	Research for improved policy making/implementation & transboundary cooperation for sustainable NRM and ensuring

			livelihoods.
Basin	Expert	Social & Cultural aspects	Transboundary cooperation for sustainable NRM and ensuring livelihoods.

Source: own research

The *regional scale* is the most diverse in terms of priorities. This can be justified by the fact that we also have different types of stakeholders across different sectors, each with different agendas. The differences in priorities from a country perspective also play an important role; while the regional scales in Namibia and Botswana have a general agreement with the local scale over the importance of empowering the local communities through their involvement in decision making, as well as continuous training and education for sustainable natural resource management and conservation of the ORB, Angola's regional scale believes agricultural development is the best approach towards livelihoods improvement and economic growth. To achieve this, proper land use planning and management is key. This view is shared by most profiles within this scale level for Angola. For instance, a civil servant involved in humanitarian aid mentioned during the interview the following: *"…So I think, in my point of view, people with opportunity and money, they shouldn't invest only in town. They should also [invest] in rural areas, like creating 'fazendas', creating small jobs, give incentives to local people to be there and develop their own lives through agriculture. I think the key is agriculture for us."*

The higher scale levels *basin* and *national* consist of stakeholders mainly fitting the profiles of experts and coordinators, whose main priority involves social and cultural aspects that also include policy and governance such as transboundary management and research for improved policy making and implementation that should ensure the livelihoods of the people. Their view of the SES is quite broad and focused on macroeconomic terms.

The *national scale* was particularly keen on expressing the importance of scientific research when making socio-economic related decisions at the governmental level in order to avoid unsustainable use of resources. From data collection for proper monitoring of river flows and soil fertility, to assessing the dependence and importance of ecosystem services for the riparian communities, research is an important contributor to sustainable land use management to the national scale –

"…we want this land to be used today for socio-economic benefit without necessarily deteriorating its value… we should not be utilizing this resources as if there is no tomorrow… our future generations should be able to find the land and to derive value from its use as much as we would derived value from using it.".

Similarly, the basin scale looks for approaches that secure the livelihoods of the riparian communities while preserving the ecosystem and the natural resources provided. Most stakeholders engaged at this scale level are government members or consultants that are also involved in transboundary organisms, the majority within the Permanent Okavango River Basin Water Commission (OKACOM) and the Okavango Basin Management Committee (OkBMC). As a result, transboundary cooperation is seen as a key approach towards sustainable and fair resource management between the three riparian states.

Thus, while the perception and position of the local and national/basin scales differ strongly from one another, the regional scale shares the perception of the other three scales to a certain extent, but surprisingly seems to differ within itself, which proved to have a strong relation to the sector or activity where the stakeholder is active. The regional scale is aware of the problematic occurring both "on site" and at the decision making levels. However, this awareness seems limited to the realm of the activities or sector in which the stakeholder is involved and is also strongly influenced by the country's socio-economic and political interests. This may explain why the domain priorities strongly differ depending on the profile of the stakeholder within this scale. In addition, when cross-tabulating the stakeholder's activity and sector against the domain priority, it was confirmed that the stakeholder will most likely advocate for the approach in which his professional activity is involved (i.e. Government agent engaged at the basin level signalling transboundary cooperation as key). In the following section we explain these sectoral differences in more detail.

Sector level

It is significant to note that the different sectors analysed were predefined during the stakeholder analysis made before the interviews were carried. With that said, we found, as shown in Table 5, that the *agricultural* and *coordination* sectors are more inclined towards approaches within the domain economy and livelihoods. This is possibly related to the fact that within the agricultural sector exists mainly subsistence farmers as well as advocates of agricultural development, while at the coordination sector there are experts (consultants at the basin level, mainly) and civil

servants (traditional authorities) whose main aim is to improve the livelihoods of the local communities.

Table 5. Sector comparison of positions on optimal natural resource management

Sector	Predominant Profile	Domain priority	Main approaches mentioned
Agriculture	Land user	Economy & livelihoods	Agricultural development, conservation agriculture for livelihoods improvement.
Coordination	Expert, civil servant	Economy & livelihoods	Improve living conditions of riparian communities whereby natural resources are sustainably used.
Lands	Civil servant, coordinator	Economy & livelihoods, social & cultural aspects	Land use planning and management, tenure system that promotes sustainable resource management
Tourism	Conservationist, investor	Natural environment, economy & livelihoods	ORB biodiversity conservation and tourism development as means of livelihoods improvement
Environment & resource user	Expert	Social & cultural aspects, economy & livelihoods	Education and awareness increase over sustainable resource management and environmental protection across all levels; transboundary cooperation.
Livelihoods	Civil servant	Social & cultural aspects, economy & livelihoods	Empower local communities and eradicate poverty through CBRM and education/training programmes and market access.
Water	Coordinator, expert	Social & cultural aspects, natural environment	Transboundary cooperation through OKACOM and other transboundary organisms.

Source: own research

The *lands* sector, on the other hand, focuses on both the livelihoods of the riparian population and in social & cultural aspects involving governance such as

sustainable land use planning and management to achieve the latter. Within this sector we found mainly stakeholders categorized as coordinators and civil servants.

Stakeholders categorized in the *environment and resource user*, *livelihoods* and *water* sectors, however, focus on social and cultural aspects that include approaches involving research for improved policy making, transboundary and inter-scale cooperation, as well as the empowerment and increased awareness of the people.

Lastly, the *tourism* sector has as highest priority the natural environment and its conservation and also expressed the importance of the tourism sector to support the economy and livelihoods of the riparian population.

From the latter we can observe that the approaches towards optimal resource management mentioned by most stakeholders across the different sectors seek to secure or improve and develop the livelihoods of the ORB riparian communities. However, strong differences as to which approach is best can be identified primarily between the *tourism*, *water* and *agricultural* sector. Each of these sectors advocate for their "own agenda" – while the tourism sector believes that economic activities related to tourism such as handcrafting or tour guiding can decrease dependency from the natural resources provided by the ORB and also improve their economic situation through income generation, the agricultural sector argues that agricultural development can provide employment and food security for the population. By the same token, the lands sector perceives land use planning as key approach towards sustainable resource management and advocates for sustainable land allocation. The water sector, on the other hand, sees water flows as the corner stone of the SES and is focused on maintaining this resource in an equitable and sustainable manner. Without transboundary cooperation, the water sector believes the river will be overexploited. Comparably, the livelihoods and resource use sectors consisting of experts or academics, as well as civil servants involved in civil organisations and other donor or non-profit groups, view the SES from a broader perspective and share the belief that transboundary and inter-scale cooperation, people empowerment and education are key approaches towards sustainable resource management and the safeguarding of livelihoods.

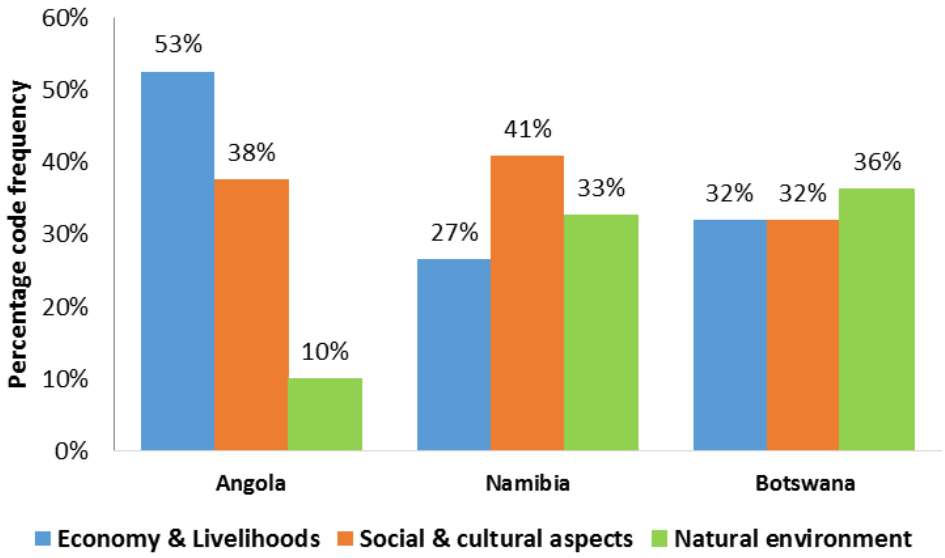
Moreover, a lack of knowledge or understanding between the sectors of the activities carried out by their counterparts was detected. Some stakeholders at relatively important governmental positions were not aware of the on-going plans or policies implemented across the other ministries and if they did, some of them

expressed feelings of worry or disapproval. Nonetheless, a desire to cooperate between the sectors was conveyed – Cooperation and harmonization of plans is seen by all sectors as key to achieve sustainable resource management.

Country level

Differences in priorities and interests between the three riparian states have been stated in previous research and were therefore expected to be found in our study. Indeed, differences were also found in regards to the domain each country prioritizes, as well as in the perception of what are the best approaches towards optimal natural resource management. Figure 7 illustrates the domain priorities in each country, while Table 6 provides an overview of the main approaches mentioned when referring to what optimal resource management entails.

Figure 7. Domain priorities according to country



Source: Own research, based on code occurrence frequency (N=80 Interviews). Percentages are rounded up.

As reflected in the interviews, *Angolan* stakeholders perceive the ORB SES as a provider of livelihoods, especially through agricultural production. The main priority for the ORB area is clearing the mines left after the civil war, re-allocating this land and developing the agricultural sector. There was also emphasis on the importance of research and data collection for proper land use planning and management. Understanding the river water flows and other concepts and behaviours related to soil fertility are of great concern to Angola.

Table 6. Country comparison of positions on optimal natural resource management (Source: own research)

Country	Domain priority	Main approaches mentioned
Angola	Economy & livelihoods	Resettlement, access to land and agricultural development (mainly irrigation schemes) for improved economy and livelihoods.
Namibia	Social & cultural aspects	People empowerment, awareness increase and transboundary cooperation for a sustainable management and use of resources
Botswana	Natural environment	Sustainable resource management, conservation and transboundary cooperation.

Botswana, on the other hand, sees the ORB as a natural treasure that must be conserved. The income generation derived from the tourism industry is of great importance for the majority of the Botswanan stakeholders at all scales and levels. However, it is also understood that their position as recipients of the river flows is vulnerable and therefore believe transboundary cooperation is of great importance to achieve sustainable resource management. *Namibian* stakeholders also share this thought, transboundary cooperation is, according to them, key for proper resource management and for conserving the ecological integrity of the basin which secures its people's livelihoods. However, as agriculture is already quite developed, their focus lies rather on increasing awareness on the importance of protecting the natural resources surrounding the ORB, empowering the local communities so they value and take responsibility over their usage of the natural resources they depend on. As a Namibian stakeholder clearly expresses: *"…we want people to then see the benefits coming from that system [Okavango River Basin] and in a way, after seeing benefits, our assumptions are that people will start to look after the environment, that they will start to practice resource use but in a sustainable manner."*

ESS preference

In regards to the ESS preference being related to the position of the stakeholder on natural resource management, we investigated whether there is a correlation between ESS preference and the perception of stakeholders on the ORB SES using previously published data on ESS preferences by the interviewed stakeholders in Domptail, S., Mundy, (2013) (A table specifying the ESS ranking per country, per scale and within the whole ORB can be found in Appendix 3). Their study presents

the differences in ranking of twelve ESS across the four studied scales. While our results support the fact that the characteristics of each stakeholder affect the ranking they give to ESS, there is no evidence that stakeholders' perceptions about the ORB SES are affected by their ESS preferences. On the contrary, in most cases the profile and characteristics of the stakeholder, and how he experienced and perceived the SES influenced his preference for a particular ESS or the overall ranking of the twelve types of ESS. For instance, land users working in the agricultural sector chose (after water) staple crops, livestock, trees and thatching grass as ESS of highest importance. On the other hand, stakeholders involved in tourism were more inclined on ranking environmental settings and species diversity as highest.

Moreover, we found evidence that indeed, as stated in our conceptual framework, lower level scales prefer provisioning services, while higher level scales focus on regulating services. Yet, in some special cases it was noticeable that the stakeholder positioned in a higher scale chose to rank provisioning or cultural services higher if he opted to perceive the system from a local scale perspective. For instance, a government member at the regional level justified his ranking of environmental settings as most important as follows: *"What was appealing to me was the connection between people and the environment where they live. And it was appealing to me because, well: What is the environment? If we start from the definition of environment, it is a group of living elements and not living elements."*

In conclusion, differences in the perception of the ORB SES among Stakeholders exist at the scale, sector and country level. While the differences from a country perspective are innate as presented in previous literature (Weinzierl & Schilling, 2013), at the scale level, strong differences in perception and priorities on optimal NRM were found between the lowest (local) and highest scales (national and basin). Local scales view the SES as a provider of livelihoods, while the national scale seeks to ensure and improve the livelihoods of the people by focusing on proper NRM and transboundary cooperation. Thus, the inherent difference between both scales lies in what livelihoods improvement means to the national scale and to the local scale – the national scale is focused on fostering tourism or large scale (agricultural) projects and quickly transitioning into a market economy as means of livelihoods development. The local scale, on the other hand, wishes for basic access to livelihoods (subsistence farming, basic infrastructure, involvement in LU decision making, protection of their cultural values and the appropriate tools to transition smoothly into

a diversified economy). Regional scale actors accept the transitioning phase of the local scale as a fatality and are frustrated by the lack of tools, support and empowerment they face to guide the people through this transition. Moreover, within itself, the regional scale shows strong differences in perceptions and priorities over optimal NRM which were found to be influenced primarily by the sector in which the stakeholder carries his professional activities. These differences in views are supported by the differences in ESS preferences of each scale. Based on these findings, we were able to move forward towards our second research objective by analysing whether these differences are related or lead to on-going (latent) or potential conflicts within the ORB.

4.4 Research question number 3: *Can we find conflicts (between scales) from these detected differences in positions? If so, at which stage?*

Throughout the analysis of the data derived from the interviews, we found that ORB stakeholders expressed their opinions in regards to certain issues in different manners according to their profile and perception of the system. However, these differences in opinion did not always imply a conflict at sight. In order to diagnose the issues as manifest or potential conflicts, the guidelines explained in section 2.2. according to Glasl (1994, 2004) and Yasmi et al. (2006) were followed.

As a result of this analysis, four main types of issues were found that led to manifest and latent or potential conflicts not only between scales, but also between countries and sectors. In some cases, differences at every level could be found as underlying causes within one issue. The conflict landscapes found can be classified as: 1) land use issues; 2) Governance issues; 3) Socio-cultural issues and 4) Transboundary issues. Table 7 below delineates these four landscapes along with the specific subjects of dispute as well as the manifestation stage that was reflected in the interviews. In the following paragraphs, a detailed description of the conflict, as well as its relation to the differences in positions and perceptions found in our previous research questions is presented.

Table 7. ORB conflict landscapes

Conflict landscape	Subject of dispute	Manifestation stage	Scales involved	Escalation risk?
1) Land use	-Conservation over livelihoods -Human-wildlife conflicts	Stage 5: Access restriction	Regional (national) vs local	Yes
	-Subsistence vs commercial land use	Stage 5: Access restriction	Regional (national) vs local	Yes
2) Governance	-Weak implementation/absence of policies and regulations	Stage 2: Debate and critique	Regional & national	No
	-Political and personal interests, corruption	Stage 3: Lobby and persuasion	Regional (national) vs local	Yes
	-Bureaucracy, lack of institutional capacity	Stage 1: Feeling anxiety	Inter-scale (govt)	No
	-Effective devolution & Stakeholder involvement	Stage 2: Debate and critique	National (regional) vs local	Yes
3) Socio-cultural issues	-Lack of awareness and education	Stage 2: Debate and critique	Regional vs local	Yes
4) Transboundary cooperation	-Benefit sharing among riparian countries	Stage 1: Feeling anxiety	Interscale (govt)	No
	-Cooperation at basin level	Stage 1: Feeling anxiety	Basin	Yes

Source: own research

Land use

Conservation over livelihoods – Stage 5: Access restriction

Within the category of land use conflicts, we found that the subject of conservation over livelihoods was a source of concern for the ORB stakeholders, primarily at the local and regional scale. Local communities face challenges in this regard and are affected by the increasing number of wildlife. According to the information provided during the interviews, the excessive number of elephants and crocodiles affects their livelihoods (mostly through crop destruction and attacks where lives have been lost). However, experts say that this "intrusion" is double-sided as the increasing human population has forced the communities to expand to areas occupied by wildlife:

"… And yes, in our case [Botswana] the issue it is more on the elephants. They are the ones that cause havoc. But it is more about us against people in terms of

the population increase that is now, we are competing for land with the wildlife that used to use the land on their own. They are also increasing in numbers. But we are also extending our needs to their areas. And again, tourism is also growing in the area. There are old practices that used to be practiced by communities. Obviously, they are going to conflict with the new tourism activities. They need to be managed and to make them adaptable to the situation."

On the other hand, NGOs expressed that this is a result of bad land use planning that has allowed the riparian communities to move into these areas, or by allocating non-fertile lands to them, forcing them to move to areas where they can successfully grow their crops. The tourism industry had their own opinion on the matter and expressed that the local communities are highly dependent on agriculture and opportunities should instead be sought in tourism for economic growth and livelihood securing, especially in Angola and Namibia. In Botswana, major issues surround the high numbers of livestock as direct result of traditional cultural beliefs (higher number of cattle seen as a sign of wealth), as well as the inability to sell their meat because of the infectious Foot-mouth disease to which some cattle is exposed.

This conflict occurs in all three riparian states with slight differences and is indeed based on differences of perception at the scale level. The local scale's main concern and goal is to make a living, hence their feelings of constraint derived from the continuous introduction of protectionist /conservationist measures and regulations. According to some of the experts interviewed, the hunting ban (in Botswana) and land zoning affects their ability to ensure their livelihoods in the traditional way and pushes them towards new forms of "making a living". The regional scale is aware of the issue and understands the position in which the riparian communities are, but is not in any position to make changes in legislation as such decisions are made at the higher governmental level. Similarly, the national scale is also aware of the situation and attempting to tackle these issues through improved land use planning. Stakeholders at this scale are aware of the importance of harmonizing legislation across all sectors so that the local community can transition smoothly into new forms of living.

These new forms of living, within this conflict context, involve essentially tourism-related activities, which are not necessarily of the liking for the riparian communities. In other words, the direction in which the government and its institutions are going is not entirely in synchrony with the ideals and cultural

behaviour of the local communities who have traditionally been dependent on agriculture/natural resource use, confirming the findings presented in our previous research question. We also found that the agricultural sector at the local scale is bearing the most costs within this conflict, which based on the data collected can be categorized as a conflict at stage 5: Access restriction. There has been an imposed restriction on subsistence activities, forced resettlement, fencing by landowners, among other constricting measures for the local scale. Risk of further escalation to the point of intimidation and physical exchange (violence) is present if the basic needs of the riparian communities and their involvement in the decision making process are not taken into account.

S*ubsistence vs commercial land use – Stage 5: Access restriction*

The second conflict detected within this category is related as well to land-use management – subsistence vs commercial land use, specifically involving agro-industrial or large scale farming projects. This is a conflict in which although access restriction is evident (Stage 5: Access restriction), most interviewees categorized as ongoing conflicts that are solvable and at the time of the data collection had not escalated. The conflicting parties involved are at the national and local scale, although the regional scale (government) is also involved as implementer of policies made at the higher level. Yet, the conflict manifests between communities and the private sector when farming and tourism companies acquire land where communities are settled. The conflict arises as the legal owners of the disputed land claim it and the government must intervene to resettle the communities occupying it.

Additionally, the land tenure processes are complex for most of the riparian population and economically out of reach as there are fees to be paid or certain documentation required, as well as in some cases the need to travel to the main towns, putting them at disadvantage in comparison to the private sector. Although some stakeholders at the national level mentioned that the government has made efforts to bring land registration to the local communities, experts explained that most local stakeholders still do not understand the modern land tenure processes and therefore fear losing their land or find no value in registering it.

These differences in perception over the importance of land rights can lead to conflict escalation. Furthermore, there is a growing tendency of land use for commercial rather than just subsistence purposes among the local stakeholders. This issue, coupled with lack of awareness of sustainable resource use and alternatives for

income generation, threatens the ecological integrity of the ORB. This view of the conflict is supported by some of the interviewed experts in environmental conservation.

Governance

W*eak implementation and/or absence of policies and regulation – Stage 2: Debate and critique*

The second conflict landscape detected reflects conflicts at the governance level that impact the riparian communities in different degrees. As a manifest conflict we found the weak implementation and/or absence of policies and regulation, especially in regards to environmental protection. This issue involves regional and national/basin scales mainly in Angola and Namibia. There is lack of harmonization in environmental protection legislation, especially when it comes to resource use activities such as fishing, grazing and wood and grass collection. While Angola has not yet created the appropriate laws to limit or control such activities, Namibia has, yet also faces challenges enforcing these policies internally due to lack of enforcement mechanisms and monitoring. Furthermore, externally, Namibia is challenged by Angola's lack of cooperation and commitment, which provides for loopholes that allow Namibian resource users to cross the border to Angolan ground where no enforcement mechanisms are set yet. According to the interviewed stakeholders, both countries have different priorities and have not yet taken advantage of the transboundary cooperation mechanisms created such as the OKACOM.

> *"…so I think, you need, as you done here, two different spatial scales, you need the macro and you need the micro to tackle any problem and so that leads you to dealing with different social structures, you can't ignore one or the other, you can't ignore the communities or the households or government, so take top-down and bottom-up approach. So everything that we do, we do that way. So fisheries try to change laws within fisheries production because its unsustainable use of fisheries, so you if you're looking at the Okavango River at Rundu, the guys are fishing on one side of the river and then they paddle over to the other side of the river and it happens all the time, so that's because you've got an inequality of legislation. So on one side is that you can't use the mosquito nets; on the other side there is no law to stop using these nets… So we can ask to harmonize legislation so it's a top-down approach but to a big river it's impossible to police it effectively, so instead you look at a bottom-up approach, you say to*

communities: "Have you noticed that the fish stocks are declining?" "Yeah, it's really hard now to catch enough fish to survive and to sell." So then with top-down approach you give legislative support for, by laws, community-based laws, so that those communities are empowered to actually be responsible over their own natural resources so that they can say "Well, this is our fish protection area and you can't fish in that because this is like an important sporning ground and therefore it supports our livelihoods." And they are actually the best enforcer. Communities are the best enforcer... community pro-action is generally co-management with a much better effect, more effective approach."

At the regional scale there is also lack of harmonization in policies between sectors and/or ministries. Feelings of anxiety are expressed from the regional scale towards the way decisions are made at the national scale level, where no "overarching environmental management" can be seen. The latter can be directly linked to the different perceptions and positions presented when answering our previous research questions. There are strong differences in perception between the different sectors, not only nationally, but also across the basin. Nevertheless, this conflict does not pose a threat of escalating as the regional level is aware of its position as implementer; the power relations between the conflicting parties allow for an overlap in ideals and thus, the desire to cooperate in order to achieve the desired goals. We therefore classified this conflict as stage 2: Debate and critique, since critique to government policies was clearly expressed by the interviewees. It is, however, worth mentioning that stakeholders at the regional scale did mention that there are ongoing talks with the government and Angola is cooperating in the legislation harmonization process, reducing any potential escalation risk to a minimum.

Political and personal interests, corruption – Stage 3: lobby and persuasion

A second conflict within this category refers to the political and personal interests among government members that hinder the sustainable development of the ORB. This is a scale-based conflict at stage 3: lobby and persuasion involving local, regional and national scales. According to our research, the local scale feels constrained and displaced when it comes to decision making. The traditional authorities expressed frustration in their inability to effectively transmit the needs of the community to higher governmental levels and also feel constrained as civil servants. They feel there is lack of interest and political will from the national scale to

empower and develop the local communities – *"…The traditional authorities feel threatened by the politicians because they are making the decisions in the government and these decisions are implemented in the community... They feel that they do not have really the power to decide. Yes, they feel that their powers have been taken by the government, by the politicians…"* The regional scale also brought this subject to light and agrees with the local scales in regards to the decisions made at the top level not really benefiting the local communities. Stakeholders at the lower scales (governmental and non-governmental) believe political interests are the underlying cause of bad planning and decision making that usually leaves communities behind. Stakeholders in all three countries mentioned this issue, however, it could be detected that a general sense of fear was present when talking about this situation and many stakeholders, especially government members, were very politically correct and avoided uncomfortable subjects.

Additionally, under this issue of political interests we found evidence of land grabbing from government members (private interests within the tourism and agricultural sector), which are also related to corruption and bribery, as well as to the preference for elitist development projects such as irrigation schemes and foreign investment that do not involve nor benefit the local communities, and in many cases, lead to their eviction and forced resettlement. Furthermore, stakeholders expressed concerns in regards to the strong lobbying efforts from the tourism industry that highly influence the course of action taken by the government, particularly in Botswana. Some of the stakeholders expressed a fear of a violent rebellion within the local communities, as they are slowly becoming aware of the injustices they face (in Botswana mainly related to the tourism industry not sharing its benefits). This conflict has a higher risk of escalating in the before mentioned country if not addressed in a timely manner.

B*ureaucracy and lack of institutional capacity – Stage 1: feeling anxiety*

As a potential conflict and also as an underlying cause and result of the before mentioned conflicts (respectively) is the issue of bureaucracy and lack of institutional capacity that the governments of the three riparian states experience across all scales. This issue has the potential to become a conflict if communication between ministries and sectors is not improved. The conflicting parties are the governmental sectors and ministries at the regional and national scales, where one sector feels constrained by the other in following its mandate. This originates at the national level where the

national plans are developed and is inherited into the provincial/regional/district level. Stakeholders at the regional scale generally feel frustrated by the lack of coordination at the decision making level. No actual risk of conflict escalation could be detected as the positions and relationships of the parties allow for cooperation and diplomatic approaches to tackle this issue. In the meantime, however, such dynamics may hinder the further development of the riparian states towards sustainable land use management.

Effective devolution & stakeholder involvement – Stage 2: Debate and critique

The final subject of dispute within this landscape of conflicts is due to the lack of stakeholder involvement in the land use decision making processes, which can also be identified as lack of effective decentralization and devolution. This is a conflict manifested stage 2: debate and critique. The conflicting parties are stakeholders at the local, regional and national scales (primarily local communities and traditional authorities vs government). The riparian communities have expressed a general feeling of abandonment from the government in different degrees that depend on the country of residence. For example: in Botswana, tourism is a favoured topic in the political agenda and local land users see no benefit from the development of this sector; in Namibia, however, irrigation/green schemes are the favoured topic over small scale farming, driving land users to become employed by these enterprises and adopt the market economy, making them dependent on cash. In Angola, the conflict involves resettlement issues and land rights over the areas being demined. Furthermore, communal stakeholders do not feel involved in the decision making and expressed they “hear false promises” when it comes to support.

The national scale across all countries expressed willingness and desire to support and help communities develop, but as stated by some experts at the regional scale, the national government lacks understanding of the traditional and cultural aspects of the local communities. As mentioned previously, the definition of development within the riparian communities differs or does not entirely match with the one from the government. Riparian communities place high value on the spiritual and cultural meaning of their land and feel these values are disregarded at the decision making level. Stakeholders belonging to the older generations, such as traditional authorities, expressed feelings of worry and grievance over the loss of their cultural values and indigenous knowledge. Younger generations are increasingly inclined to adopt a utilitarian value system or “modernisation” mind-set without the proper

education or support that can guide them to make sustainable resource use decisions. The regional and basin scales see this issue but also feel they have no power over decision making: *"…Maybe it is because most of this is [decided] at a higher level. And here in the district we are just implementers. We only implement them. We do not contribute much to when they put these policies [in place]. Even though most of the time we are consulted, but we find out that the end result is not right to what we wanted it to be, and mostly because some of these are/these policies, they/we can change in time because of maybe a situation that has arisen. And then we would have planned to do something, and then you are requested to do something else, so that you can try and [plan] whatever is the thing at that time."*

Considering that this form of democratic set-up is relatively new, improvements are still necessary. Risk of (violent) escalation is present, especially if the riparian communities see no benefit from the policies being implemented. Such feelings of disempowerment and abandonment are already believed to be underlying cause of illegal practices such as poaching. In the words of a stakeholder at the basin scale: *"…Benefit sharing at the local scale is highly important as it impacts how the resources will be used. If they do not value their land, they will not take care of it, and they need to see benefits and feel involved in the decision making involving resource and land use or they won't support it."*

Socio-cultural

L*ack of awareness and education – Stage 2: Debate and critique*

As a socio-cultural issue we found in our research that a lack of awareness for sustainable resource use can be considered as an underlying cause for potential conflicts arising when implementing legislative frameworks for conservation and other environmental protectionist measures at the local level. The lack of environmental awareness and education at the local scale can lead to conflicts between stakeholders at the local and the regional scale (in charge of implementing these policies and regulations). This takes place particularly when government members at the regional attempt to implement or enforce regulations on local stakeholders. Clashes have already occurred as expressed by some government members (Stage 2: Debate and critique):

> *"…Just even mentioning that there should be less cattle gets people violently aggressive… Especially in that area [Seronga, Botswana]. I just happened to be talking to a colleague recently, flying to Maun, and he was a Botswana man who*

comes from that area listed to me. He just started shouting at us in the airport: "You people and your government, you can take your wildlife and go to hell. Leave our cattle alone". Everyone at the airport was just looking at this mad man."

Other unsustainable activities mentioned by the stakeholders that call for concern as they lead to confrontations – direct result of lack of environmental awareness – is slash and burn practices, over-grazing and fishing, among others. Regional scales expressed the difficulties of working with the riparian communities who refuse to change their traditional and at time unsustainable livelihood practices (as they lack understanding of why the change is necessary) and believe more funds should be destined towards training and education as well as environmental awareness campaigns. This lack of awareness also touches the national scale – each state has different degrees of environmental awareness and prioritization of it. While Namibia and Botswana stakeholders have a higher acknowledgement of the importance of sustainable resource management, Angola is still on the way to achieve this capacity of awareness and has predominantly economic development priorities. There is a risk of further escalation if the appropriate tools and mechanisms are not put in place to balance environmental awareness across all countries, especially at the national level, so that policies and their respective legislation frameworks are harmonized at a basin scale.

Transboundary cooperation

In the realm of transboundary cooperation, we found that many of the issues/conflicts mentioned earlier impact the ability of a smooth and sustainable cooperation across the riparian states. Within this conflict landscape, we found two latent conflicts: *Benefit sharing* and *cooperation at the basin level*. Both conflicts can be categorized as *stage 1*, where feelings of worry and anxiety were expressed by stakeholders at the regional, national and basin scales, both at the governmental and non-governmental level. It is however significant to note that if any of these conflicts were to escalate, the conflicting parties involved would most likely be government members at the national and basin scales.

In regards to *benefit-sharing*, as explained in section 4.3., there are strong differences between the three riparian states in priorities over the use of the natural resources provided by the ORB. This directly influences the perception each country has over what is equal or fair benefit sharing.

According to the data collected, Angola's main priority is to develop and lift the country from poverty. The Angolan government and private sector see high potential in agricultural development to achieve economic growth. By limiting their amount of water use, as well as of other natural resources obtained from the river basin without seeing additional (economic) benefits, a feeling of impairment arises.

Similarly, Namibia, is also focused on improving the livelihoods of its people, especially through food security (agriculture), yet, also has a higher degree of environmental awareness and highly values the ecological integrity of the ORB, which has abetted the development of policies and legislation that support this view. However, as explained by some stakeholders from the other two riparian states, negotiation can prove difficult with Namibia, especially within the OKACOM – it seems Namibian stakeholders seem to believe that they are in the least favourable position by "just letting the water flow through".

In contrast, Botswana's main priority is the fostering of the tourism sector, which thrives from natural environment conservation. This pressures and impairs Namibia and Angola to achieve their nationally established aims and puts Botswana in a vulnerable position as highly dependent on the land use decisions of its neighbours. As expressed by a stakeholder at the basin scale:

> "*…Botswana already has wildlife and tourism as its primary form of land use. Maintaining that system is only as good as the willingness of the countries upstream to allow the water to flow. The moment the countries upstream decide to start seriously tapping that water, particularly in Angola and Namibia, then the whole basis of the land use in Botswana becomes threatened. So it's very much in Botswana's interest to be very much more proactive with their neighbours and for them to really drive a strong vision for the Okavango system, because they are the recipients of the water at bottom end, other people control the tap and it's very much in their interest to drive a vision and an action plan for the Okavango Basin and to work with partners, up-river countries, and also to look at benefit sharing up-river in a number of ways, helping up-river countries to develop appropriate compatible land uses and also looking at how they could create opportunities for up-river countries to get at least as good a return from alternative forms of livelihoods that people in the basin and the countries as through agriculture and preferably better.*"

This issue is complex and multifaceted. Although differences in perceptions and priorities play an important role, other more inherent differences such as cultural and language differences, disparities in socio-economic status (or the belief that there are strong differences between them in this realm) and the geographic location of each country are also to be taken into account in the dynamics of sustainable transboundary cooperation. Conflict escalation is not foreseeable if the appropriate guidelines on benefit-sharing being developed at the time of data collection are sustainably implemented and in agreement with the conflicting parties.

The subject of *cooperation at the basin level* is directly related to the before-mentioned latent conflict between the riparian states, except for the fact that it takes place at the basin and regional level, between lower ranked government members. This is an issue that calls for potential conflict if the needs of each country and sector are not met, as well as if the stakeholders do not show the willingness to cooperate. Concerns were expressed regarding the development plans of Angola around the ORB, which could have a substantial impact on the flow and integrity of the river basin. OKACOM is making efforts to construct a holistic view of the basin among its members and harmonize policies in the basin area. Nevertheless, this poses a challenge as disparities in interests and agendas exist as well at the national level between the different ministries and sectors in each country. One such case is the OKACOM itself, which was pushed forward by the Water ministries of the three riparian states. Thus, there is a gap between the development plans created by the different ministries such as tourism and lands and the ones by OKACOM and the water sector.

In summary, conflicts were found at four landscapes, all at relatively early stages of manifestation. The conflict of most concern lies within the conflict landscape of land use (stage 5: Access restriction), where land use decisions are perceived as favouring conservation or agro-industrial projects, imposing restriction on traditional subsistence activities of the riparian communities. The latter is interrelated with the second conflict of highest concern involving weaknesses in governance, where conflicts of interests and corruption hinder sustainable land use planning and management (at stage 3: Lobby and persuasion). We also found that indeed, differences in perception at both scale and sectoral level play an essential role in shaping national and transboundary resource management decisions, which can become sources of conflict if not coordinated in a way that all involved stakeholders'

needs are taken into account. In the following section we will expand on these interrelationships and discuss the importance of our findings in transboundary resource governance and land use management.

5. Discussion

The six ideal types or profiles found in this study allow indeed for an overview of the different perceptions and interests of all actors across all scales typically involved in the realm of transboundary natural resource management. We found that stakeholders tend to have a particular perception of the SES and consequently, a relationship with it and its landscape domains (natural environment, economy & livelihoods and social & cultural aspects) based on both individual and situational factors, which determine the behaviour and decisions made over its resources.

Stakeholders fitting the profile of investors (mainly involved in tourism) and conservationists were found to have a closer relationship with the natural environment, hence the favouring of approaches ensuring its protection. Although the high value placed on the ecosystem and its resources is justified by different interests between the two (economic vs. ethical), the foremost interest on maintaining the ecological integrity of the system is shared. Meanwhile, the perception profiles coordinator and expert share the preference over social and cultural aspects, where human related factors such as value systems, livelihoods and education, as well as good governance at the micro, meso and macro levels are seen as key to achieve sustainable resource management. A holistic view of the SES allows these two stakeholder profiles to opt for an integrative approach where the basic needs of both society and ecology are considered. Lastly, at the other side of the spectrum, we found stakeholders that identified with the profiles we defined as land or resource user and civil servants. These two profiles differ themselves from the rest through their perception of the ORB SES as a provider of services for subsistence. Land and resource users especially see it as means of ensuring their livelihoods (physically, emotionally and spiritually) and are highly dependent on the natural resources they directly obtain from the ecosystem. Civil servants, although sharing a holistic perception of the SES with experts and coordinators, also believe empowering and ensuring the livelihoods of the local communities is the ideal approach to also ensure optimal natural resource management.

In short, we can categorize the six types of perceptions into three groups according to the priorities they share: The first group consists of investors and conservationists who prefer the natural environment domain; in the second group, coordinators and experts favour the domain of social and cultural aspects, while our third group, consisting of resource/land users and civil servants opt for approaches favouring the domain of economy and livelihoods.

In addition, our findings confirmed that the spatial scale at which the stakeholder is active plays a significant role in their perception of the system. Indeed, as expressed by Hein et al. (2006), the local scale is comprised of individuals and households, or as we call them in our stakeholder profiling: land and resource users, who are in direct contact with the ecosystem. Whereas the higher scales (regional, national and basin) are formed by institutions (primarily governmental) across the meso and macro levels. The profiles conservationist, coordination and civil servants were found most active at the regional scale, while coordinators and experts are most active at the national and basin scale.

Based on Parris et al., (2013), scale in this case can be identified as both an individual level and situational factor influencing perception. It can be considered as an individual level factor as within a spatial scale, certain moral mandates, self-interests and beliefs such as cultural and political ideologies or specific value judgments are more predominant than within another. For instance, the local scale, as previously mentioned, consists of land and resource users highly dependent on the natural resources the system provides, their focus lies on surviving and ensuring their livelihoods. The connection this scale has to ESS is deeper and intrinsic. The higher scales, on the other hand, do not share this interest in the natural resources as means of survival. The majority of stakeholders at these scales feel no spiritual or physical connection to the land and are mainly focused on managing its resources in a relatively sustainable manner.

As a situational factor, scale influences perception as within each spatial scale, the availability of information and perception of the effectiveness of the socio-economic environment, the social relations and perceived social pressure varies greatly. Higher level scales experience difficulties understanding the social or cultural value of owning cattle for the local communities, whereas the local riparian communities have a hard time understanding the importance of settling in one area so that the appropriate infrastructure services can be provided by the government in an

efficient manner. Thus, scale can be confirmed as extremely influential in how stakeholders perceive that the system functions – what influences what parts of the SES and what would be a solution for land use issues.

With that said, scale is related not only to ESS valuation, as stated in our conceptual framework, but actually to the whole perception of the SES. In other words, the influence of scale and the activity of the stakeholder on the perception of the system is what in turn affects the high or low value that is given to an ecosystem service. Local scales perceive the SES as a livelihoods provider; their view of the system is limited to the activities they carry and depend on in order to survive, which are typically directly related to provisioning services such as water, crops, livestock, etc., attaching a higher value to these types of ESS. Moreover, our research also concluded that as a result of the on-going transition into a market economy, as well as the strong vulnerability of the natural resources they highly depend on due to climate change and globalisation, the value that was given to ESS for cultural purposes is decreasing, posing a threat to the integrity of the ecosystem. The need to earn a living coupled with lack of awareness leads local communities to over/misuse the ESS provided by the ORB. National scales, on the other hand, perceive the system from a management standpoint, focusing on effectively allocating and conserving the natural resources. This justifies the high value they give to regulation services such as flood/hazard regulation along with the high importance they give to land zoning for conservation purposes as well as to the tools (scientific research) that will allow them to sustainably achieve this. The basin scale shares this perception, although also strongly advocates for transboundary cooperation and pursues to establish a holistic view of the ORB, without borders. In addition, the variety in perceptions and priorities found among regional scale actors allowed us to further confirm that a stakeholder will value a certain ESS based on the type of contact it has with it. Regional scale stakeholders advocated for the ESS which was closely related to the professional activities they carried, which also had a strong relation to the sector. We believe this finding particularly contributes to an improved understanding of the rationale behind the on-going conflicts occurring in the ORB at all scale levels, as according to Glasl (1994), differences in perception, aims and goals pose for conflict potential when one of the involved parties feels constrained by the other. In other words, the fact that each actor is focused on protecting or improving the ESS they are

specialised on tends to create loopholes and conflict between the plans and projects of the others.

Furthermore, conflicts within the realm of NRM tend to originate beyond material incompatibilities and can be closely related to the different set of knowledge systems, understandings, perceptions and priorities among the stakeholders (Yasmi et al., 2006). In our study, we found four conflict landscapes where different subjects of dispute take place: 1) land use; 2) governance, 3) socio-cultural issues and 4) transboundary cooperation. At the centre of all conflict landscapes we find weak governance, where corruption, bureaucracy and lack of institutional capacity and sense of commitment can be seen as the underlying cause of many of the issues at stake. This is a complex subject that needs further study. Nonetheless, it can be observed that the value system behind each actor involved plays an essential role in this matter. Yet, more specifically, we found that the underlying cause of latent and manifest conflicts in NRM between actors at higher and lower scales is the difference in perception over what livelihoods development entails. The perceptions and values given to the natural resources are evidently different. This is clearly seen in the conflict landscape of land use, where local communities feel strongly constrained by the implementation of conservation and large scale agricultural programmes restricting access to land, while the government believes this transition means progress and secure employment opportunities for the people.

Furthermore, we found evidence suggesting lack of harmonization in policies and programmes, not only from a transboundary point of view, but also between sectors and/or ministries at the national level to be one of the underlying reasons for feelings of constraint at the macro and meso scales. Eventually these feelings affect the lower scales through weak implementation of development policies and programmes. Also, governments still operate in a predominantly centralized manner, where the regional and local scale has little or no power to influence decision-making over NRM. The evaluative frame of reference and shaping environments (Leeuwis, 2004) of stakeholders at the national scale limit their view to political and macroeconomic aspects and make it difficult to grasp the situation of the local scale as they are not “on site”, putting policies in place that are hard (or impossible) to implement or not beneficial for the local scale. Thus, when there is no integrative view of the SES where all three landscape domains are considered and the appropriate assessments taking all stakeholders affected into account are made before the creation

and implementation of policies and plans, it is highly likely that one of the parties involved will experience feelings of undermining and impairment, increasing conflict potential.

Also, it was found that most of the problems detected are localized, nationally, yet affect the ORB as a whole. Indeed, as explained by Uitto & Duda (2002), these issues have the potential to grow to transboundary proportions with downstream environmental degradation being the early warning indicator for potential conflict. Such is the case between Angola and Namibia, in the border region of Cubango/Okavango, where the lack of legislative frameworks and enforcement mechanisms in Angola hinder the ORB integrity protection efforts by Namibia, as explained in section 4.4 regarding the conflict of weak implementation/absence of policies and regulation.

Moreover, within the landscape of transboundary cooperation, we found that besides the natural differences in priorities between the three riparian states and despite the efforts from the OKACOM to establish a shared holistic view of the basin, feelings of mistrust still exist between them, creating difficulties in cooperation between actors at the national and regional level basin wide. National interests seem to still shadow transboundary projects. According to the stakeholders sampled, the transboundary organisms put in place are still lacking of the necessary institutional capacity and political will and require more national support and a stronger involvement of local and regional stakeholders.

Thus, adopting a cross-disciplinary, integrative approach that considers all scales and sectors across the whole basin is essential in the transnational management of watersheds. Effective decentralization and devolution are in this regard of great importance. By strengthening participation and devolving decision making power to regional institutions and groups with the appropriate legal and institutional support from the basin scale, higher involvement and understanding of the needs at the local levels can be scaled up to the national level, easing the process of legislative and political harmonization for a sustainable transboundary water resource management.

Limitations

One of the limitations of this research study was the composition of the sample. The basin and national scale samples were smaller than the local and regional samples. In addition, in some of the interviews where a translator was present, this showed to influence the interpretation of the questions and thus the answer that was

given. Also, the presence of other persons in the room, as well as political pressure may have influenced the openness of the interviewee when asked to express his/her opinion over a certain subject, especially in Angola. Therefore, the results might not generalize or portray the actual perception of the scale nor provide the correct escalation stage at which the conflicts are manifested. Indeed, further research is suggested for a more detailed conflict analysis, where the questionnaire is primarily focused on detecting the conflict mechanisms active within the conflicting parties and their inter-relationships.

6. Conclusion

This study was set out to contribute to ease the process of multi-scale resource governance by delivering insights on inter-scale differences in the perception of the land-use system reframed as a socio-ecological system. Indeed, by investigating the perceptions about the SES of the stakeholders at different scales, countries and sectors and their relationship to ecosystem services in the ORB, we were able to find that certain differences in perception and priorities of what optimal NRM entails already lead to conflicts between stakeholders at different scale levels which are manifested at diverse stages, some posing potential of further escalation. Furthermore, our findings confirm that understanding the implications of land use changes, primarily at the local and regional scale, are key in the realm of transboundary and inter-scale land use and resource management, as it is at this level where most of the conflict potential takes place. This means that above all, understanding the different perceptions and priorities between all actors across all levels and fostering a basin-wide perspective between them is of great importance for sustainable development and effective implementation of policies, it strengthens cooperation and minimizes conflict potential.

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Appendix 1: Interview questionnaire

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

THE FUTURE OKAVANGO

SCENARIO BUILDING PROCESS – The Future Okavango Research Project

Integration of ground and science base knowledge in the definition of scenarios

Stephanie Domptail, University of Giessen, Germany.

Interview guideline Land Users

	FIRST SECTION: the Scenario research process
	Explain background, TFO project, team, the scenario project (multi-scale). AIM of the interview: present the scenario project, obtain expertize of the SH on the OKB as a system, and collect some data to understand how the SH is linked to the OKR, and see whether the SH wants to be involved in
A	**the whole process.**
1	Questions?
	Steps of the scenarios (purpose of interview) and finally the scenario
B	**focus.**
2	Questions?
	Explain the scenarios: meaning for TFO: explore unknown direction to
C	**improve common knowledge on system. Freedom -exploration**
3	Do you think that such scenarios can be helpful for your work? How?
D	**Explain what is possible and what is not possible.**

	SECOND SECTION: Activities
4	Which activities do you carry out?
	How much does you activity depends on land resources?
	On water resources?
5	On nature, on other things that our environment provides?
6	Do changes in land use or water availability in [Shambyu] affect you?
	How does your activity change/influence nature? (Water? Land? Forest?
7	Grazing, …)
8	What is your aim in your activities? (in farming, tourism, fishing,…)
	Do you think that other people or groups have different goals concerning
9	nature and the people living here when they do their job?
10	How do you feel about that?

	THIRD SECTION: perception of land use
11	Since when do you live in this area?
12	Have you ever seen the basin in each of the 3 countries Angola, Namibia, Botswana?
13	What do you think is the most special about this area near the River in [Shambyu and in Kavango] along the river?
14	What is the most regrettable?
15	What is frightening?
16	What gives you hope?
17	Have the land use, the water availability and the livelihoods of people been changing recently?
18	What is driving these changes? Why do they happen?
19	What else do you think will make the land use and water availability change in the future?
20	Imagine we are in 2030 and the land use and well-being of people in the area has turned out just as you would dream of. Can you describe this situation?
	FOURTH SECTION: ranking of services from nature
21	**In the project we are working with this way of seeing nature: we have identified 11 services that nature provides for people in the area. [Present cards]. Are you familiar with these services? Let me give a brief explanation.**
22	Please rank the different cards according to the importance and value it has to you.
23	What are the reasons for this order?
24	What role do you play in the management if the most important card?
25	How do you benefit from the 2 items at the top of the list?
26	Do you have costs related to any of these cards?
	FIFTH SECTION: Data on the specific area of expertize?
27	Is there anything important that I have failed to ask you?
28	Would you be interested in participating to the scenario evaluation workshop?

Many thanks for your invaluable cooperation!

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

THE FUTURE OKAVANGO

SCENARIO BUILDING PROCESS – The Future Okavango Research Project

Integration of ground- and science-based knowledge in the definition of scenarios: Interviews of Experts and Stakeholders

Stephanie Domptail, University of Giessen, Germany

Interview guideline Experts and government members

	FIRST SECTION: the Scenario research process
	Explain background, TFO project, team, the scenario project (multi-scale). AIM of the interview: present the scenario project, obtain expertize of the SH on the ORB as a system, and collect some data to understand how the SH is linked to
A	**the ORB, and see whether the SH wants to be involved in the whole process.**
1	Questions?
B	**Steps of the scenarios and finally the scenario focus at the BASIN scale**
	Explain the scenarios: meaning for TFO: explore unknown direction to improve
C	**common knowledge on system. Freedom -exploration**
2	Do you think these scenarios can be useful for you in your professional life? How?
D	**If necessary, explain what is possible and what is not possible.**
	SECOND SECTION: Stakeholder activities
3	How are your activities related to land, water and resource use in the ORB?
3b	**In which area/scale**? Shall we discuss the rest of the question for this area?
4	What is your goal in your action in the ORB?
5	Do you think other actors have different aims than yours?
6	How does the situation affect you? (Do you feel threatened?, supported?)
	PM: How much autonomy in decisions do you have in the decisions on land use
7	and water availability? How much do you depend on other actors?
8	PM: Do you communicate much with other actors?
	THIRD SECTION: perception of the system
9	Since when are you in contact with Okavango River Basin and region?
10	Have you seen the basin in each of the 3 countries Angola, Namibia, Botswana?
	Say I am new at your job and you would need to brief me. Based on your knowledge of the environment, the economy and the people in the ORB, what is
11	the key thing in this river basin that makes the system work or not work?
11	Would you tell me are the **strengths** of the ORB as a system? Characteristics it

b can draw upon for its future development?

What are **weaknesses** of this system, negative points, on which the system
12 cannot rely?

13 What would you see as **opportunities** for the future for the ORB?

14 What would you see as **threats**?

In a more general perspective of the ORB now, what are the **main changes going**
15 **on**?

16 What is **driving these changes**?

Is there **any other important driving force** that might affect the system from now
17 to 2030?

VISION: Imagine we are in 2030. How could land use, the environment and people's situation change for you to feel that the rights developments have
18 occurred? Can you describe this situation?

19 What do you believe might happen instead?

20 What do you think will keep things from turning out as in your vision?

FOURTH SECTION: Ecosystem Services

You have mentioned some ecological characteristics. Let us continue in this direction. **In the project we are working with this way of seeing nature: we have 11 ecosystem services which we are investigating. [present ESS cards]. Let me**
E **give a brief explanation.**

Please **rank** the different ESS according to the importance and value it has to you. You can take time and do it silently for yourself. I will ask you three questions about the cards afterwards. Feel free to ask me explanation if one card or the
21 other is not clear.

22 Can you **briefly explain** why you have chosen this order?

Which of these ESS does **your activity has the aim to affect** positively or negatively, directly or indirectly? Ex: through an effect on Land use.
23 (Alternatively: What role do you play in the management if the [main] ESS?)

Are you on a personal or professional level also **affected by** nature and water
24 availability in the ORB? HOW?

35 LAND USERS only - How do you benefit from the 2 main ESS?

FIFTH SECTION: Data on plans and projects affecting land, water and resources – NO RECORDING!

Do you know about plans and projects which are being put in place or intended and which could affect land, water and the environment in the ORB? I am
25 interested in getting the source of the data to integrate them in the scenarios.

26 Would you be interested in Participating in Cross-checking the scenarios?

27 Would you be interested in receiving the Visions?

28 Would you be interested in participating to the evaluation workshop?

29 Is there anything I have failed to ask and which you would like to add?

SCIENTISTS ONLY- do you have data on [FILL IN] that you would like to share to
30 us?

Would you be interested in Participating in Cross-checking the scenarios? BASIN
31 AND LOCAL [FILL IN COUNTRY]

Appendix 2: Coding structure used during qualitative analysis (complete)

Main category	Subcategory	2nd level subcategory	3rd level subcategory	4th level subcategory
GRAL DATA				
	Stakeholder group			
		Govt - Museum of Botswana		
		MOA		
		MEWT		
		MMWER		
		SADC		
		Village community rep		
		NamWater		
		OkBMC		
		Agricultural extension MAWF		
		Water Agency DWA MAWF		
		Business/tourism		
		Donnors & Dev projects		
		Education		
		Education and Research		
		Expert/researcher		
		Govt- Dept of lands		
		Govt/water affairs		
		Humanitarian aid		
		Local gov		
		LUPU		
		MET CBNRM		
		Natural resource/land user		
		NGO		
		Private entrepeneur		
		Provincial Govt		
		Resource user & women's sake		
		Small scale farmers: ranching		
		Tourism		
		Traditional authorities		
		Govt MEWT - Dpt W and National Parks (DWNP)		
		CBNRM		

Appendix 2: Coding structure used during qualitative analysis (complete)

		OKACOM, OKASEC		
		Civil society - youth		
	Sector			
		Coordination		
		Water		
		Livelihoods		
		Tourism		
		Lands		
		Resource user		
		Agriculture		
		Other		
	Activity			
		Other		
		Resource user		
		Donnors/support		
		Civil Soc, NGO, CBO		
		Basin mgmt		
		Govt		
		Para-statal agency		
		Expert/researcher		
ESS PREFERENCE				
	Cultural services			
		Trees		
		Environmental settings		
	Supporting services			
		Wildlife		
		Soil		
	Regulating services			
		Species diversity		
		Minerals		
		Hazard regulation		
		Climate regulation		
	Provisioning services			
		Thatching grass		
		Staple crops		

Appendix 2: Coding structure used during qualitative analysis (complete)

		Livestock		
		Fish		
		Vegetables & Staple crops		
		Water		
RELATIONSHIP WITH ESS				
	· Depending			
	· Managing			
	· Bearing costs of			
	· Benefiting/using			
RESOURCE MGMT PRIORITY				
	Economy & Livelihoods			
		Tourism		
		Agriculture dev		
		Constant water access		
		Livelihoods		
	Social & cultural aspects			
		Transboundary cooperation		
		Interscale cooperation		
		Awareness increase		
		LUP and mgmt		
		Research for improved policy making/implementation		
		People empowerment		
	Natural environmental			
		Sustainable resource management		
		Conservation agriculture		
		Conservation		
PERCEPTION OF SHAPING ENVIRONMENTS				
	Identity group			
		Investor		
		Conservation		
		Coordination		
		Expert		
		Resource/Land user		
		Public server		

Appendix 2: Coding structure used during qualitative analysis (complete)

	Intention of others			
		Supported		
			Acknowledgement/appreciation	
		Not supported		
			Access to SHs	
			Govt pressure on Trad auth	
			Locals expect more/not satisfied	
			No engagement in the issues	
			No help from govt	
			Seeing locals as threat	
			Seeing OKACOM as useless	
		Uncertain		
			Uncertain of govt approach	
a) Perception of ORB natural environment				
	Present			
		Negative		
			Neglected areas for protection	
			Unsustainable agr activities	
			Bad soils	
			Excess livestock	
			Excessive land conversion	
				Commercial agriculture
			Flood extension	
			Lack of water	
			Less wildlife	
			Polluted water	
		Positive		
			Balanced river flow/flood control	
			Pristine-ness	
			Good water quality	
			Diversity of the ORB	
			Flood control	
			Good soil	
			Rich natural resources	

Appendix 2: Coding structure used during qualitative analysis (complete)

	Future			
		Opportunities		
			Conservation Agriculture practices	
			Electricity vs fuel	
			Increase in protected areas	
		Threats		
			Agrochemicals	
			Biodiversity loss	
			Deforestation	
				Destroying reeds
			Droughts	
			Excess elephant no.	
			Excessive livestock	
			Exploitation of resources	
				Over-fishing
				Over-grazing
			Field/bush fire	
			High (foreign) demand of natural resources	
			Invasive species	
			Irrigation schemes	
			Mining	
			Soil degradation	
			Water pollution	
		Visions		
			Stop the diamond mining	
			Population decrease - Delta Conservation	
			Conservation/eco integrity	
			Better wildlife management	
b) Perception of economic status and growth opp				
	Present			
		Negative traits		
			Poor economic dev planning	
			No funding/investment	
			Malaria	

Appendix 2: Coding structure used during qualitative analysis (complete)

			Lack of local market opp	
			Lack of infrastructure	
			High production costs	
		Positive traits		
			Tourism as livelihood provider	
			Self-sufficient agriculture	
			On-going dev	
			Low criminality levels	
			Infrastructure	
		State of wealth		
			Positive	
			Negative	
				No access to cash/Poverty
				Not enough investment
	Future			
		Opportunities		
			Diversification	
			Agricultural dev	
			Increase basin use	
			Tourism	
			Small scale farming	
			Investments/reserch	
			Investments in peasant agr.	
			Improved econ dev analysis	
		Threats		
			Strict market control	
		Visions		
			Intensification of agriculture	
			Sust. agricultural development	
			Tourism as econ dev	
c) Perception of livelihoods development				
	Present			
		Negative		
			Lack of SH involvement	

Appendix 2: Coding structure used during qualitative analysis (complete)

			Unequal benefit sharing	
			Disparities in/Lack of Sci knowledge	
			Incomplete Ed. curricula	
			Lack of awareness/education	
		Positive		
			Env. sustainable activities	
			Cooperation with locals	
			Low levels of development	
			Education	
				Sci/tech knowledge
				Awareness increase
	Future			
		Opportunities		
			SH involvement	
			Proper dev intervention	
			Centralized planning/local implementation	
			Hydropower	
			Solar energy	
			Education	
				Knowledge transfer
				Education/awareness increase
				Continuous training/capacity building
				Community development
				Basin identity promotion
		Threats		
			Lack of expert knowledge	
			HIV/AIDS	
			Unplanned rapid urban dev	
			Land shortage/Land speculation	
		Visions		
			Communiy development	
			SH involvement & empowerment	
			FMD erradication	
			Land zoning	
			Planned/Proper urban dev	

Appendix 2: Coding structure used during qualitative analysis (complete)

			Infrastructure development	
			Equal benefit sharing	
			Improved livelihoods	
d) Perception of social and cultural state				
	Present			
		Negative		
			Loss of local traditions	
			Decrease in power of traditional auth	
			Harmful attitudes	
			Imposition of modern ways	
			Lack of commitment	
		Positive		
			Resilience	
			Positive attitude of SHs	
			Local culture/traditional knowledge	
			Collective action	
			Respect twds trad auth	
	Future			
		Threats		
			Conflicts over nat resources	
				LU conflicts/war
			Lack of interest	
			Unsustainable practices	
			Increasing crime	
			Over-population/pop growth	
			Corruption	
		Visions		
			ORB identity promotion/Awareness (whole picture)	
			Maintain local cultural values/traditions	
			Peace	
			Sustainable practices/attitude change	
			Reinforcement of trad auth	
			People empowerement	
			Returning youth	

Appendix 2: Coding structure used during qualitative analysis (complete)

e) Perception of governance effectiveness				
	Present			
		Positive		
			Transboundary cooperation	
			Effective legislation	
		Negative		
			Difference in views/agenda on ORB	
			Poor local LUP	
				Scattered villages
			Poor institutional capacity	
			Lack of transboundary cooperation	
			Poor coordination/monitoring	
			Too strict regulations	
			Unclear property rights	
			Disparities in policy & regulation	
	Future			
		Opportunities		
			Transboundary cooperation	
			Transboundary projects	
			Incentives for joint coop	
			Good policy making	
		Threats		
			Inefficient econ dev policies	
			Over-capacity Tourism	
			Excessive dependency on intl donnors	
			Centralized govt	
		Visions		
			Transboundary cooperation	
			Fair/proper land management	
			OKACOM empowered and independent	
			Sustainable economic dev policy	
			Capacity building	
Perception of system dynamics				
	Key drivers			

Appendix 2: Coding structure used during qualitative analysis (complete)

		Education and awareness		
		Environmental		
			Land conversion	
			Pristine-ness	
			Climate change	
			Ecosystem functioning	
		Socio-economic		
			Urbanization	
			Poverty	
			Population growth	
			Migration	
			Land tenure policy dev	
			Intl economy	
			Intl cooperation/investments	
			Infrastructure development	
			Globalization	
			Food security	
			Econ dev policy	
			Country stability	
		Transboundary cooperation		
	On-going projects & other trends			
		Botswana/Namibia		
			Delta WH	
			Land-zoning	
			FMD erradication plans	
			Namibia's canal link to river	
			Devil's claw	
			Water dist Nam	
			Water dist Bots	
		Angola		
			Industrial agriculture	
			Infrastructure dev	
			Kaza Project	
			UOIP	
			hydropower plants	

Appendix 2: Coding structure used during qualitative analysis (complete)

			Water distribution Angola	
Cornerstone				
	Ecological			
		Functional ecosystem		
		Environmental settings		
		Pristine-ness		
	ESS			
		Water		
		Forest		
		Land		
		Climate regulation		
	Social			
		Joint cooperation		
		Collective action		
		Resilience		
		Good governance		
		Fulfilling management plans		
		Common historical background		
	Livelihoods			
	Transboundary cooperation			
		RAMSAR site		
Comments from coders				
	astonished			
	confused			
	Contradiction?			
	hurtful truth			
	smiling			
CONFLICT				
	1. Issues			
		Land use		
			Migration	
			Conflicts between subsistence & commercial use	
				Habitation vs agro-industrial projects
			Conservation vs livelihoods	
				Human-wildlife conflict

Appendix 2: Coding structure used during qualitative analysis (complete)

			Illegal settlements	
			Land grabbing	
			Land tenure policy implementation	
			Relocation of communities	
		Local/national conflicts		
			Lack of people's awareness for sustainable resource use	
				Loss of cultural values
				Knowledge leakage
				Lack of degree of local/expert knowledge
				Harmful attitudes
			Water distribution	
			Benefit sharing at the local scale	
				Strong power distance: the weak cannot speak up
				No education/healthcare
				Social inequity/gender inequity
			Pressure on tourism as growth booster	
		Governance		
			Burocracy, institutional flexibility and learning capacity	
				Mismanagement of funds
				Communication issues between scales
				Language barriers
			Politicians' personal interests	
				Land grabbing by government members
				Lack of interest on the gov side
				Elitist projects
				Corruption and bribery
			Weak implementation/absence of policies & regulation	
		Transboundary issues		
			(Weak) power of OKACOM	
			Angolan OKACOM taking over river mgmt	

Appendix 2: Coding structure used during qualitative analysis (complete)

			Benefit sharing among countries	
			Cooperation within the basin	
			Dev plans at diff scales/countries	
			Disparities in dev affecting one another	
			Equitable water distribution among countries	
			Quick changes in political strategies	
				WH site
				Angola's pressure to dev
			Vulnerability of Namibia and Botswana as countries dependin	
	2. Course conflict (if existent)			
		Unstable		
		Stable		
	3. Conflicting parties			
		Sector		
			Public	
			Private	
		Scale		
			Local	
			Provincial	
			National	
			Transboundary	
	4. Positions and relationships			
		Power relations		
			Objective	
			Subjective	
			Symmetric	
			Asymmetric	
		Dependencies		
			Objective	
			Subjective	
			Asymmetric	
			Symmetric	
	5. Feelings, attitudes towards conflict/issues			
		Acceptance		

Appendix 2: Coding structure used during qualitative analysis (complete)

		Appreciation/acknowledgement		
		Defends the govt system		
		Hopeful		
		Pesimistic		
		Proud/satisfied of his work		
	6. Conflict Stage			
		Stage 1 - Feeling Anxiety		
		Stage 2 - Debate and critique		
		Stage 3 - Lobby and persuasion		
		Stage 4 - Protest and campaigning		
		Stage 5 - Access restriction		
		Stage 6 - Court		
		Stage 7 - Intimidation and physical exchange		
		Stage 8 - Nationalization and internationalization		

Appendix 3: Median ESS ranking per country, per scale and within the whole ORB

Scale	N	Water	Climate regulation	Species diversity	Hazard regulation	Environmental settings	Trees	Staple crops	Wildlife	Fish	Livestock	Vegetables	Thatching grass
Basin	1												
National	5	3	11	4	4	9	6	5	5	5	6	6	10
District	8	3	4	5	5	3	5	8	6	9	8	9	11
Local	10	3	7	9	11	7	5	4	10	8	7	5	10
Angola total	24	3	6	6	8	7	5	5	7	7	7	6	10
Basin	3	1	2	2	2	3	7	8	6	6	8	8	6
National	5	4	1	5	3	2	6	7	7	8	9	11	9
District	6	1	7	3	6	6	3	8	7	8	8	9	11
Local	9	2	8	8	8	6	9	3	6	6	6	9	8
Botswana total	23	1	5	5	4	4	6	7	6	7	7	10	9
Basin	3	6	5	5	6	9	5	10	2	5	10	10	5
National	5	2	9	4	4	8	5	9	5	3	8	9	8
District	12	3	3	4	7	10	6	5	7	6	8	8	11
Local	8	4	10	9	5	10	4	4	7	10	7	7	9
Namibia total	28	3	6	5	6	9	5	5	7	6	8	8	9
Basin	7	3	5	5	4	9	7	8	6	6	8	8	6
National	15	3	3	5	3	7	6	7	6	6	8	8	9
District	26	3	5	4	7	6	5	8	7	8	8	8	11
Local	27	2	8	9	8	7	6	4	7	7	6	5	9
Whole sample	75	3	5	5	5	6	6	6	6	7	7	8	9

Source: Domptail, S., Mundy, (2013)