

THERAPEUTIC EFFECTS OF WETLANDS ON MENTAL WELL-BEING

*THE CONCEPT OF THERAPEUTIC LANDSCAPES APPLIED TO AN
ECOSYSTEM IN UGANDA*

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ABSTRACT

The therapeutical effects of wetlands help to keep people mentally healthy. Especially in developing countries, health care prioritizes the treatment and prevention of physical illness before mental illness due to the high burden of physical and often fatal diseases. Wetlands are landscapes with important functions for the water cycle and the global climate by serving as water storages and CO₂ sinks. Thus, the conservation of wetlands fulfils at least two functions: On the one hand, it contributes to the global climate regulation, on the other hand, it helps to prevent mental illness.

The mental representation of places plays a role in short-term, mid-term and long-term actions. The research on this, however, requires an interdisciplinary approach since it combines medical, psychological and geographical complex of themes in analysing landscapes. The sensory perception of the body performs the window between human beings and nature. Landscapes contain places, which are evaluated cognitively and emotionally. Those places influence the individual and societal well-being.

In this study, the impact of wetlands on mental well-being was assessed by the approach of *therapeutic landscapes*. This concept regards landscapes from a natural, structuralistic and humanistic view. It broadens the environmentalist perspective on landscapes by a humanistic one and aims to assess holistically the therapeutical effects of a landscape. The social-ecological perspective of medical geography forms the scientific background of this concept. The focus is on social and societal constructions of landscapes in order to assess positive impacts on mental well-being.

A wetland in Uganda was investigated by its symbolic and social space as well as by its activity and experienced space. A qualitative study contained seven in-depth interviews with different stakeholders. The historical development of the wetland was assessed. Another six group interviews with 48 participants in total were conducted by applying *PRA-methods*. The results underpinned the results of a quantitative study of different psychometric scales assessing the functional and emotional bonding to the wetland, life satisfaction, emotional well-being, stress perception and self-esteem of the wetland's residents (n=235).

The study shows that the residents strongly identify with the wetland due to the provision of livelihood by the wetland. Additionally, the recreational value and the cultural heritage of this ecosystem play a role. *Place identity* develops with personal

biography and also with the societal and social biography of the wetland. The biological diversity and the constant provision of resources result in an *ecological identification* and secondly in an *ecological pride* of the residents on the wetland. Those feelings, however, decrease with the increasing degradation of the ecosystem.

The change of symbolic meanings of the wetland mirrors the historical development of the country. The sense of place of Uganda's wetlands went through certain opposite states from *wastelands* via the *land of fortune* to *sadlands*. Environmental changes of wetlands and the development of the country stay in a close dialectical relationship.

The social fabric in wetlands is highly complex since these landscapes provide many resources in which various stakeholders claim their interest. The hierarchical structure of the social space and the distribution of resources contain high conflict potentials, which may negatively impact perception of the landscape. The social space of wetlands is decisive for mental well-being.

The sense of place can be influenced by governmental incentives. This provides an opportunity to highlight wetlands as areas worth of protection. Nevertheless, in terms of a sustainable environmental protection, farmers only have a restricted scope of action. This task must be delegated to higher governmental and social levels, while the involvement and say of locals must be guaranteed.

Wetlands are landscapes positively impacting on mental well-being due to their regulatory and provisional functions as well as due to their aesthetic and cultural values. The study shows, however, that health-promoting effects of wetlands are linked to certain conditions in the symbolic, social, action and experienced space.

ZUSAMMENFASSUNG

Therapeutische Effekte von Feuchtgebieten helfen dabei Menschen psychisch und damit auch physisch gesund zu erhalten. Insbesondere in Entwicklungsländern wird die medizinische Versorgung von psychisch Erkrankten aufgrund der besonderen Krankheitslast lebensbedrohlicher physischer Erkrankungen häufig als zweitrangig betrachtet.

Feuchtgebiete sind Landschaften, die Wasser speichern und als CO₂-Senken fungieren. Sie erfüllen dadurch eine zentrale Rolle in Bezug auf die globale Klimaregulierung und den Wasserhaushalt. Der Schutz von Feuchtgebieten trägt somit zum einen zum globalen Klimaschutz und zum anderen zur Prävention mentaler Erkrankungen bei.

Die Repräsentation von Orten in der menschlichen Psyche spielt eine Rolle für kurz- und langfristiges Handeln. Die Erforschung dieser Thematik bedarf einer interdisziplinären Perspektive, da sie medizinische, psychologische und geographische Themenkomplexe miteinander kombiniert und Landschaften danach analysiert. Die sensorische Wahrnehmung des Körpers ist das Fenster zwischen Mensch und Natur. Landschaften beinhalten Orte, die kognitiv und emotional bewertet werden, diese haben Einfluss auf das individuelle und gesellschaftliche Wohlbefinden.

Der Einfluss von Feuchtgebieten auf das mentale Wohlbefinden seiner Bewohner wurde mittels des Konzepts der *Therapeutischen Landschaften* ermittelt. Dieses Konzept betrachtet Landschaften auf einer humanistischen, natürlichen und strukturalistischen Ebene. Das Konzept erweitert die naturwissenschaftliche um eine humanistische Perspektive und verfolgt einen holistischen Ansatz in der Darstellung therapeutischer Effekte einer Landschaft. Dem Konzept liegt die sozial-ökologische Perspektive aus der medizinischen Geographie zu Grunde. Es geht nicht um die Darstellung naturwissenschaftlicher Prozesse, sondern darum das soziale und gesellschaftliche Landschaftskonstrukt zu begreifen um dessen positive Einflüsse auf das mentale Wohlbefinden zu erfassen.

Ein Feuchtgebiet in Uganda wurde als Untersuchungsgebiet herangezogen. Es wurde als symbolischer, sozialer Raum sowie als Erfahrungs- und Aktionsraum untersucht. Eine qualitative Teilstudie beinhaltete sieben Tiefeninterviews mit unterschiedlichen Interessensvertretern des Feuchtgebietes in denen die historische Entwicklung des Feuchtgebietes erfasst wurde. Sechs Gruppeninterviews mit insgesamt 48 Teilnehmern wurden mit *PRA-Methoden* durchgeführt, die

hermeneutisch zu den Ergebnissen einer Umfrage herangezogen wurden. Verschiedenen psychometrischen Skalen erfassten die funktionale und emotionale Bindung zum Feuchtgebiet sowie emotionales Wohlbefinden, Lebenszufriedenheit, Stressempfinden sowie Selbstwertgefühl der Bewohner des Feuchtgebietes (n=235).

Die Studie zeigt, dass die Bewohner sich mit dem Feuchtgebiet stark identifizieren. Hierbei spielt die Sicherstellung des eigenen Lebensunterhalts durch das Feuchtgebiet eine zentrale Rolle. Außerdem sind der Erholungswert und das kulturelle Erbe dieses Ökosystems von Bedeutung. *Place Identity* entwickelt sich mit der persönlichen Entwicklung aber auch mit der gesellschaftlichen und sozialen Entwicklung des Feuchtgebietes. Ökologische Vielfalt und die konstante Bereitstellung von Ressourcen führen zur *ökologischen Identifikation* und sekundär zu einem *ökologischen Stolz* der Bewohner über das Feuchtgebiet. Diese Gefühle gehen jedoch mit zunehmender Degradation des Ökosystems verloren.

Der symbolische Wandel des Feuchtgebietes spiegelt die historische Entwicklung des Landes wider. Der *Sense of Place* der Feuchtgebiete Ugandas hat im Laufe der Geschichte des Landes einen starken Wandel von *Wastelands* über das *Land of Fortune* hin zu *Sadlands* durchlaufen. Veränderungen der Feuchtgebiete und Entwicklungen der Gesellschaft stehen in einem dialektischen Zusammenhang.

Die soziale Struktur in Feuchtgebieten ist sehr komplex, da diese Landstriche viele Ressourcen liefern an die diverse Interessen geknüpft sind. Die hierarchische Struktur des sozialen Raums und die Verteilung von Ressourcen bieten Konfliktpotenziale, die einen stark negativen Einfluss auf die Wahrnehmung der Landschaft haben. Der soziale Raum in Feuchtgebieten erweist sich in Uganda als entscheidend für das mentale Wohlbefinden.

Der *Sense of Place* kann durch staatliche Anreize verändert werden, was Möglichkeiten bietet, Feuchtgebiete zu schützenswerten Gegenständen zu deklarieren. Der Handlungsrahmen des einzelnen Bewohners jedoch ist im Sinne des langfristigen und nachhaltigen Umweltschutzes sehr begrenzt. Diese Aufgabe muss an höhere staatliche und soziale Ebenen weitergegeben werden, wobei Einbezug und Mitspracherecht der lokalen Bevölkerung garantiert sein muss.

Feuchtgebiete sind Landschaften, die durch ihre regulatorischen und versorgenden Ressourcen, sowie ihren ästhetischen und kulturellen Wert positiv auf den Menschen wirken. Die Studie zeigt jedoch, dass gesundheitsfördernde Effekte von Feuchtgebieten an grundsätzliche Bedingungen im symbolischen, sozialen sowie Erfahrungs- und Aktionsraum gebunden sind.

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ABBREVIATIONS

A	Research site A
A1	Local Council Area A1
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ANOVA	Analysis of Variance
B	Research site B
BLB	Buganda Land Board
BMBF	Bundesministerium für Bildung und Forschung (German Federal Ministry of Education and Research)
BMI	Body Mass Index
C	Research site C
C1	Local Council Area C1
C2	Local Council Area C2
CICES	Common International Classification of Ecosystem Service
COMM	Community
D	Research site D
DRC	Democratic Republic of Congo
ENR	Environment and Natural Resources
FKZ	Förderkennzeichen (Funding code)
FM	Farm Manager
GI	Group Interview
GIS	Geographical Information System
Globe	Globale Ernährungssicherung (Global Food Security)
ICD 10	International Classification of Diseases and Related Health Problems – 10th Revision
IHPH	Institute for Hygiene and Public Health
KIDS	Number of Children
LC	Local Council
LOR	Length of Residence
MC	Medical Centre
MEA	Millennium Ecosystem Assessment
MIN	Minutes

NaCRRRI	National Crops and Resources Research Institute
NARO	National Agriculture Research Organization
NBI	Nile Basin Initiative
NDP	National Development Plan
NEMA	National Environment Management Authority
NGO	Non-Government Organisation
NPA	National Planning Authority
NWP	National Wetlands Programme
OECD	Organisation for Economic Cooperation and Development
PAI	Place Attachment Inventory
PCA	Principle Component Analysis
PD	Place Dependence
PF	Private Farmer
PI	Place Identity
PPH	Persons per Household
PRA	Participatory Rural Approach
PSS-10	Perceived Stress Scale with ten items
PTJ	Projekträger Jülich (Project Management Jülich)
QOL	Quality of Life
RSE	Rosenberg's Self-Esteem scale
SWL	Satisfaction with Life
SWLS	Satisfaction With Life Scale
UBOS	Uganda Bureau Of Statistics
WHO	World Health Organization
WHO-5	Well-Being Index of the WHO with five items
WID	Wetland Inspection Division
WMD	Wetlands Management Department



„Erst die Fremde lehrt uns, was wir in der Heimat haben.“

[The stranger teaches us what we have in the home]

Theodor Fontane

1. INTRODUCTION

1.1 WETLANDS IN EAST AFRICA – THREATENED PROVIDER OF LIVELIHOOD

Wetlands are ecosystems whose main agent is water. At the global scale, wetlands extend across four to six percent of the Earth’s surface (IPCC SAR WG2 1996). Due to their different properties and ecosystem services, coastal wetlands have been distinguished from inland wetlands (Finlayson et al. 2005, 33). Coastal wetlands contain estuaries and marshes, mangroves, lagoons, salt ponds, intertidal flats, beaches, kelp, rock and shell reefs, seagrass beds as well as coral reefs (Finlayson et al. 2005, 32). In contrast, inland wetlands are landscapes containing permanent and temporary rivers and streams, permanent lakes, reservoirs, seasonal lakes, forested wetlands, marshes, swamps, floodplains, alpine and tundra wetlands, springs and oases, geothermal wetlands as well as underground wetlands, caves and groundwater systems (Finlayson et al. 2005, 31). In this study, the focus is on inland wetlands, referred to *wetlands*.

Wetlands contain a high biodiversity and provide life-giving ecosystem services for all kinds of life. Wetlands serve as habitat for animals and plants, such as various healing plants or important bird areas (Huising 2012, 127) and their soils are highly fertile. They support pollination as well as the accumulation of organic matter for the nutrient cycle (Finlayson et al. 2005, 32). Additionally, wetlands have an important function on the water cycle due to their functions of water collection and water storage as well as water purification (Corvalan et al. 2005, 37). These ecosystems play a crucial role in providing clean drinking water since they serve as natural sewage plants. Furthermore, they provide nutrition such as agricultural products, fish, game and honey as well as materials like fibre, herbaceous vegetation and trees or life stock grazing (Finlayson et al. 2005, 33).

Besides these *supporting* and *provisioning ecosystem services*, wetlands fulfil *regulating ecosystem services* by regulating temperature and climate. Evapotranspiration, as well as the permanent availability of water, helps to stabilise temperature and local climate, which, especially in hot regions, is essential for the health and well-being of humans and animals.

Wetlands serve as a CO₂ sink and thus play a crucial role in long-term climate stabilisation. Finlayson et al. (2005) made aware of the tremendous importance of these ecosystems in terms of climate regulation:

Although covering only an estimated 3 – 4 % of the world's land area, peat lands are estimated to hold 540 gigatons of carbon, representing about 1.5 % of the total estimated global carbon storage and about 25 – 30 % of that contained in terrestrial vegetation and soils.

With this in mind, it is clear that the protection of wetlands is a relevant political topic in the context of international aspirations to reduce CO₂ emissions and to mitigate climate change. Wetlands attract people by providing convenient conditions to sustain livelihoods and to settle down (Horwitz et al. 2012, 89). Their aesthetic appearance and high recreational functionality draw tourists. Additionally, wetlands can be associated with intangible values, such as educational opportunities and as *emotional* and *symbolic places*. Therefore, wetlands form a large part of the cultural heritage of many local communities.

The population growth coupled with growing economic activity has been suggested as "*the primary indirect driver*" of changing water-related milieus (Corvalan et al. 2005, 41). Conversion into drained farmland and extensive use for agricultural purposes has resulted in a rapid exploitation of wetlands. The utilization of

wetlands for the construction of houses and infrastructure are main drivers of degradation (Finlayson et al. 2005, 39). In this context developing countries come to the fore, as they are often disadvantaged by seasonal food and water scarcity and characterised by high population growth as well as a strong drive to accelerate infrastructural development.

Addressing these threats for the wetlands remaining, a project on global food security was initiated. The research project GlobE-project: “Wetlands in East Africa – Reconciling food security with environmental protection”, a collaboration of European and African partners was funded by the German Federal Ministry of Research and Education. The GlobE-project focuses on wetlands in four East African countries: Tanzania, Kenya, Rwanda and Uganda and at the same time, it was the umbrella project of this study.

The addressed East African countries are covered by twenty million hectares of wetlands, which are rapidly changing due to encroachment and increasing use for agricultural purposes by the rural population and others (Settele et al. 2014). The rural population of these countries is expected to increase strongly between 2015 and 2025. In Uganda, the population is expected to grow from 34.9 million to 46 million people (UBOS 2014). Together with Nigeria, the Democratic Republic of Congo, Tanzania and Ethiopia, Uganda is expected to contribute substantially to the total global population increase between 2015 and 2050 (United Nations 2014).

In Uganda, more than ten percent of the whole population is highly dependent on wetlands for the provision of food, water and other materials (WMD et al. 2009, 1). As a consequence of the massive population growth of 3 % per year and the scarcity of agricultural space, the protection of wetlands in Uganda is already an emerging point of conflict in the country (Heinkel 2014). Conflict about wetlands and their rapid change has arisen as a source of distress for locals, since “*changes to wetlands, [...] can influence a person’s mental health by becoming a source of psychological stress*” (Horwitz et al. 2012, 4). Especially in Uganda, there is an urgent need to prioritise the topic of the protection and *wise use* of the wetlands (McInnes et al. 2016) in accordance with the local communities in a trans disciplinary approach including practitioner and policy-makers on environment and health (Horwitz and Finlayson 2011b).

1.2 MENTAL WELL-BEING AS UMBRELLA TERM FOR EMOTIONAL, AFFECTIVE AND PSYCHOLOGICAL ASPECTS OF HEALTH

Inhabitants of developing countries, especially in rural areas, strongly depend on wetlands, which contains conflict potentials as e.g. the public debate in Uganda shows (Heinkel 2014). Besides this, poverty and lack of employment trigger mental diseases (Ndyabangi et al. 2004) but Uganda's mental health care services are predominantly available in urban areas. Only one percent of the governmental expenditures on healthcare is directed to primary mental health care (WHO 2006). Furthermore, the National Development Plan 2040 of Uganda prioritizes preventive healthcare services in order to reduce curative healthcare services (The Republic of Uganda 2015, §452). In this context, questions on the environment's promotion of mental health gain importance.

The definition of health as a *"state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"* (WHO 1948) implies that well-being is a positive state of human beings in different respects resulting in health. Human well-being is a multifaceted term, applicable in diverse areas of human-centric topics. Here, the focus is on well-being related to emotions and minds provoked by wetlands. In this context, it is important to what extent well-being is influenced by the perception of the natural and physical environment and the interaction with it. A conceptual delineation is necessary concerning the use of the term *well-being* since the term is broadly used, but conceived and understood differently in each scientific discipline which *"is a potential source of confusion and misunderstanding for scientists and conservation policymakers and practitioners"* (Milner-Gulland et al. 2014, 3). The large amount of parallel existing types of well-being addressing emotions and states of minds lacks clear definitions and distinction from each other. Within this study, the emphasis is on *mental, psychological, emotional and affective well-being*.

The WHO uses the term *mental well-being* for the definition of *mental health*, thus mental health and mental well-being are intertwined. Mental well-being is the person's *"ability to cope with normal stresses of life"* (WHO 2001) as well as to be productive in terms of their own lives and the life of others in a community. Mental health is a cognitive and emotional state in which an individual is able to act in a self-reliant manner and capable of interacting with their surroundings (WHO 2001). A state of mental health can be gained in an environment that *"respects and protects basic civil, political, socio-economic and cultural rights"* (WHO 2001) and is safe and secure (Kaplan and Kaplan 1989). Various and overlapping psychological, social and

biological influences determine mental well-being, however, *"the clearest evidence is associated with indicators of poverty, including low levels of education"* (WHO 2001). The emotional and cognitive interaction of individuals and groups with wetlands needs to be highlighted and the topic of natural influences on mental well-being needs to be stressed.

In this study, mental well-being is used synonymously for psychological well-being, as the definitions of both differ only slightly, in terms of their perspectives. While mental well-being is related to an individual's impact on the external surrounding, psychological well-being provides a definition rather from the perspective of psychologists.

Its focal points highlight aspects of self-efficacy in terms of the self and of self-realization (Ryff 1989). Psychological well-being implies a state of

(1) positive evaluations of oneself and one's past life (Self-Acceptance), (2) a sense of continued growth and development as a person (Personal Growth), (3) the belief that one's life is purposeful and meaningful (Purpose in Life), (4) the possession of quality relations with others (Positive Relations With Others), (5) the capacity to manage effectively one's life and surrounding world (Environmental Mastery), (6) and a sense of self-determination (Autonomy) (Ryff and Keyes 1995, 720).

Evaluation of life and reflection on one's own purpose in life includes living in line with ethical standards (Ryff and Singer 2008). This refers to *eudaimonic¹ well-being*, which is understood as a sub-dimension of mental well-being. Eudaimonic well-being has its origin in Aristotle's concept of *Eudaimonia*, which implies living in *"accordance with their daimon, or true self"* (Ryan and Deci 2001). Its counterpart is *hedonic well-being*, which is a state of the pleasure of mind and body (Atkinson et al. 2012; Kubovy 1999) in terms of the satisfaction of desires and the fulfilment of wishes (Ryff and Singer 2008, 14; Ryan and Deci 2001). Hedonic well-being refers to the concept of happiness and short-term emotional reactions (Delle Fave et al. 2011). Affects and emotional reactions by residents of a wetland on exposure to natural environment will be established in this study, thus emotional well-being and affective well-being are of special interest for this research.

¹ In accordance with the scientific literature, the Greek spelling of the word was chosen (Delle Fave et al. 2011; Ryan and Deci 2001; Ryff and Keyes 1995). Other spellings such as eudaemonia as the anglicised British version or eudemonia in American English are also in use.

Kahnemann & Deaton (2010) define emotional well-being as *“the emotional quality of an individual’s everyday experience — the frequency and intensity of experiences of joy, fascination, anxiety, sadness, anger, and affection that make one’s life pleasant or unpleasant”*. Similarly, Luhmann et al. (2012) describe affective well-being – in almost identical words - as *“the frequency and intensity of positive and negative emotions and mood”*. In this study, the terms of emotional and affective well-being are used synonymously.

1.3 KEY QUESTIONS AND AIM OF THE STUDY

Relatively few studies concerning mental well-being and wetlands in different cultural contexts have been performed. More research is required in terms of the support or impact of place-human-relationships on mental well-being, especially in developing countries. The protection of wetlands and the ecosystems’ impact on mental well-being are linked and become central in terms of the rapid and tremendous changes of nature in developing countries. This study, therefore, focuses on the following questions:

1. To what extent are inhabitants of wetlands under the conditions of poverty and low educational levels attached to the landscape?

1.1. How are inhabitants of Uganda emotionally connected to wetlands?

1.2. Which semantic meanings and symbolic characters does the environment have?

1.3. To what extent are social fabrics determined by the wetlands?

2. How does a wetland in Uganda influence the mental well-being of people who feel attached to this wetland?

2.1. Which supporters and which stressors of mental well-being does a wetland provide?

2.2. How is the current situation of the people’s well-being related to wetlands and how will the people’s mental health and well-being be influenced by changes in the use of the wetlands in the future?

3. How can knowledge about this human-environment-relation be integrated into a sustainable strategy of ecosystem management?

- 3.1. Can place attachment and related mental well-being contribute to an adequate management of wetlands?
- 3.2. How can mental well-being arising from wetlands contribute to programmes conserving nature and establish sustainable land uses?
- 3.3. How can individuals be motivated to support the establishment of long-term programmes of nature conservation and sustainable land uses?

Human-environment concepts shall be outlined in the scientific scope of *medical geography* in order to contribute to the understanding of societies in space. Medical geography is the scientific linkage of medicine and geography and focuses on the interface of human beings and their environment. The reciprocity of human-environment-relationship of wetlands with its residents shall be assessed.

The study aims to investigate meanings and values, which are attributed to wetlands and the understanding of the residents' perception of the landscape. It will be of central interest, which attributes of a wetland support the mental well-being of its residents. The case study of a wetland in Uganda exemplifies the importance of determining place-community-relationships and their information yield for designing an integrated ecosystem management.

The results of a quantitative study will be used to assess the attachment of residents to the wetland and the state of well-being, which is related to the ecosystem. Personal, social and environmental factors of the wetland will be investigated and their influence on place attachment and mental well-being assessed. Qualitative studies shed light on the sense of the wetland and its local meanings and detect conflict potentials and mental benefits. Furthermore, the qualitative research addresses local and political aspects.

1.4 STRUCTURE OF THE DISSERTATION

Chapter 2 outlines the theoretical background on the research topic. It explains the concepts applied to the study. A systematic literature on wetlands and mental well-being is provided, which shows the current state of research. Furthermore, the research area is outlined as well as methods applied in the study. Chapter 3 focuses on the impact of an exemplary wetland on mental well-being. The case study from Uganda focused on a certain wetland by the concept of therapeutical landscapes. The division of chapters of the case study presents discussed results on assessments at macro, meso and micro scale. Chapter 4 summarizes findings from the case study and outlines what the results can be used for. Chapter 5 provides concluding remarks.

2. WETLANDS' IMPACTS ON MENTAL WELL-BEING

2.1 THEORETICAL FRAMEWORK IN THE RESEARCH OF WELL-BEING AND WETLANDS

2.1.1 *Cultural and physical geographical conceptions of landscapes addressing mental aspects*

Wetlands are landscapes characterised by a special appearance and a unique sociology of plants and animals. Landscapes are also seen as representations of politics and ethics (Hinchliffe 2002) and their phenomena and changes embody specific developments political systems. Assessing the dialectic of tectonics and semiotics of a landscape requires researchers, and especially geographers, to be more experimental in order to develop "*progressive forms of inhabitation*" by practical engagement (Hinchliffe 2002). The separation of *tectonic* matter and *cultural* aspects of landscapes has been scrutinised in terms of the assessment of human-environment-relationship (Hinchliffe 2002; Wylie 2006).

The new scientific direction of feministic geography highlighted the role of the physical body in the relationship between people and places. Their emphasis was on the Cartesian separation of body and mind (Longhurst 1997). The physical reactions of the senses with the surrounding was made subject of discussion as well as the individual's consciousness of living in the body (Thrift 1999; Kazig 2013). The idea of embodiment became relevant in the analysis of human-environment-relationships (Wylie 2006; Lea 2008). Landscapes are perceived by the embodiment (Kazig 2013) of the body as physical material as well as of the predetermined mindset of cultural, societal and physical disposition. Landscapes are societal constructs receiving their meanings through conscious or unconscious perceptions (Ipsen 2006). This highlights the subjectivity of landscapes as perceived entities (Claßen 2016).

The landscape is a product of the everyday lives and the subjects' activities in a landscape. This includes activities with the landscape's materials as well as human interactivities (Rose 2002). The interaction between landscape and human beings generates a sense of coherence. The individuals' manner of acting provides insights into the representation of landscape in minds. Rose (2002) suggests that social processes rely on structures of sensory experiences and activities in landscapes. A landscape's change is considered as a dynamic process.

Geographies dealing with landscapes have discovered an emotional perspective to describe and assess landscapes (Wylie 2006). However, a landscape is not only what observers see, but also what they feel about these entities. The landscape is a construct of materialism and sensibilities (Wylie 2006) which are expressed in narratives with immanent topographies. The French philosopher Merleau-Ponty (1962) describes the perception of space by its depths. This includes not only the three-dimensionality of space but also the subjective perception of *being-in-depth* (Wylie 2006) as a purely individual experience of embodiment in space. He outlines that a person can be both subject and object in space. Subjects can perceive parts of their bodies as objects (Merleau-Ponty 1968). This reversibility influences and shifts the way of sensory experience. Wylie (2006) defines landscape as an emerging relationship between narratives and visual aesthetics and sensibilities predicated by cultural-historical patterns as well as materialities of immanent topographies.

Investigating the relationship of wetlands and psychological aspects of human beings refer to *reciprocal* concepts of people and places (Brandenburg and Carroll 1995; Altman and Low 2012). Places are special areas in a landscape containing individual or collective meanings. Relph (2008, 35f.) distinguishes landscape and places as follows:

Place is situated in space, but so is everything else, and place has no privileged relationship to space. Landscape also distinguishes places from space, for there is no landscape of space, and while landscape has a horizon, space does not. Landscape is an attribute of places and can prove a context for them, but it differs from place because it is expansive – it is drawn out to a horizon – whereas place always relates to the “place-world” of the body.

Places may be manifest in landscapes (Claßen 2016), while both are societal or individual constructions. Cresswell (2004) separates places from landscapes by the positions of the observer. Landscapes are extracts of spaces, which are perceived by an external perspective, while places are perceived by an internal view including personal experiences and living environments.

Perceiving the environment by neural processes, which are triggered by visual, acoustic, olfactory and sensual stimuli, results in the intrinsic representation of the environment in mind (Lengen and Kistemann 2012). Dewsbury (2015) enlarges this perspective by focusing on habits in landscapes by Deleuze's philosophy of thinking through habits. He says that tacitly knowledge of a body and mind is developed by habits in the landscape. Human beings learn from acting in their environment; for

example, which force is required to lift a small stone or which sensibility is required to step on a wet road (Dewsbury 2015). Relating to the shape and size of our body, we have experiences in landscapes and thus develop a very subjective unique practical intelligence. This perspective requires ethnographic data, since differences in cultural habits such as clothing, use of the landscape, social aspects and narratives are main drivers of the elaboration of tacit knowledge. Thus it is the landscape “*producing a certain kind of body*” (Dewsbury 2015, 41).

2.1.2 *Medical geography connecting wetlands and mental well-being*

The understanding of natural processes as well as physical aspects of wetlands requires an environmental scientific background. In contrast, the assessment of psychological aspects and psychosomatic outcomes needs a comprehension of medical as well as psychological phenomena and human pathogens, symptoms or diagnoses. These sciences often concentrate on diseases and illness as well as health impacts of the environment (Gatrell 2002). Therefore, finding the scientific overlap of both, wetlands and mental well-being, is not trivial.

The interdisciplinary approach of medical geography allows the view on human well-being and health in relation to the natural environment. Medical geography forms a link between geography, earth science and cartography on the one hand and medicine, health and psychology on the other hand. It applies geographical concepts, techniques and methods to medical research questions (Hunter 1974). This includes the time-spatial mapping of diseases, where geographical disease patterns are detected (Gatrell 2002). Medical geography discovers risk and preventive factors on human health, which are existent in the environment (Kistemann and Schweikart 2010). This *positivistic* research perspective of medical study designs was extended by aspects of cultural geographic science. Besides the pillars of healthcare and spread of diseases, medical geography assesses benefits from social and physical environments and constructions on human well-being and health. Social interactions, as well as social constructions of locations and places, are also emphasised (Gatrell 2002). Medical geography aims to establish human-environment-interactions and provides the necessary interdisciplinary approach to link medical and psychological aspects with physical and social environments.

The personal bonding to a place or a characteristic landscape like a wetland influences people's behaviour, their way of thinking, their course of life and moreover, the social fabric (Lengen and Kistemann 2012, 1162). A familiar place

triggers important feelings of an individual's mental well-being, such as being at home, feeling safe and happy. Positive sensual perceptions of landscapes (DeMiglio and Williams 2008, 17) evoke attraction or associations of good experiences. Visual incentives evoke mental refreshing (Völker 2016), as well as changes in mood and stress reduction (Ulrich et al. 1991; Hartig et al. 2003).

People emotionally bonded to a place have an interest and a special motivation to take care of that place, and are willing to take action to preserve it (Shamai 1991; Najafi and Kamal 2012). People who perceive special landscapes as positive due to, e.g., their green and colourful area (Barton and Pretty 2010) or their climate, are more likely to advocate for it. In contrast, people who are distracted by a landscape or associate it with bad experiences are less liable to act pro-environmentally and are less motivated to act for this environment's protection.

A people's appraisal of a wetland as place influences their pro-environmental behaviour and their will to protect these ecosystems. The motivation for conserving this wetland and the sustainable usage of this land results from a positive bond to the wetland. Thus a positive bond to wetlands may have a huge effect on the motivation of Ugandans to act for the wetland protection as required in the National Development Plan (NDP) (The Republic of Uganda 2010).

In this study, wetlands are understood as *landscapes* containing specific *places*. Landscapes are overlapping constructs linking physical spaces with anthropogenic imprinted places. In the scope of this research, wetlands will be examined as multi-layered landscapes (Kearns and Gesler 1998) and the reciprocal interaction between communities and individuals with the wetland will be investigated. The wetland will be regarded from different perspectives as a *therapeutic landscape* (Völker and Kistemann 2011; 2013; 2015; A. Williams 2002; Gesler 1992).

2.1.3 *Therapeutic landscapes as umbrella concept*

Therapeutic landscapes are places which have a physical, mental and spiritual healing character (Kearns and Gesler 1998). The concept of therapeutic landscapes "*provides a framework to assess health benefits*" of different ecosystems (Völker and Kistemann 2011, 456) and thus enriches the positivistic view on landscapes from medical science as physical entity and container of pathogens by a resource-orientated *salutogenic* perspective. It aims to assess health-promoting aspects of the surrounding. According to Antonovsky (1996), healing aspects of nature are dependent on the people's *sense of coherence* including aspects of meaningfulness,

manageability and comprehensibility. A sense of coherence emerges in an individual by understanding phenomena in its surrounding landscape (Lengen and Gebhard 2016; Hornberg 2016). In the course of a new cultural geography, Gesler (1992) expanded the concept of landscape from a *naturalistic* view to a *humanistic* and *structuralistic* perspective by combining environmental scientific concepts of nature and landscape with those from a social science and health.

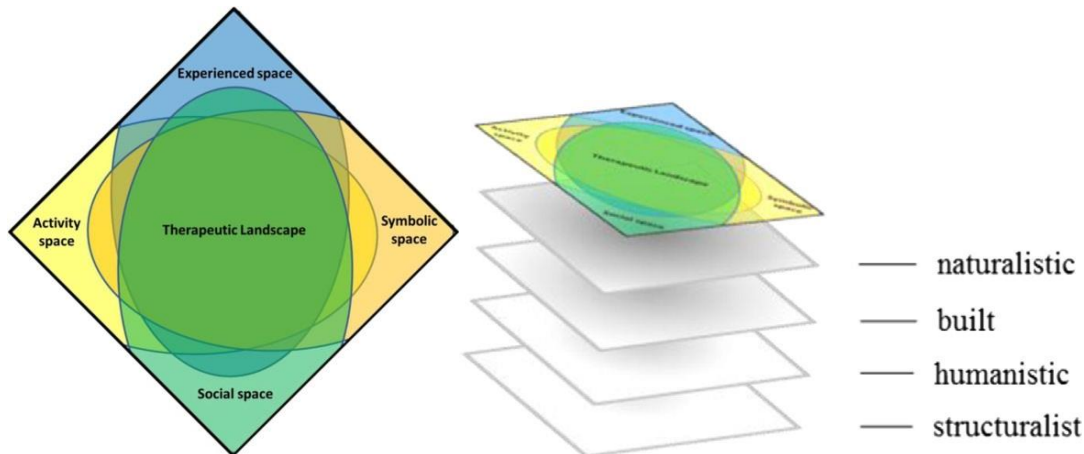


Figure 2.1-1: The concept of therapeutic landscapes (Völker and Kistemann 2015)

Völker and Kistemann (2011; 2013; 2015) operationalised the concept of therapeutic landscapes by the clarification of different dimension and layers. As shown in Figure 2.1-1, their visualization defines a therapeutic landscape as overlap of social, activity, experienced and symbolic spaces (Völker and Kistemann 2015; A. Williams 2002; Gesler 1992). This concept aspires a holistic view of landscapes and places including interactions between physical environment, societal construction and individual perception.

Wetlands as *naturalistic* spaces influence human beings both, directly and indirectly (Corvalan et al. 2005, 1). The provision of food and water ensures peoples' health and well-being and provides autonomy (Corvalan et al. 2005) and satisfaction to the wetland's residents. A wetland provides unique items, which hardly can be found somewhere else and generates a certain *dependence* on wetland users (see Chapter below). This includes the provision of water, food and other materials, as well as the existence of attractions in nature to perform leisure time activities (Shumaker and Stokols 1982, 158).

Direct health impacts in a pathogenetic sense can be expected from floods, mosquito bites and water-transmitted diseases. Impacts on mental well-being result from long-term consequences of wetland-related diseases or injuries. A disastrous flood may destroy assets of residents and cause injuries to people. While physical injuries

may heal quickly, mental disorders (e.g. post-traumatic reactions) may persist and become visible only months later. Losses of landscapes and changed places might be a source of “*psychoterratic distress*”, the so-called *solastalgia* (Albrecht et al. 2007). The concept of therapeutic landscape describes landscapes from human actions and bodily experiences in *non-human* spaces (Latour 2001; Hinchliffe 2002). The scientific clarification of e.g. species of animals as well as the detailed view of natural processes might be underrepresented in the concept.

The *structuralistic* perspective on landscapes refers to their partitioning in materials and territories (Gesler 1992). Wetlands consist of water and green areas in shore zones as well as swampy areas and thus are landscapes containing *blue* and *green spaces* (Völker and Kistemann 2011; Völker and Kistemann 2015). This composition of green and blue elements and borders (Lengen 2015; Kaplan and Kaplan 1989) forms the aesthetic appearance (Ulrich 1983) of the environment, which qualifies wetlands as more aesthetic than other landscapes. These landscape preferences, however, differ between ethnicities, cultures and knowledge (Kaplan and Kaplan 1989; Ulrich 1983). In the concept of therapeutic landscapes, the focus is on activities and experiences (Gesler 1992; Völker and Kistemann 2011) in nature. It overcomes this structural perspective on landscapes by the inclusion of humanistic constructions of the landscape. Nature has to be understood as an active contributor to therapeutic effects for the human body and embodiment (Lea 2008). Moreover, the author suggested an understanding of different aspects of landscapes as retreats, like the relation of oneself with nature.

Activities in landscapes influence the subjective experience as well as the individuals' feelings of being present in the landscape (Kazig 2013). Physical activity, as well as leisure time activities, spent in nature promote mental and physical well-being (Barton and Pretty 2010; Claßen 2016). In this course, wetlands as *activity space* are of interest. Spending time in nature, breathing in fresh air and seeing colours of nature may enhance good feelings and happiness. A landscape's health-promoting effect is based on the sensory and emotional experience (Völker and Kistemann 2013). Emotional bonding forms an *experienced space*. In close relationship with individual experiences in nature, the activities as such and the activity radius play a role in individuals' well-being. Here also the feeling of safety and being at home is included. The landscape as a place containing personal and collective experiences and providing space for activities (Völker and Kistemann 2015) receives same importance as the physical environment itself.

Underlining the importance of therapeutic landscape experiences, Conradson (2005) suggest the *self-landscape encounter*. The self-landscape incorporates the ecology of places which, in accordance with Thrift (1999), “frames a place as a rich constellation of human, non-human and material entities” as well as the *relational conception of the self* (Conradson 2005, 346). Here, the landscape is seen as a compilation of socially interwoven human and non-human life forms as well as material and immaterial entities. He outlines the importance of interaction and interrelation between the self and the landscape’s entities, which goes far beyond pure materialism by including emotional relations.

The *humanistic concept* of nature contains the individual access to the landscape as well as personal experiences and – sometimes culturally determined - symbolic meanings of landscapes. Humans shape landscapes in order to access resources. According to Gesler (1992) landscapes are shaped and created by cultural-social concepts as a supporter of human well-being. Wetlands, therefore, are “*personal, mental construct[s]*” (Kearns and Gesler 1998) conserving perceptions and memories of people (Twigger-Ross and Uzzell 1996). Wetlands in the study context are considered “*places as social and cultural category*” (A. Williams 1999). Each place contains semantic meanings, which is privileged on the social-cultural framework of the landscape as well as social and cultural values that emerge from the ecosystems. These meanings form a landscape-specific sense of place (A. Williams 1998). It is a *symbolic* layer of landscapes.

2.1.4 *Sense of place, place identity, and place dependence as subordinate concepts*

Wetlands as ecosystems are landscapes, which are attributed to meanings and cultural values having the potential to support mental well-being. In this context, their aesthetic appearance is important for cultural identity and support the development of a *sense of place* (Tuan 1977; Shamai 1991; Jorgensen and Stedman 2001; Lengen and Kistemann 2012; Relph 1976). The sense of place is “*the product of the relationship between people and places*” (DeMiglio and Williams 2008, 16), this involves emotional affects provoked by the place as well as the cognitive evaluation of the place. “*What begins as undifferentiated space becomes place as we get to know it better and endow it with value*” (Tuan 1977, 9).

The sense of a place influences the individual’s *place attachment*. The attachment to a place describes the intense emotional bond to places, which develops through

social relations and other interactions in a place (I Altman and Low 2012, 6ff). By growing up in a place one gathers personal memories, which are related to certain places. Thus personal experiences shaped by social relationships, friends and family members are directly associated with specific places (Hay 1998). Place attachment is a dynamic concept changing in a course of life (Chawla 1992). It changes in intensity and scale (Jack 2010, 92ff.) and is influenced by the feeling of safety (Kaplan and Kaplan 1989; Bowlby 1979) and freedom to act. Place attachment implies identification with a place.

Landscapes as places provide a collective and personal identity by narratives and emotional representations in minds (Lengen and Kistemann 2012). *Place identity* is part of the self-identity (Proshansky et al. 1983, 58f.), and it means the personal deep and complex bonding with a unique landscape or place (Relph 1976). Breakwell (1986) concept of identity sets distinctiveness and continuity of places and the individual's self-esteem as three pillars of identity. Here, places play a salient role in the people's identity. Personal experiences and events are emotionally linked to places and through revisiting these places, memories of the past are provoked (Twigger-Ross and Uzzell 1996). By their uniqueness and consistency in the provision of life-giving resources, Uganda's wetlands play an essential role in the residents' life. Wetlands represent part of their selves. Studies have shown that place identity acts as a mediator for place dependence and environmentally responsible behaviour (Vaske and Kobrin 2001, 20).

Place dependence is defined as a functional attachment to a place (D. Williams and Roggenbuck 1989). A serious evaluation of the provisioning ecosystem services as a source of well-being requires a detailed description of the external setting and the individual's life situation. The length of residence, migration movements, as well as the social embeddedness and the resources at the place are factors influencing the relationship between people and places and their well-being, accordingly. In the outlined research context, communities and individuals evolve meanings about wetlands and create places by interacting with and in the ecosystem. Residents of wetlands in developing countries might use their natural environment for agricultural purposes and leisure activities, and shape the landscape according to their needs. They equip it with tangible and intangible values (Relph 1976), which rely on cultural perceptions and social fabrics (Kaplan and Kaplan 1989, 56).

Landscapes consist of spaces of interactions between human and nature as well as social interactions (*social space*). Personal relationships with others commit people to places. Social interaction action triggers the identification (A. Williams 1999)

with places as well as support feelings of being home and safe. The human-place-relationship is dependent on a stakeholder's position and status as well as their relationship to other stakeholders of a landscape. Based on their function in the wetland, different stakeholders of a landscape may have different emotional and functional attachment to the environments (Kaplan and Kaplan 1989). Feelings of familiarity onsite and social coherence in a certain place may trigger the health-promoting character of the landscape. Therapeutic effects of a landscape are outcomes of a specific constellation in socio-ecological involvement (Conradson 2005).

The chosen scientific perspective has to be viewed critically concerning its scientific details. The concept of therapeutic landscapes is an overarching interdisciplinary concept and might lack conciseness of specific scientific perspectives at some points. For example, it does not address political systems through the view of political scientific concepts nor natural aspects of environmental scientific conciseness. Nevertheless, Gesler's concept of therapeutic landscapes does not merely address landscape as social construction (Lea 2008); it reflects also on a landscape as a natural, a built, a humanistic and a structuralistic entity (Gesler 1992).

The strength of the concept is its assessment of landscape by the individuals' physical and emotional actions and by this allows conclusions on landscapes as humanistic, naturalistic, built and structuralistic construction. The human-centrist perspective, which is adapted from epidemiological sciences, is chosen for the study. The landscape is regarded through the eye of individuals, their experiences in and with the landscape are outlined and provide information about therapeutic effects in the wetland. Against Leas (2008) approach, this study is based on in the assumption that neither social-cultural nor natural aspects are predominant in the relationship between human beings and nature. Both aspects cannot be regarded separately from the assessment of the therapeutic character of landscapes for an individual human being, since social-cultural assignment and built or natural environmental setting are crucial parts of everyone's life and the way individuals experience and evaluate landscape (Gatrell 2002). This approach refers to a *post-structuralistic* perspective, which Völker and Kistemann (2011) have added to the concept of therapeutic landscapes.

By using the concept of therapeutic landscapes, this individual perspective is conceptualised and separated in different aspects of individuals living in the wetland. Each of the four spaces has the same importance. The strength of this

individual perspective addresses reflections of several scientists on being incorporated by another body, which means a living in a different world (Hayles 1995; Conradson 2005; Lea 2008). Therapeutic aspects of a landscape are highly individual and might be hardly generalizable. The landscape is the continuous reinterpretation of an assemblage of material and immaterial entities and human and non-human relations. It might therefore be difficult to generate general conclusions on the results of one study on therapeutic landscapes, which illustrates the need for more research on landscapes and their therapeutic effects. The outlined study aspires to apply the concept of therapeutic landscapes in a region, where inhabitants are highly connected to nature (Hinchliffe 2002).

The impact of wetlands on mental well-being highly depends on the quality of the individual's relationship with the landscape and the use of provisioning ecosystem services. Wetland users physically rely on the ecosystem. In this context *insiders*, who are rooted in the place and have a deep sense of place, can be distinguished from *outsiders*, who have neither knowledge nor any emotional bonding to the place (Relph 1976). Rowles (1983) differs between *physical*, *social* and *biographical insideness* to outline different qualities of people-place-relationships. Scales of sense of place range from "not having any sense of place to a deep commitment towards a place" (Shamai 1991), which might be helpful to understand responses to different places and individual action patterns.

2.2 THE CURRENT STATE OF KNOWLEDGE OF WETLANDS AND MENTAL WELL-BEING

2.2.1 *Methods of the systematic scientific review*

In order to gain an overview of the scientific research on wetlands as landscapes promoting mental well-being, a systematic literature review was carried out. Three electronic literature databases (Science Direct², PubMed³, and Web of Science⁴) were reviewed for English and German literature on the topic of wetlands and the different types of well-being. A combination of keywords as described in Table 2.2-1 served as research filter. All combinations also were inserted with a different spelling of well-being, like "wellbeing" as well.

² <http://www.sciencedirect.com/>

³ <https://www.ncbi.nlm.nih.gov/pubmed/>

⁴ <http://apps.webofknowledge.com/>

In a first step, the abstracts were scanned and selected according to their relation to wetlands. If this was the case, the abstracts were scanned for those types of well-being, which are related to the individual's mind and emotions. Human-centrist studies on ecosystem services, as well as case studies from wetlands were included in the review process.

Table 2.2-1: Amount of articles of literature database

Keywords / phrase			Science direct	Pub med	Web of Science	Total
	Subjective		5/36	0/0	0/0	5/36
	Psychological		8/45	0/0	0/0	8/45
	Mental		6/28	0/1	0/0	6/29
Wetland	Emotional	AND	2/9	1/1	1/1	4/11
AND	Affective	Well-being	0/0	0/0	0/0	0/0
	Hedonic		0/0	0/0	0/0	0/0
	Eudaimonic		0/0	0/0	0/0	0/0
	Total		21/118	1/2	1/1	23/121
Selected articles/total amount of articles provided by the database						

Additionally, the salutogenic support of wetlands and ecosystem services on mental health and well-being, quantitative and qualitative studies, commentaries, and reviews were set as autoptic inclusion criteria. All other types of well-being, like e.g. economic, social, environmental etc. were excluded from the study. Besides the exclusion criteria, other autoptic criteria were defined. Thus pathogenic impacts of water and wetlands on human health or human beings as well as studies on medical plants, healing methods for specific physical diseases, and indoor studies were excluded (see Figure 2.2-1).

Applying all steps and inclusion criteria, 23 publications out of a literature sample of 121 publications were included in the review process. The oldest article was published in 1995; however, the main body of literature came up only at the beginning of the current decade. All articles were inserted into the Table 2.2-2 and Table 2.2-3 showing the type of the study, methods applied, the location of the study, as well as which types of well-being, has been addressed.

By reading all papers, the tables were expanded by human-environmental-concepts, such as e.g. the sense of a place or place identity, which were discussed in the reviewed literature. Furthermore, the application of quality of life (QOL) as well as satisfaction with life (SWL), both operationalised evaluation tools of the environment, were tracked. Excerpts from the reviewed literature were thematically

organised and discussed under different aspects. In the body of literature psychological, emotional and mental well-being were used synonymously as the state of mental health.

In the following, mental well-being was used as a term including psychological and emotional well-being. Besides the psychological aspects of happiness and life satisfaction, subjective well-being was also connotated with economic well-being and therefore used separately

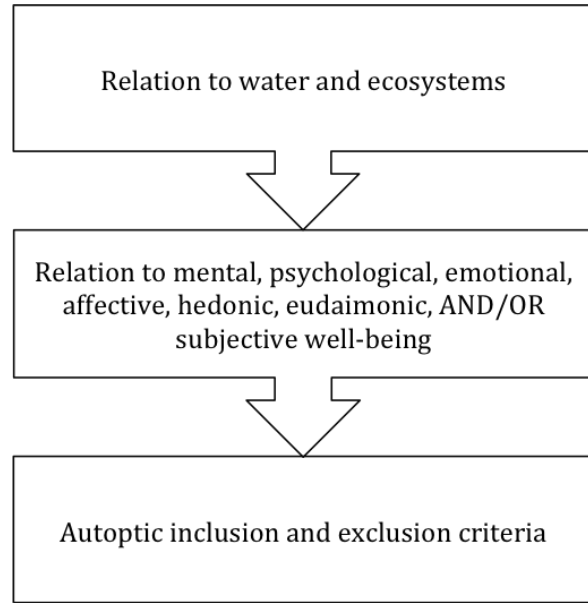


Figure 2.2-1: Stepwise review process

2.2.2 *Wetlands as landscapes of happiness and identification*

Exposure to nature is often associated with good mental health and happiness (Alcock et al. 2015; MacKerron and Mourato 2013). The exposition has mental benefits in terms of psycho-physiological restoration as well as the decreased perception of stress, anger, depression and sadness (White et al. 2013) while energy increases (Douglas 2012). The exposure to nature provokes affects, which occur spontaneously and intuitively and also without conscious knowledge about the impact. Mental benefits also occur after the exclusion of socio-economic confounders and the status of health (Alcock et al. 2015, 43; MacKerron and Mourato 2013). The wetlands' evaluation, however, is a product of cognition (Butler and Hanna 2013).

Wetlands, together with other types of landscapes, are perceived as *happier locations* than urban areas (MacKerron and Mourato 2013; Kopmann and Rehdanz 2013), however, wetlands cannot be assigned to a specific state of mental well-being (Alcock et al. 2015; MacKerron and Mourato 2013). There is a hierarchy in the intensity of feeling relaxation in dependence on the type of landscape. Marine and coastal areas are associated with the highest scores of happiness and well-being (MacKerron and Mourato 2013). Coastal areas are strongly associated with restoration, while the intensity of this feeling is lower in rural areas and countrysides. Lowest levels of relaxation are perceived in urban green areas (White et al. 2013). In terms of recreation demand, people prefer manifold landscapes, like

wetlands, containing bodies of water, shorelines, but also many colours (Peña et al. 2015, 6) and borders (Lengen 2015).

Broad views on and into the water, which are associated with fresh air and deep breathing, trigger feelings of freedom and purity (Völker & Kistemann 2015). The authors demonstrated that *“the water acts as an important element of emotional attachment to the place, which sometimes evokes strong emotions and awakens ‘creative’ or ‘spiritual’ thoughts”*. Due to their properties, appearances, simplicities, and semantic meanings, bodies of water support the formation of identity (Völker and Kistemann 2015).

The individual evaluation of a wetland depends on the use since it can be *passive*, i.e. only based on visual impressions, or based on a *consumptive* use, which refers to services and material received from nature (Martinez-Juarez et al. 2015). Provisioning ecosystem services are supporters for mental and subjective well-being including the provision of jobs as well as the decrease of illnesses, which boost the quality of life and the satisfaction with life (Mononen et al. 2016; Horwitz et al. 2012) and so does biodiversity (Sandifer et al. 2015). Additionally, biodiversity is stated as a source of happiness and improved moods and mental well-being (Kuřová et al. 2008; Fuller et al. 2007).

In high-income countries, provisioning services play a subordinate role in the people's quality of life. Here the ecological status of the ecosystem is ranked as more important than income opportunities raising from the wetland (Stoeckl et al. 2014). Especially in more nature-based societies of developing countries, provisioning ecosystem services sustain peoples livelihood and their welfare, which closely influence mental well-being in a consequence. For example, in societies depending on external water sources, women as caretakers for water supply often struggle with their conscience, since they know about the water quality and even if it is bad they are obliged to take the unsafe water for their families (Sultana 2011). Due to the lack of alternative water sources, they have no access to safe drinking water. Knowing that the water may be contaminated with pathogens, they put their families at risk and if one member of the family gets sick, they may accuse themselves (Kevany and Huisinĝh 2013). The restricted access to ecosystem services or water insecurity impact mental health and may affect the physical well-being.

Table 2.2-2: Findings from literature review and key aspects of the content I

Literature Database Outcome				Type of Well-being						Place Concepts					Others		
Publication	Study Design	Location*	Methods	Psychological	Subjective	Emotional	Mental	Eudaimonic	Hedonic	Sense of Place	Place Attachment	Place Identity	Place Dependence	Biophilia	Solastalgia	QoL	SWL
1 Alcock et al. (2015)	Quantitative Study	GBR	Survey; GIS classification	(X)							(X)						
2 Belton (2016)	Case Study	BGD	Mixed- methods approach		X	X							X				
3 Butler & Hanna (2013)	Book Chapter	-	Ecosystems, Biodiversity, Climate and Health	X													
4 Cottet et al. (2013)	Quantitative Case Study	FRA	Photo-questionnaire survey; ANOVA	X		X	X						X				
5 Douglas (2012)	Commentary	AFR; USA; ASI	Providing examples	X			X										X
6 Douglas et al. (2016)	Case Study	AUS	Mixed-methods approach	X		X							X				
7 Horwitz et al. (2001)	Commentary	AUS	Providing examples	X		X				X	X	X					
8 Kevany & Huisinigh (2013)	Review	-	Women's empowerment in water management	X!			X						X				
9 Kopmann & Rehdanz (2013)	Quantitative Study	EUR	Data from surveys in region-based model	(X)	X				(X)		X						X
10 Kumar & Kumar (2008)	Commentary	-	Psychological perspective on ESS evaluation	X		X	X	(X)	(X)			X					X
11 Kusová et al. (2008)	Case Study	CZE	Mixed-methods approach		X		X			X	X						X
12 MacKerron & Mourato (2013)	Quantitative Study	GBR	Smartphone-based survey with GIS data	X	X	X	X	X	X								X X

*All country codes according to ISO 3166-1 Alpha-3; X = mentioned; (X) = indirectly mentioned

Table 2.2-3: Findings from Literature review and key aspects of the content II

Literature Database Outcome				Type of Well-being					Place Concepts				Others				
Publication	Study Design	Location*	Methods	Psychological	Subjective	Emotional	Mental	Eudaimonic	Hedonic	Sense of Place	Place Attachment	Place Identity	Place Dependence	Biophilia	Solastalgia	QoL	SWL
13 Martinez-Juarez et al. (2015)	Review		MEA approach	X			X										
14 Martín-López et al. (2007)	Quantitative Case Study	ESP	Survey; ANOVA; Cluster analysis	X				(X)	(X)			X		X			
15 Mononen et al. (2015)	Qualitative study	FIN	CICES cascade model	(X)								X				(X)	
16 Pena et al. (2015)	Quantitative Study	ESP	Photo-questionnaire survey; PCA	(X)						(X)	X	X					
17 Rosenberg et al. (1995)	Qualitative Case Study	CAN	Providing examples	X			X							X			
18 Sandifer et al. (2015)	Review	-	Knowledge about biodiversity and well-being	X		X	X					X	X			X	
19 Silver & Grek-Martin (2015)	Case Study	CAN	Mixed-methods approach	X			X			X!	X	X	X		X	X	
20 Smith et al. (2013)	Review	-	Different well-being scales in relation to environment	X	X					X				X		X	X
21 Stoeckl et al. (2014)	Quantitative Case Study	AUS	Survey, PCA, Wilcoxon test		X											X	X
22 Völker & Kistemann (2015)	Qualitative Case Study	DEU	Semi-standardised interviews in blue space			X	X			X	X	X				X	
23 White et al. (2013)	Quantitative study	GBR	Survey, multiple regression			X											

*All country codes according to ISO 3166-1 Alpha-3; X = mentioned; (X) = indirectly mentioned

Wetlands provide economic independence, which is important for the freedom of choice (Smith et al. 2013). This defines Ryff (1989) as a key indicator of mental well-being. The comparison of the studies of Kevany and Huisinigh (2013) focusing on mental well-being in wetlands of developing countries and Stoeckl et al. (2014) investigating aspects of mental well-being in wetlands of high-income countries shows the importance of considering external economic as well as social factors when investigating wetlands as a source of well-being. Regarding the interdependence of humans and ecosystems requires the consideration of cultural, social, economic and political aspects (Stoeckl et al. 2014; Smith et al. 2013).

Cottet et al. (2013) showed the interplay of emotion and cognition in the aesthetic evaluation of wetlands. The researchers investigated how laypersons in contrast to wetland experts perceived values and ecological functions of a wetland. For both laypersons and experts, the aesthetic appearance of a wetland is connected with emotions. Wetlands, which are perceived as pristine and tidy, arouse a broad range of positive feelings, like happiness, cheerfulness and ease. Polluted environments and obviously invasive uses of wetlands are perceived as unclean, not attractive, disgusting and risky (Cottet et al. 2013). Considering the verbal description of the environment, laypersons use a more emotional wording while experts refer to cognition. Based on their knowledge, experts attribute a higher status of ecological health to bodies of water with a low trophic status. On the contrary, laypersons mainly evaluate the status of a wetland's health only on basis of aesthetical values (Cottet et al. 2013). The aesthetic evaluation of landscapes underlies psychological and socio-economical aspects, which *"can be site-specific, based on local geographic and cultural characteristics, moral convictions, life experience, and use and non-use of particular areas"* (Peña et al. 2015). In this context, land use management and the impact on naturalness play an important role in mental aspects (Peña et al. 2015). By discussing concepts of biophilia according to Wilson (1984), Smith et al. (2013) state, that the emotional link to nature enhances well-being relating to physical, mental and cultural aspects and ensures *cultural fulfilment*.

A wetland with its typical natural sites and bodies of water attaches people emotionally and provides symbols, physical elements and settings contributing to the people's identity (Horwitz et al. 2001). Wetlands are seen as cultural heritage, which creates a cultural and collective identity. Cultural and cultural *enriching* services of ecosystems have been assigned to benefits for the mental well-being (Butler and Hanna 2013; Mononen et al. 2016; Horwitz et al. 2012). Wetlands contain a high biodiversity as well as a local-specific flora and fauna, which makes them to preferred landscapes for recreational purposes (Peña et al. 2015).

Time spent in wetlands results in the identification with this type of landscape (Sandifer et al. 2015; Peña et al. 2015; White et al. 2013).

Ecological identity is developed from this identification with nature as well as *self-identification* and from psycho-educational processes. Ecological identity also influences our idiosyncratic sense of ethics, social norms and morality (Kumar and Kumar 2008), which addresses eudaimonic well-being, and finally, humans' current action and future planning on basis of the natural environment. Kumar & Kumar (2008) suggest that "*ecological identity in the case of valuation of ecosystem services becomes one of the many indices to be understood and explored for better understanding*".

The rapid or successive transformation of a wetland results in multiple losses and harm of mental well-being (Silver and Grek-Martin 2015; Horwitz et al. 2001; Rosenberg et al. 1995). The degradation of wetlands, especially after natural disasters, might cause intense feelings of "*grief, loss, guilt, frustration, uncertainty, and disbelief*", which might result in acute stress reactions (ICD-10⁵). Besides health risks, which influence the human psyche (Horwitz and Finlayson 2011; Rosenberg et al. 1995), irritations occur due to the inconsistency of the landscape and destruction of the accustomed environment. Wetland-related jobs, as well as opportunities to spent time on-site, are lost and thus are perceived as a *discontinuity* in space (Silver and Grek-Martin 2015). Furthermore, the loss of symbols and collective meanings results in a physical and mental disconnection to the environments and finally in a loss of home and identity.

The phase of deconstruction and destruction of wetlands and its symbolic and individual meanings is followed by a phase of reorientation (Silver and Grek-Martin 2015). Reorientation means a long-term recovery process, which may help people to adjust to the changing environment and to form new symbols and meanings of a place. Thus, redefining symbolic and semantic meanings of a place might help after natural disasters. Furthermore, the joint loss, reconstruction or reorientation of a place may go along with social coherence causing "*intense feelings of togetherness, purpose, and identity that arouse from experience of shared suffering*" (Silver and Grek-Martin 2015). As a consequence, the landscape supports the psychological healing and well-being of attached people.

⁵ <http://www.who.int/classifications/icd/en/>

A reconstruction of a changed environment not only refers to the reorientation in the physical environment, but also to a reshaping of a whole society with new value systems. In an example of the Hudson Bay, which was intended to be used for hydro-electricity projects (Rosenberg et al. 1995), relocation and resettlements of local tribes affected traditional housing and caused social tension. Additionally, environmental encroachment destroyed traditional territories and caused social impacts. Harvest disruption occurred as a consequence of lower water levels and challenging circumstances. The consequences of the environmental changes and social fabrics affect all scopes of life.

Another case study in Bangladesh showed the ambiguity of changes in the environment (Belton 2016). Here, the agrarian change from paddy-dominated subsistence agriculture to commercial aquaculture in two Bangladeshi wetlands resulted in very different perceptions concerning the subjective and social well-being of residents. The change of the environment caused a transformation of the whole cultural and socio-economical system. Neither the access to resources nor the income classes were the same anymore (Belton 2016). In the outlined cultural context, growing rice is central to the constitution of well-being. Due to the newly gained ability to grow rice, the transition resulted in better food security, higher incomes as well as an equal distribution of resources and finally, the enhancement of subjective well-being. This was, however, only the case in one of both villages. In the other village, the same transitional process caused food insecurity as a consequence of losing the variety of agricultural products (Belton 2016) and power asymmetries, which contributed to a failed leading of the collective land management. Thus the majority of residents perceived a negative impact on their subjective well-being due to the loss of economic independence and self-reliance. The changed agricultural system made them dependent on anthropogenic external factors like market prices and access to markets, which they could not influence or foresee and made planning for the future impossible. Feelings of anxiety and uneasiness popped up together with anger about the injustice of the system (Belton 2016).

Same place-making activities can be healing for one community and mean damage of symbols and meanings of a place and a destruction of social values for another. The attachment to a wetland as well the attribution with tangible and intangible values always depends on the perspective and user groups of the landscape (Stoeckl et al. 2014; Horwitz 2001). There is evidence on the positive effects of the exposure to landscapes, however, it cannot be assumed that these interactions between human beings and nature are pervasive and rigid. They rather are small-scaled and dynamic (Martinez-Juarez et al. 2015).

A central aspect to consider is the *reciprocity* of human beings and ecosystems. Reciprocal approaches detect patterns of motivations, emotional episodes and economic decision-making (Kumar and Kumar 2008, 813). Reconciling nature protection activities and the use of wetlands contains potential conflicts. An example Kušová et al. (2008) showed that residents of a biosphere reserve in the Czech Republic were negatively influenced in their quality of life due to the legislative framework, which impacted their socio-economic development. Their quality of life could not be fostered by the fact that they lived in an intact nature side.

Different stakeholders, like the government, professional environmentalists, as well as residents, may have different interests, preferences and perspectives on conservation and place-making activities (Horwitz 2001; Martín-López et al. 2007; Cottet 2013). Environmental professionals are motivated by eudaimonic aspects for the conservation of nature-based ecosystems, e.g. providing living space for all kinds of life and/or keeping the earth healthy in order to hand it over to future generations. Wetland users in nature-based societies rely on the ecosystems functions, which they use for their livelihood (Martín-López et al. 2007). A dialogue between laypersons and experts on management plans suggests an empathetic management in order to integrate cognitions and emotions into the process of elaborating a strategic management concept (Cottet et al. 2013). Nevertheless, emotions are seen as critical in the development of sustainable management plans, due to their high dynamic and the need for interdisciplinary perspectives.

In a study applying mental modelling for farmers' decision-making processes about irrigation schemes in Australia, Douglas et al. (2016) showed that emotional factors and the state of emotional well-being were highly discussed topics and influenced the farmers' decisions and their appetite for risky choices. The farmers tend to take decisions on basis of emotions. Even though retrospectively these emotion-led decisions not always resulted in the best choices, they classified those emotional decisions as inevitable (Douglas et al. 2016). In a long-term perspective, the perceived risk in terms of uncertainty was influenced by the farmers' well-being.

Men experience a landscape in a different manner than women. At least marine and coastal margins have a greater effect on the women's well-being than on the men's (MacKerron and Mourato 2013). Gender-related perceptions of wetlands result in different landscapes preferences of women compared to men. A gender-related evaluation of certain elements or the whole scenery of a wetland is required for decision-making on management plans. The engagement of women into leaderships in water management and other decision-making processes enhances their mental well-being (Kevany and Huisingsh 2013).

Besides emotional and social aspects, environmental decision-making contains economic aspects. Kopman & Rehdanz (2013) assessed the marginal willingness to pay for conservation activities by a model including landscape preferences and land cover types. Central Europeans were willing to pay a minimum of 0.03 € per increased km² of a natural forest, while they were willing to pay a minimum of 69.96 € per increased km² of a wetland. The mean of the marginal willingness to pay per increased km² of any landscape was 5.40 €. Besides the aesthetical appearance and biodiversity of wetlands, the researchers argued that this result refers to the limited and scarce availability of wetlands in Central Europe (Kopmann and Rehdanz 2013). A need for an environmental ethical advocacy, as well as the need to stretch the topic on environmental education policies, has been demanded (Martín-López et al. 2007). Horwitz et al. (2001) point out the concept of *sense of place* as an applicable baseline to determine reciprocal effects of health and well-being and nature conservation. A sense of place contributes to the elaboration of policies and strategies (Horwitz et al. 2001).

2.2.3 Focus on the recreational value of wetlands in Western countries

Wetlands provide ecosystem services, which influence the mental and subjective well-being. The influences of a wetland on the human psyche, however, are highly complex and need to be considered in dependence on social, economic, and political factors (Stoeckl et al. 2014; Smith et al. 2013). Different wetland uses result in different evaluations of the ecosystem (Martinez-Juarez et al. 2015). The attachment to a wetland distinguishes people-place relationships in low-income countries from high-income countries.

In high-income countries, people appreciate the wetland as a place for relaxation. Exposure to nature and especially water provides calmness and happiness, thus wetlands are associated with good feelings (Alcock et al. 2015; MacKerron and Mourato 2013; Ulrich 1983; Völker and Kistemann 2015; Kopmann and Rehdanz 2013). Landscapes with a high biodiversity, water and green areas are preferred (Peña et al. 2015). In low-income countries and rather nature-based communities people are more dependent on provisioning ecosystem services (Kevany and Huisingsh 2013). However, there is a lack of research on the human-wetland relationship in low-income countries.

A wetland contains elements for identification, which emotionally and cognitively attach people to the place (Horwitz 2001). Damages and losses of wetlands may have a strong impact on people's mental well-being, since losses of important places may result in sadness, despair and disorientation (Silver and Grek-Martin 2015).

However, a subsequent reorientation in the place and joint place-making activities may be healing (Silver and Grek-Martin 2015). Impacts of places on the mental well-being, however, are highly variable. Changes of the environment may be good for one community, but a harm for another (Belton 2016). Differences in the perception of a wetland also appear between gender and different user types of the ecosystem (Stoeckl et al. 2014; Horwitz 2001). The impacts of wetlands on mental well-being depend on the different interests and on stakeholders and their emotional relationship with the place (Horwitz 2001; Martín-López et al. 2007; Cottet 2013). The attachment of different user types of a wetland, however, is poorly investigated, yet, and requires more research activity. The reciprocal connection between human beings and wetlands might be a motivator for economic and pro-environmental decision-making and may help to elaborate policies on the ecosystems (Kumar and Kumar 2008, 813; Horwitz et al. 2001).

Literature provides evidence on wetlands affecting mental and subjective well-being. Especially, provisioning and cultural ecosystem services have been taken into account. The provision of semantics and identity is a soft ecosystem service and therefore declared as abstract (Mononen et al. 2016).

Supporting and regulating ecosystem services, such as climatic and hydrological aspects of wetlands for mental well-being need to be extended in the scientific context. Wetlands' impacts on mental well-being have often been reduced to their aesthetic appearance and functions in terms of relaxation. Other aspects of perceptions have hardly been taken into account, yet. More research on the emotional evaluation of wetlands is required in order to broaden and clarify their meanings and their symbolic character in different cultural and social settings.

2.3 A WETLAND IN UGANDA AS RESEARCH AREA

2.3.1 Country profile of Uganda

The Republic of Uganda is a landlocked country located in the heart of East Africa (see Figure 2.3-1). Lake Victoria sets borders in the south, the Republic of Kenya in the east, and the United Republic of Tanzania in the southern part. Further landlocked neighbouring countries are the Republic of Rwanda in the southwest as well as the Democratic Republic of the Congo (DRC) in the west.

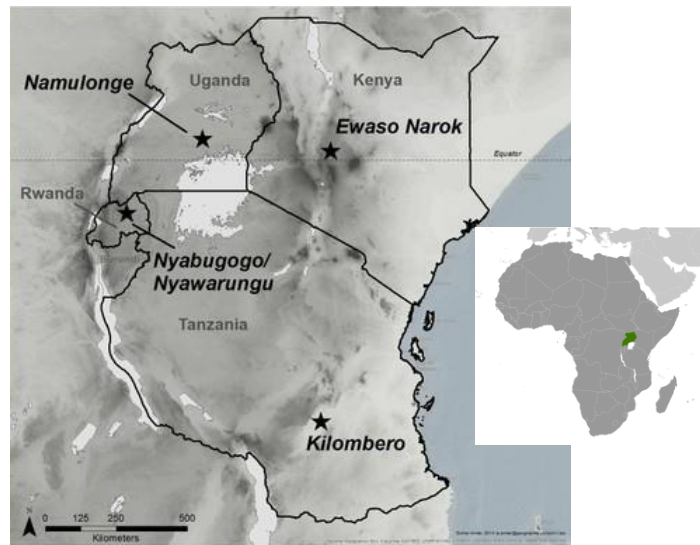


Figure 2.3-1: Location of Uganda⁶

The western part of Uganda is framed by Lake Albert, Lake Edward, and a number of other smaller lakes, which form geographical borders with the DRC and Rwanda. These lakes are surrounded by numerous national parks stretching along the whole western border region, until the border to the Republic of South Sudan closes. Uganda's total land area of 241,551 km² contains various lakes and wetlands. An estimated 17% (41,743 km²) of the area is covered by open water and swamps (see Figure 2.3-2), while 199,807 km² is land area (UBOS 2012, xiv). The water system is part of the upper White Nile system. Rivers from the highlands of Rwanda and Burundi, as well as various river streams from Tanzania and Kenya supply water to Lake Victoria (Nile Basin Initiative 2013). Nearby the city Jinja, located in the wider shore zones of Lake Victoria, the Victoria Nile river leaves the Lake Victoria and flow in direction of the northern border and South Sudan. The Victoria Nile supplies many bodies of water and wetlands in Uganda. The most prominent inland body of water is Lake Kyoga in the central area of a lake plateau.

In addition to the lakes, Uganda is located within a grid of wetlands dominating the central, eastern, and western part of the country. In 2005, 4,841 km² of the country were covered by seasonally or permanently flooded wetlands (UBOS 2012, 1).

⁶ <https://www.cia.gov/library/publications/the-world-factbook/geos/ug.html>
<https://www.wetlands-africa.uni-bonn.de/>
 Research areas focused in the GlobE research project.

Uganda is part of the East African Rift valley. The lowest point is 620 m high at Lake Albert, while the highest elevation is Mount Rwenzori (5,110 m) (UBOS 2012, xiv).

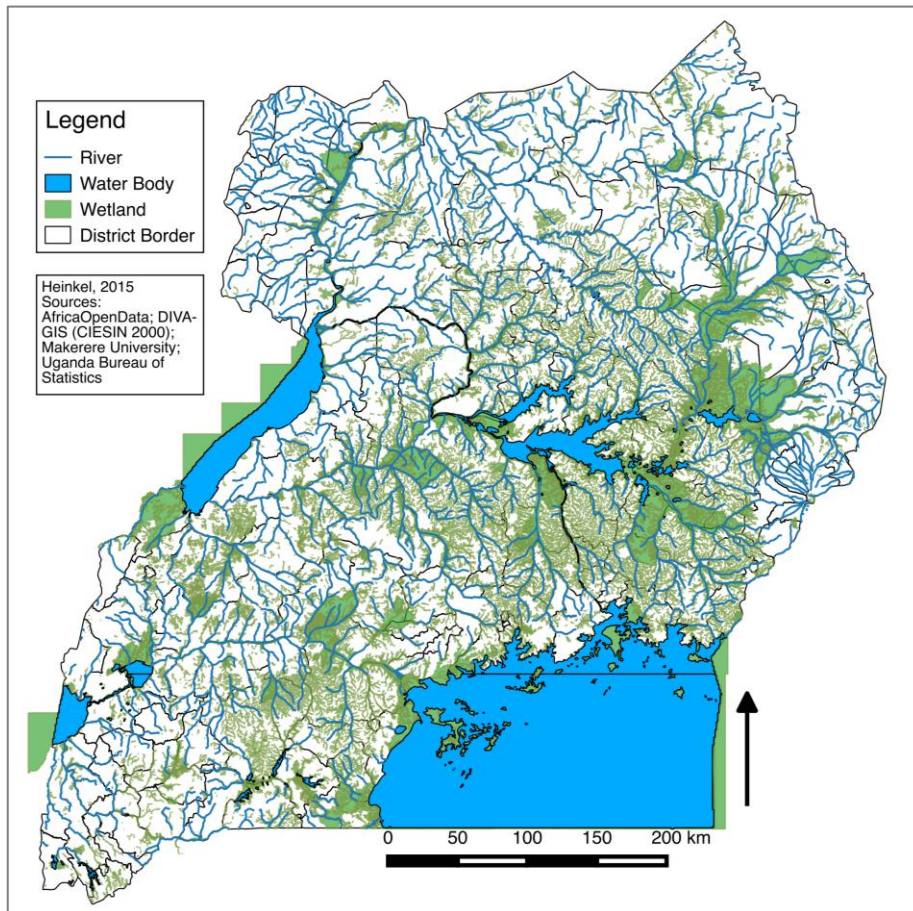


Figure 2.3-2: Water bodies and wetlands in Uganda

The variation in altitude influences the climate in the regions, thus the annual mean temperature ranges from 16°C in the southwestern regions up to 30°C in the northern region (AWE Air Water Earth Ltd. 2015, 10). The capital Kampala has an annual mean temperature of 17°C⁷. During the year, maximum temperatures are expected in January and February and with minimum temperatures experienced in July and August (UBOS 2012).

There is a high geographical and seasonal variance in Uganda (see Figure 2.3-3). The regions within two degrees around the equator are relatively constant in their annual humidity (UBOS 2012), experiencing two rainy seasons from March to May and September to November. By contrast, the northern region has only one rainy season from March to November (AWE Air Water Earth Ltd. 2015).

⁷ <http://www.gov.ug/> (accessed 3 April 2017)

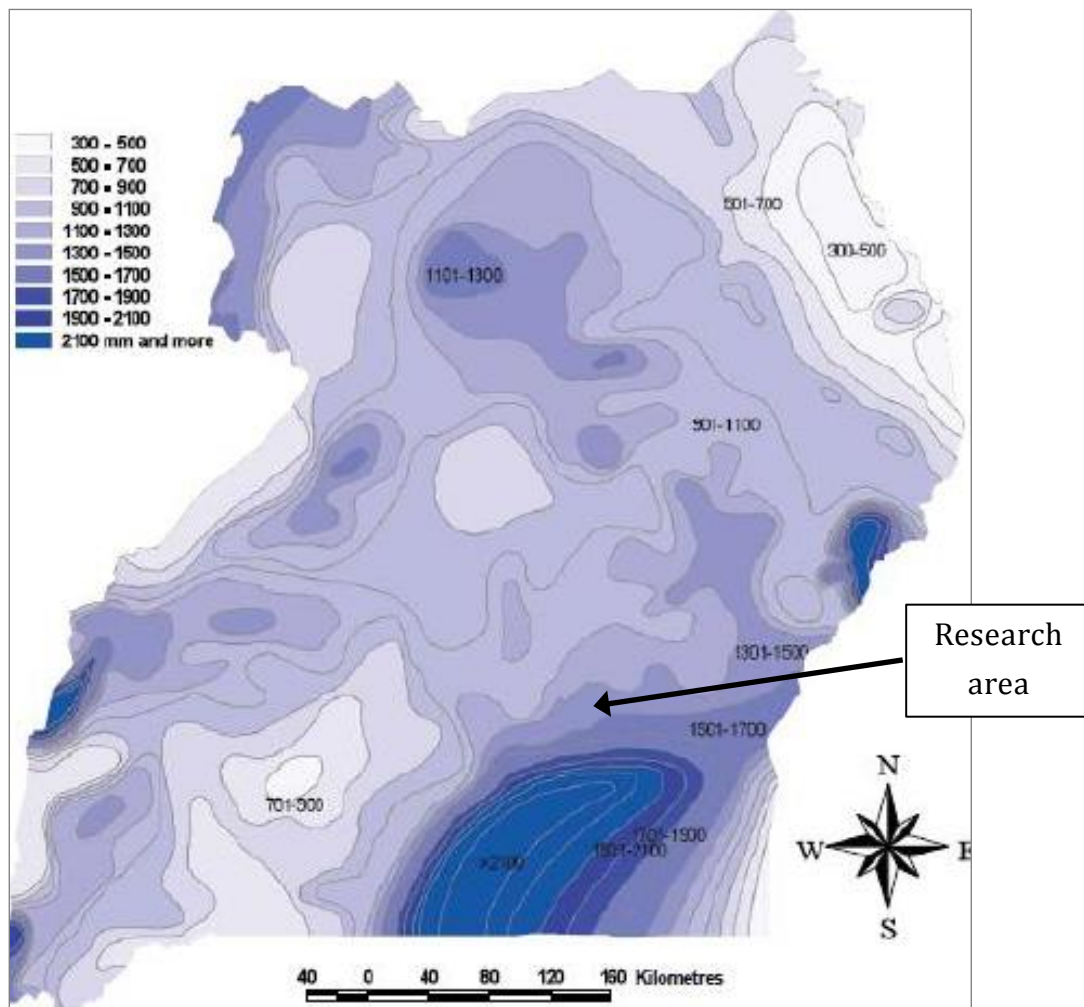


Figure 2.3-3: Rainfall map of Uganda(AWE Air Water Earth Ltd. 2015)

The starting and ending dates of these seasons may vary locally by geography (UBOS 2012, 5). The major areas of Uganda receive an annual rainfall of 750 mm to >2,100 mm (AWE Air Water Earth Ltd. 2015). As a result of the rainfall rates and the high humidity, the natural vegetation of Uganda consists mainly of highland tropical rainforest. The natural vegetation, however, is rapidly diminishing. In the years from 1990 to 2015, the forest area has reduced from 24% of the land area to 10% forest area⁸.

This changing environment is a consequence of the rapidly increasing population in Uganda. Today, the total population is estimated at 35 million persons up from estimated 17 million persons in 1991 (UBOS 2016). From 1991 to 2002 the population growth rate was 3.2% and decreased between 2002 to 2014 to 3%. Already *“Uganda has one of the world’s youngest populations, half of them under the*

age of 15 years"⁸. The Uganda Bureau of Statistics (UBOS) projects the population to approach 46 million persons in 2025 (UBOS 2014, 16), all of whom will require food, water and shelter.

Table 2.3-1: Uganda in numbers

Country profile of Uganda	
Total Population	34.9 million
Female Population	17.9 million
Male Population	16.9 million
Urban Population	6.4 million
Annual Population Growth Rate 2002-2014	3 %
Population of Kampala City	1.5 million
Population < 18 Years (2015 projected)	56.7 %
Population > 60 (2015 est.)	4.2 %
Population Density	174 persons/km ²
Infant Mortality Rate	54 per 1000
Life Expectancy at birth (UN DESA 2015)	58.5 years
Population per Physician ⁷	18,575
Gini Index ⁸	44.5
If not otherwise identified source: (UBOS 2016)	

Since the 1960s, the population density has increased from 68 persons per km² up to 174 persons per km² in 2014 (UBOS 2014, 1). The resultant pressure on the agricultural sector necessitated land conversion. Today, 25% percent of the land area is arable land, nine percent are permanent crops, nine percent are permanent pasture, 28% are still forests and woodland and 29% are used for other purposes⁷. The highest population density, as shown in Table 2.3-1, occurs mainly in regions with an annual rainfall of 900-1,500 mm. Here and at the shore zones of the lakes, the environment provides optimal conditions for agriculture. *"Agriculture is the lifeblood of the smallholder household in Uganda. It provides the primary sustenance of the household, gives the household strength, financially or emotionally, and drives household priorities"* (J. Anderson et al. 2016). The most common crops for subsistence farmers are maize, beans, cassava, sweet potatoes, and groundnuts. Additionally, depending on the climate of the area, matooke (plantain), sweet bananas, millet, sorghum, and other crops are grown. Every household grows roughly seven food crops, while the common cash crops are coffee and sugar cane (J. Anderson et al. 2016).

⁸ <http://www.worldbank.org/en/country/uganda/overview>

The agricultural sector constitutes only 24% of Uganda's GDP, while services are the main income source, covering more than 50% of the GDP. Despite this, the agricultural sector employs 82% of the labour force⁹. The agricultural production is mainly based upon a subsistence economy. Uganda's agriculture sector is facing challenges due to the lack of access to electricity and technology.

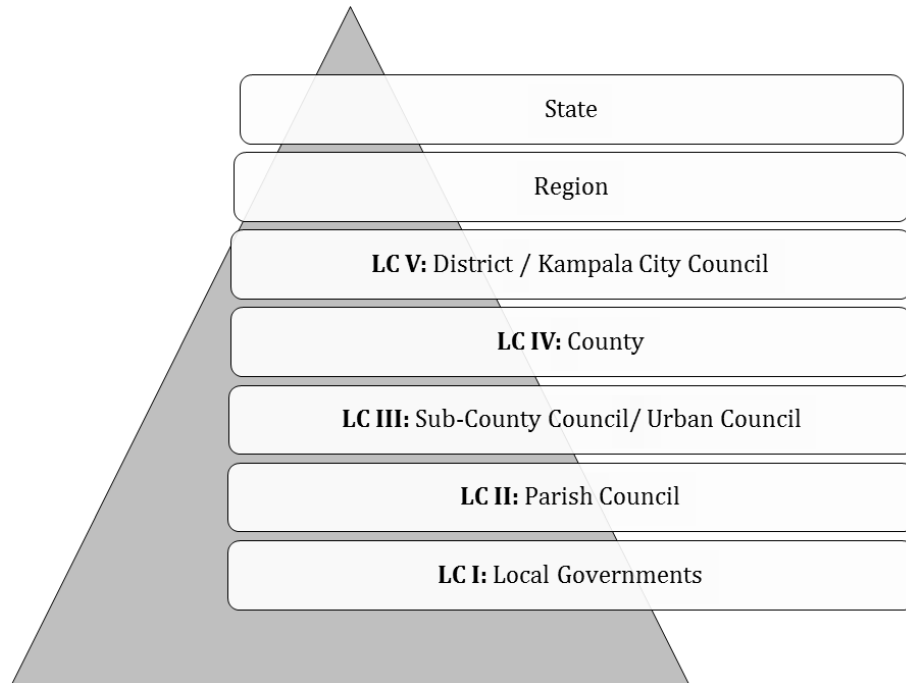


Figure 2.3-4: Levels of administration in Uganda

In 2015, Uganda was ranked on 163rd of 188 countries on the Human Development Index¹⁰. Nevertheless, due to agricultural activities, urbanization, and improved education, poverty rates were reduced during the years from 1993 to 2013 from 56% of persons having \$1.25 per day available to 20%⁸.

Uganda is a multi-ethnic state containing people from more than 65 ethnic groups. In the centre area of the country, the Baganda are the largest ethnic group (17%) (UBOS 2016). Major languages are English and Luganda. More than 17 religions are represented in the country. The three largest groups are Catholics (39 %), Anglicans (32%) and Moslems (14%), who mainly live in the rural areas.

The country is organised in seven administrative subunits forming levels of different local councils (see Figure 2.3-4). The country has four regions: the Northern, Eastern, Western and the Central Regions. Within the country the regions are

⁹ <https://www.cia.gov/library/publications/the-world-factbook/geos/ug.html> (latest access 30.03.2017)

¹⁰ <http://hdr.undp.org/en/composite/HDI>

heterogeneous in their environmental conditions, and even the districts of administration differ widely in the composition of ethnic groups.

The research area of this study is located in the Central region, in Wakiso District, which is the first level of the local council (LC V). A census conducted in 2014 provides data down to sub-county level (LC III), which in the study is Busukuma (UBOS 2016). Busukuma has estimated 37,730 inhabitants with a slight surplus of men (gender ratio of f:m = 1.00:1.01); 19,557 of this population (52%) are under 18 years (UBOS 2016, 269f.). Busukuma sub-county has an illiteracy rate of 15% of person elder than eighteen and is highly depending on subsistence farming (49% households), while 51% has other sources of income or receives remittances from abroad (27.3 %). Twenty-four percent of households have access to electricity, with the remainder depending on paraffin lanterns as light. An average household consists of 3.8 persons. Concerning living standards: 85% of the sub-county inhabitants have access to at least two meals a day. Nineteen percent of households have access to only unprotected sources of drinking water. The majority has access only to unimproved (60.5%) or no toilet facilities (2.5%). At the district level, 56% of households have a health facility within a radius of three kilometres.

2.3.2 *Historical glance since Uganda's independence (1962-2016)*

After seventy-four years of British colonialism (1889 – 1963), Uganda gained independence on the 9th October 1962. In 1963, Milton Obote, who was the leader of the Uganda People's Congress, was installed as the first prime minister and Edward Mutesa was elected as the new president. During the years of colonialism the Buganda¹¹ King *Kabaka* fostered a good relationship and friendship with the colonisers. Due to this the Buganda as one out of forty ethnic groups, always had been privileged, which under Obote became a source of tension. Obote was a member of the *Langi* ethnic group, and radically abolished the Buganda autonomy and disempowered traditional leaders from power, while installing a social-political system in 1966. The *Kabaka* fled the country.

In 1971, Idi Amin deposed Obote in a coup. Amin had good relations with the Baganda, and diplomatic relationships with Israel and the USA, from whom he obtained weapons. Under Amin, thousands of Obote's supporters, mainly those from the ethnic groups of the *Langi* and *Acholi*, were killed. Furthermore, numerous

¹¹ *Buganda* means the country of the ethnic group of the *Baganda*

Asians who had immigrated during the colonial years were deported. Amin was an autocratic dictator who did not allow others to hold power. In 1978, he attempted to annex the Tanzanian border region of Kagera but was defeated by Tanzanian president Nyerere. In response, he launched a counter-invasion to unify anti-Amin forces and deposed Amin in 1979. Amin fled the country. A transitional government ruled until Obote was re-elected as president in 1980. At that time, Yoweri Museveni had been a member of the new government. One year later, however, Museveni decided to oppose the government and became the leader of a guerrilla force named the National Resistance Army. Obote's reinvented political order was destroyed again by a coup of the Museveni's supporters in 1985. The head of the military took over as leader of the country before Museveni gained power and was sworn in as president in 1986. The ascension of Museveni led to changes for the better for the population. Nevertheless, also under Museveni's first term the office, rebels formed oppositions. At the end of the 1980s, the National Resilience Council started a major offensive against such guerrilla forces.

When political stability was re-established again during the early 1990s, Museveni established a constituent assembly in a single-party democracy system. Furthermore, Museveni allowed restoration of traditional monarchies for ceremonial and cultural functions and invited all Asian refugees to return to Uganda. Nevertheless, a number of rebel groups remained active. In 1994, Museveni was re-elected by the constituent assembly. One year later, the new constitution of the Republic of Uganda was adopted. From that point onwards, Uganda possessed the legislative, executive and a judiciary branches of a modern democracy. Step by step, the opposition organised itself into parties. In 2005, the constitution of 1995 was amended to allow a multi-party political system and Museveni was again re-elected as president. He gained the majority of seats within parliament, despite the rise of the opposition party Forum for Democratic Change (FDC). Its leader, Kizza Besigye, emerged as a political rival of Museveni. In 2006 Museveni was re-elected. Supporters of the opposition, however, started rioting in 2007. Since the growth of opposition, Museveni, not willing to transfer his power to anyone else, found himself forced to demonstrate his power. Therefore, he reduced the independence of the judiciary and reorganised the cabinet in 2009, which also resulted in struggles with the opposition. In 2011 and 2016, Museveni experienced his fourth and fifth re-election with 60-70 % of the votes, although not without protests from the opposition. During both elections, Besigye was arrested by the police and forbidden to speak publically. Nevertheless, Uganda today is a relatively stable democracy and is making major achievements on its development; the National Planning Authority (NPA) sets targets for Uganda to become a middle-income country in 2040 (The Republic of Uganda 2010).

2.3.3 *Wetlands in Uganda*

Seventeen percent of the total land area, (est. 41.743 km²) of Uganda is covered by wetlands. When Museveni took power, the government prioritised the topic of wetlands management and aimed to change “*the present attitudes and perceptions of Ugandans regarding wetlands*” (Ministry of Natural Resources 1995). The government wanted to bring the unused wetlands into the focus of agricultural production, having already detected their high fertility and agricultural potential. Reasons for the relatively low levels of attention that the Ugandan population had paid to these ecosystems included:

[That] firstly, there has been a traditional lack of recognition of wetlands as anything but unusable wastelands. In previous times when there was enough and easily cultivatable land, the extra work required to exploit waterlogged areas was too great to bother with [...]. This has led to the second general problem that the exploitation has often been unbalanced, excessive, and inappropriate for the resources. The results have frequently been an irretrievable loss of an important source for sustainable production (Ministry of Natural Resources 1995).

In addition to the high economic potential of these ecosystems, the relationship between the wetlands and water-related disease was recognised, and thus also the connection between the wetlands' use and primary health care.

When people come into increased contact with static and not purified water, as in rice growing or many other farming practices, an increase in the incidence of bilharzia infections can be expected. This would have a grossly debilitating effect on the community using the wetland calling for unnecessarily heavy investment in health facilities that would have otherwise been avoided (Ministry of Natural Resources 1995).

Nevertheless, the government remained aware of the important functions of those fragile ecosystems. As the use of the wetlands became more common and exhaustive, the government of Uganda passed several regulations and restrictions on the use of ecosystems, such as wetlands and forests, which still remain active today. The Wetland Inspection Division (WID) together with the National Wetlands Programme (NWP) is in charge of the implementation of laws to do with the conservation of wetlands. Furthermore, the National Environment Management Authority (NEMA) advocates the wetlands' protection based on the *National Environment Regulation, No. 3/2000* of the *National Environmental Act Cap 135 Section 107*. These legal frameworks set wetlands under protection and provide rules at different geographical scales. It determines clear conditions under which these ecosystems can be used. The document allows the traditional use of wetlands for (a) harvesting of papyrus, medicinal plants, trees and reeds; (b) any cultivation where the

cultivated area is not more than 25% of the total area of the wetland; (c) fishing using traps, spears and baskets or other methods than weirs; (d) collection of water for domestic use; and (e) hunting with restrictions.

In 2009, the Wetland Management Department in collaboration with the UBOS et al. mapped the current status of the Ugandan wetlands' condition and compared these maps with the spatial distribution of poverty. The document says that "*highly impacted wetlands are spread widely across Uganda*" (WMD et al. 2009, 25). Not all wetlands are used but provide convenient conditions for agriculture. Due to increasing population pressure, however, an expansion of the agricultural use of these areas seems to be the only solution to guarantee future regional food security. In Uganda, 37% wetlands products out of 13 types of different wetlands uses have been mapped (WMD et al. 2009, 12ff.).



Photo 2.3-1: Erratic wetland usages in Uganda: a) Car washing, timber wood; b) Brickmaking; c) Papyrus harvesting; d) Freshwater fetching, livestock grazing (Source: Heinkel 2015)

In order to conserve the wetlands and other ecosystems, the government of Uganda promotes *green and sustainable agriculture* (The Republic of Uganda 2012, §295). Furthermore, it fosters restoration activities and values adding to wetlands and other ecosystems with participatory methods, such as tree planting and investments in forestry. In addition to these efforts, the government encourages Uganda's inhabitants to actively engage in keeping ecosystems healthy (The Republic of Uganda 2012, §300).

The current situation of the wetlands in Busukuma sub-county differs noticeably from the standards set out in the laws. In the wetlands, various uses are present (see Photo 2.3-1). The land is in use for different crops and farming techniques, such as yams, rice, and other products. Additionally, slash-and-burn-techniques to open new fields are widely common, as is the cultivation of monocultures, like sugar cane and tea. In some areas, greenhouses have been constructed. There also exist substantial areas from which brickmakers collect soil.

2.3.4 Data collection sites

The research project was performed in a wetland basin in Wakiso District, Central Region. This wetland is located 30 km northeast of the capital Kampala. The inland wetland basin spans over 116,7 km² (Leemhuis et al. 2016). It is used for different purposes (see Photo 2.3-1) by locals and the pristine vegetation is partly replaced by different crops. Green vegetation dominates the wetlands view (see Box 3.2-1). In order to cover a broad variety of living standards, the study was carried out in six local council areas (A1, A2, B, C1, C2, D), which were characterised by their different infrastructural settings, namely the pavement of roads, and access to medical facilities and schools.

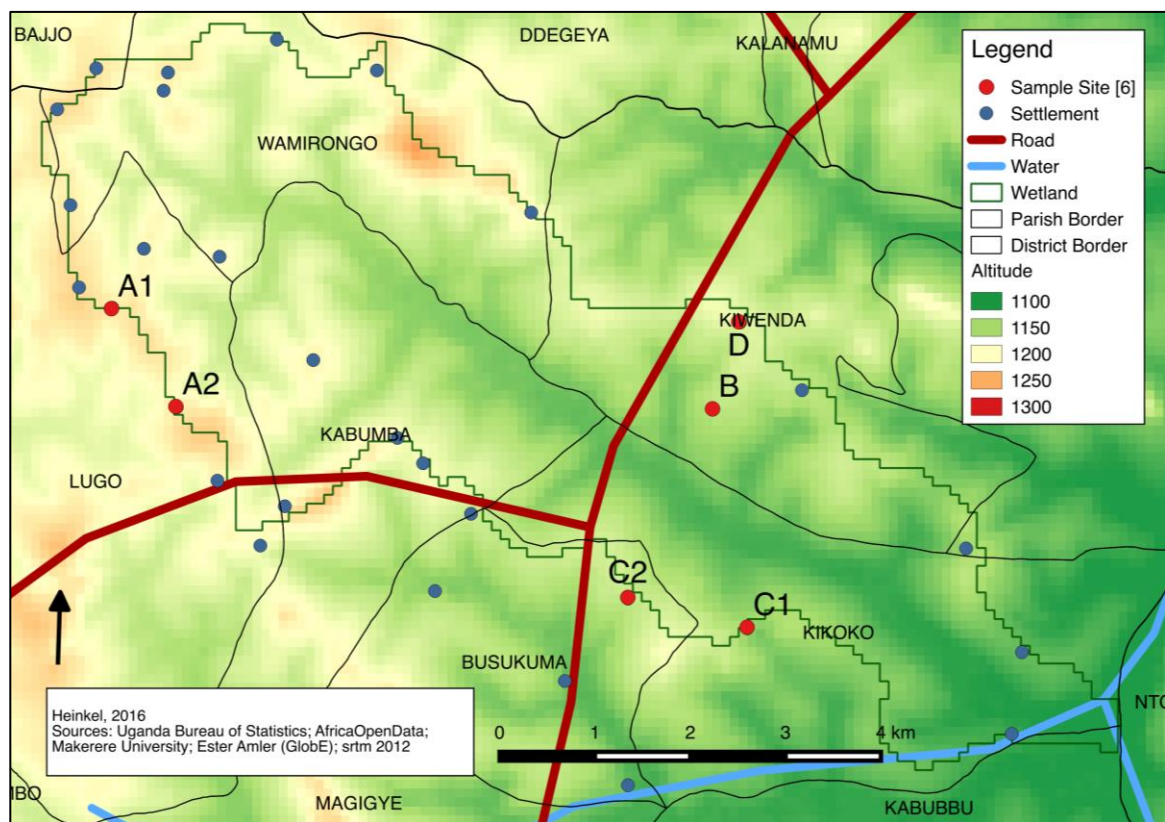


Figure 2.3-5: The investigated wetland basin

Site A is located in a rural area on top of a ridge of the wetland (see Figure 2.3-5). The road leading to the villages A1 and A2 is unpaved with most people having no vehicle to drive to the next town (see Photo 2.3-2). The two communities are assigned to one local council area (see Figure 2.3-4) but are 1.5 km apart. Both villages together have approximately 1000 inhabitants¹². The day-to-day life of the people on-site is strongly linked to the wetland. They build their houses from papyrus and bricks made in the wetland. They braid bowls out of grasses or weave mats from palm leaves and other types of grass. Other people sell food, which ingredients are harvested from the wetland.



Photo 2.3-2: Sample site A (Heinkel, 2015)

Sampling site B is a village with approximately 800 inhabitants. The village is located in the lower wetland area nearby the paved main road to Kampala (see Figure 2.3-5). The village's trading centre is represented by a primary school at one side of the main road and a small vegetable stand opposite (see Photo 2.3-3). The residents use the same health centre and facilities for goods for long-term needs as people from site C (described below). Some people are living in terrace houses next to the school, while the majority of the inhabitants' houses are spread widely from the lowest areas of the wetland up to the adjacent town D in the upper areas of the basin.

¹² Estimation based on 2014 NPHC - Main Report, Wakiso District Statistical Abstract 2008/09 and sub county development programme CIS 2009.



Photo 2.3-3: Sample site B - Primary school (Heinkel, 2015)

Site C is a town with approximately 2,700 inhabitants located on top of the southern ridge of the wetland basin (see Figure 2.3-5). The main road is paved and provides good public transport to the capital. The town is equipped with various shops and three restaurants, two primary schools and a healthcare centre. For the long-term needs, people take the public transport to the next largest town 15 km away. In terms of administrative areas (see Figure 2.3-4), town C is located in two neighbouring parishes and therefore administered by two different local councils (C1+ C2). People also use the wetland as a resource for subsistence but the on-site infrastructure reduces the physical visibility (see Photo 2.3-4).



Photo 2.3-4: Town and sample site C (Heinkel, 2015)

Site D is a town opposite of site C on the northern ridge of the wetland (see Figure 2.3-5). Site D has estimated 1,100 inhabitants. Despite the comparatively small number of inhabitants, the town has a significant commuter belt. It serves as provisioning centre for all villages on the northern side of the wetland and is an important town for the industry for flower production of the neighbouring wetland. Furthermore, the city is a transit point for public transportation to the capital and has schools and medical centres as well as shops for the short-term and the

medium-term needs (see Photo 2.3-5). Site D flanks site B and both settlements share a Catholic church, which was in the process of restoration during the research period.



Photo 2.3-5: Town and sample site D (Heinkel 2015)

Box 3.2-1: Subjective impressions and sensual perceptions of the wetland

Within the investigated basin, green dominates in lots of various shades of various grasses and papyrus reed, as well bushes and palm trees. From the ridge of the upper wetland, one has got a bird's eye view on plants, fields and houses between the trees and plants. This impression is almost the same in the wetland from every point of view. In the dry season, the dusty roads contribute with red and brownish colours to that impression, while some types of grasses in the upper areas might be dried out. During the rainy season, the green seems to be more saturated and the dusty roads tend to be more brownish than red and are covered by puddles filled with brown water.

Standing in the central area of the wetland, firstly the acoustical background of cicadas and birds stands out. Within the lower wetlands, there is hardly any sound from cars or human beings, besides field workers talking to each other. During the weekend, music sounds from the leisure club in the upper wetland. At hot days the change of the air temperature from very hot and dusty in the upper land to fresh and less dusty in the central green area is clearly perceptible. Many colourful birds, small monkeys and various insects are visible in the whole basin. One can find chameleons and snakes in the lower areas between the papyrus reed, palm trees and bamboo. Also, the Crested Crane, which is a subspecies of the grey-crowned crane and the national bird of Uganda, settles down in flocks within this wetland.



Photo 2.3-6: A) View into the wetland from the highest elevation; B) View from sample site A2; C) View on the central area of the GlobE research project (Heinkel, 2016)

Agricultural fields are spread over the whole basin (see Photo 2.3-6), but the type of agricultural use depends on the location within the wetland and therefore the availability of water. Settlements are located mostly in the upper wetlands with some sparse houses in the lower zone of the basin. There is no clear border between villages or towns discernible by outsiders. The inhabitants, however, do feel clearly

assigned to one administrative unit. Single shops, water pumps or key places, which are especially important as a meeting point for people, form the trading centres in the rural areas.

The lower wetland's area is partly state-owned and partly managed by private landowners. There are no controlled settlements in the privately managed areas. People living within the state-owned area receive special access to terrace houses, which were built in the 19th century during the colonial period for the migrant labour forces working for the cotton production for the United Kingdom. Table 2.3-2 summarises the locations and administrative unit of the sample sites

Table 2.3-2: Description of the sample sites

	Research Area					Summary
Sample Site Code	A	B	C		D	4
Community Code	A1 A2	B	C1	C2	D	6
Population Size (est. 2014)	1.005	799	1.621	1.052	1.106	5.583
LC I: Local Government	1	1	1	1	1	5
LC II: Parish	Lugo	Kiwenda	Busukuma	Kikoko	Kiwenda	4
LC III: Sub-County			Busukuma			1
LC IV: County			Kyadondo			1
LC V: District			Wakiso			1

2.4 METHODS TO ASSESS WETLAND-RELATED MENTAL WELL-BEING

2.4.1 Study design

The study on place-people relations consists of three sub-studies (see Figure 2.4-1), based upon a data triangulation (Bowling 2014, 223). Therefore, a mixed-method approach was designed and different methods were applied. Firstly, group interviews with wetland users were carried out, in order to describe the emotional relationship between the residents and the investigated wetland. This sub-study intended to detect factors of the social and environmental surrounding, which influence the feeling of being attached to a wetland. Secondly, a cross-sectional study was performed in order to provide statistical evidence on factors, which influence mental well-being. A survey applying established psychometric scales assessed the current state of mental well-being of the participants and quantified the place attachment to the wetland. Findings of the quantitative and qualitative sub-studies served as a basis for the elaboration of a semi-structured interview guide of the third sub-study. The results from each sub-study were analysed separately. The results from all studies then were *triangulated* in order to access the research topic

from different perspectives and to provide answers to the research questions (see Chapter 1.3). The aim was to provide a holistic view of the complex reciprocity of human beings and nature in the specific setting of a wetland.

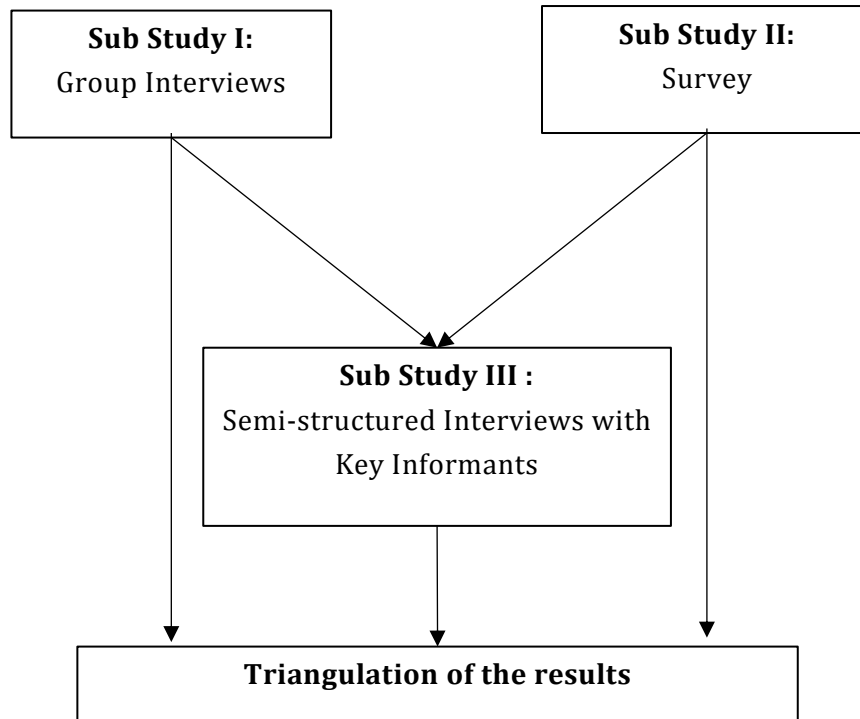


Figure 2.4-1: Study design

2.4.2 Selection criteria for the participants

Prior to each individual research activity, the local chairperson of each target community was contacted and asked for permission. The local chairperson was requested to provide facilities and contact with participants. Additionally, the chairpersons were informed about the research project and the umbrella research project.

The target group of the study are healthy persons settled within the wetland basin. According to the gender balance of the LC III area, which is generally balanced with a very slight surplus of men (see Chapter 2.3.4), a balanced gender ratio was considered for the study. The participants' minimum age was 15. Before collecting data from a potential study participant, they were informed about the research project as well as about risks and benefits of participating in the research project. Illiterate participants were catered for, as the informed consent form was read aloud and any further questions handled verbally. Each participant was obliged to sign the informed consent form as well as a second neutral person as a witness (see Appendix: Informed Consent From English and Luganda). Persons who were

physically or mentally unable to understand the informed consent or persons who declined to participate in the study have been excluded.

2.4.3 Ethical Approval

Before conducting the study, the proposal of the research and all assessment tools were approved by the ethical committee of the Medical Faculty of the University of Bonn (see Annex 7.1.1) as well as the ethical committee of the School of Medicine of the Makerere University of Kampala, Uganda (see Annex 7.1.2). The ethical standards of each university had to be fulfilled during the whole research process. This included the informed consent in English (see Annex 7.2.1) and Luganda (see Annex 7.2.2) of every participant as well as the strict compliance of the protection of the study participants, their anonymity, the acceptance of voluntariness of their contributions and the respect of the participant's privacy. The assessed data were stored inaccessible for other persons besides the researcher. This will be the case until ten years after finalisation of the PhD thesis.

A debriefing of the local councillors has been carried out. They were informed about the results of the quantitative study as well as from the group interviews. Local councillors were allowed to comment and criticise the data preparation and presentation. Debriefing also served as reassurance, that information provided in the group interviews and survey was understood correctly.

The ethical committees expected the dissemination of the study result. After its finalisation, the PhD thesis will be available for the umbrella project. Furthermore, the thesis is provided to libraries of universities in Germany and Uganda. The dissemination of data was realised further by presentations at conferences (see Annex 7.4).

2.4.4 Qualitative study methods – Assessment of symbols and social fabrics in the wetland

Group Interviews

Group interviews were conducted in order to gain in-depth information and insights about cultural settings and images regarding well-being as connected to the wetland. Group interviews are meetings with a collection of key informants, in which content-related information is gathered. An advantage is, that they can be conducted in a casual atmosphere (Russel Bernard 2006, 232). Individual statements can be contextualised and embedded into a cultural context by the group and thus a broader picture of well-being in the outlined context and wetlands can emerge. The

moderator should take care to detect dominant from shy persons within the group interview situation (Russel Bernard 2006, 232).

Key informants could be residents and people who were emotionally and functionally attached to the wetland. They could provide information on cultural facets of well-being (Panelli and Tipa 2007) as well as meanings and senses of the focused research area. The local chairpersons mobilised a maximum of ten persons, who were persons making use of the ecosystem services of the wetland. In every data collection site, one group interview was conducted with only men and one with only women. This avoided a gender-based intimidation and ensured a balanced gender ratio.

The research team consisted of the primary researcher, who acted as moderator, and a simultaneous interpreter. The primary researcher was a German woman with a study background in Medical Geography (see Chapter 2.1.1). The interpreter was a Ugandan woman coming from Mukono District and living in Kampala. She studied social science and had lived and worked in Europe before. She was fluent in Luganda and English. In preparation for each group interview, the programme was written down on a short hand-out and discussed between the moderator and the interpreter. An audio recording was made from every group interview. The participants talked about their well-being and the meaning of the wetland in their lives.

The standard procedure started with an introduction of the research team and the provision of information about the project. The interpreter translated simultaneously word by word in both directions. Additionally, she read out loud the informed consent form in Luganda. The participants then introduced themselves, providing information about their age, profession, amount of children, their length of residence within the community, and their activities in the wetland. This was felt to be important at the beginning of each group interview since it reduced concerns of the participants to answer questions and to participate actively in the interview.

Each group interview consisted of an individual programme containing three up to four of the participatory rural approach (PRA) methods (Chambers 1984) in accordance to the number of participants, the level of education of the participants and the time frame, which was set by the LC1 and the participants themselves. During the optional procedure, the interpreter translated keywords to the moderator, which were written on sticky notes in English.

Data Collection Tools - Participatory Rural Approach Methods:

In a *free listing*, associated items about “well-being” and the wetland or the place of residence were collected. In a second step, the items about well-being were *ranked* from one to five according to their importance for each participant (Cottam 1994). The items of the wetland were *classified* and assigned to different zones within the wetland. The items of the place of residence were sorted according to their geographic scales or administrative units (see Photo 2.4-1). Based on the free listing and subsequent classification of the wetland, the participants decided which items they wanted to show the researcher in a *transect walk* (see Photo 2.4-1 B). On-site, the participants showed the things they had listed before and explained them to the research team (Kirsopp-Reed 1994). In an *actor mapping* (Lelea et al. 2014), different actors within the wetland, like institutions, NGOs, governmental actors or private persons in charge of the wetland were collected (see Photo 2.4-1 C). The selected stakeholders were set into relation to each other and hierarchies were mapped between them (Lelea et al. 2014). For the elaboration of a *seasonal calendar*, the participants listed events, which occur seasonally. These items were tabulated by month. Then the seasons of each item were marked with stickers (Francis 1994).



Photo 2.4-1: A) Free listing and classification (GI1); B) Transect walk (GI2); C) Actor mapping (GI4) (Heinkel, 2016)

After every approach, the researcher summarised the results and made sure that all were understood correctly; the group members were then able to add aspects or to correct the researcher’s interpretation. Photos documented the main findings of the PRA methods. Applying PRA methods underlies certain principles like the “*direct learning from local people, offsetting biases, optimizing trade-offs, triangulating, and*

seeking diversity" and furthermore, *"facilitating analysis by local people; practising critical self-awareness and responsibility"* (Chambers 1994, 1437). Local knowledge was internally and externally shared and could easily be represented to "outsiders". Thus the main results received by the PRA methods were the visualization and digitalization of the gained images and flip charts.

Due to the provision of an interview location by the local chairpersons, the group interviews have been conducted in three different interview settings. The interviews in site A were conducted outdoors. They were held in a circle of chairs under a tree in a protected area or next to a house. The upper wetlands were visible on both sides of the location and directly accessible by foot. The village had been well informed about the event and residents had met the researchers before. Furthermore, the research team took care to maintain a good relationship with the local council, who displayed a very positive attitude in return. Thus the group interview could be conducted in a pleasant atmosphere (see Photo 2.4-1 A and B).



Photo 2.4-2: Group interview setting site C2 (Heinkel, 2016)

Two group interviews (site C) were conducted in a local primary school during the holiday season (see Photo 2.4-2). The school consisted of simple corrugated iron huts and was in poor condition. The wooden boards were old and fragile, with holes between. The classrooms were in a long row directly next to one another. Between the boards, one could see into the other rooms. Unfortunately, the room had bad acoustics, since the school was located directly next to the main road to Kampala. Thus whenever a lorry passed, it was so loud that hearing speech became difficult. This was also an issue when a short rainfall came and the raindrops drummed on the corrugated iron. At the commencement of the interview, the participants were observed to be reserved, perhaps due to a feeling of being at a school lesson. The interactive nature of the interview, however, quickly changed the tone of response from conservative to one of positive contributions. Furthermore, the local councillor

was present at both group interviews and explained in her own words the advantages of the research activities to the community.

In site D, the local council deputy had organised a room in a bar, which was closed while the group interview was held. The bar served as a de facto community centre, where local meetings were usually held (see Photo 2.4-3). The announcement for the meeting was made the day previously, by megaphone in the town centre. During the group discussion, an announcement for another meeting in the same bar rooms took place.



Photo 2.4-3: Group interview setting site D (Heinkel, 2016)

Due to the open nature of the announcement, people did not seem to feel personally committed to participate or to be there on time. Thus many participants arrived late and the first group interview could only start after a delay. Since the research team had not performed any activities in this town before, the participants did not know the frame of the research and were reluctant to have confidence in the research team. After they had listened to and agreed on the informed consent, they were unsure how they could profit from the group interview. They were only willing to contribute after they were informed that they would receive presents at the end of the interview. The second group interview went better, as the participants from the first could let others know about the content and what they could expect. Despite these difficulties, the group interviews were conducted in a quiet and productive atmosphere.

Six group interviews were held with forty-eight participants in total, coming from four representing local council areas (see Table 2.4-1). The gender ratio was roughly balanced, with a slight surplus of women. Five group interviews were held in Luganda, while one was held in English.

Table 2.4-1: Metadata of the group interviews

Group Interview ID			1	2	3	4	5	6	Summary
Representing LC Area			A 1+2		C 2		D		4
Number of Participants			8	8	9	6	9	8	48
Gender			f	m	f	m	m	f	25 f / 23 m
Talk Minutes			48	61	122	101	66	63	∅ = 77 Min
Language			Luganda		X	X	X	X	1 English
PRA Methods	Free listing	Well-Being	X	X	X	X	X	X	6
		Wetland	X	X			X	X	4
		Place of Residence			X	X			2
	Actor Mapping				X	X	X	X	4
	Seasonal Calendar				X	X			2
Transect Walk		X	X					2	

Semi-structured Interviews with key informants

Following the concept of method triangulation, key informants were detected on basis of the actor mapping of the group interviews (see Figure 3.2-1). These semi-structured interviews allowed upcoming topics from the preliminary analyses to be addressed (Russel Bernard 2006, 210). The focus of the interviews was on the different stakeholders' perspectives of the wetland.

Table 2.4-2: Semi-structure interview guide

Semi-structured Interview-Guide	
1	How was the wetland used ten years ago?
2	Did the wetland change over the past ten years? If yes, in how far?
3	Did responsibilities/social structures change over the past ten years?
4	How did/does the change affect you?
5	Is there a development/change in the wetland visible?
6	What are the reasons for that development/ change?
7	How will the wetland be in ten years?
8	How do you want the wetland to be in ten years?
9	What is the role of the government in the perspective?
10	What is the role of individuals and landowners in that future perspective?

The semi-structured interview-guide focused on responsibilities concerning the wetland. Additionally, changes in the environment and social fabric and implicated reasons were addressed. Finally, future perspectives and visions concerning the wetland as well as related aspects were brought up.

The structure of the interviews was the same as for the group interviews and the research team consisted of the same persons. Only one interview was conducted unassisted. Similar to the group interviews, the procedure started with an introduction of the research team and the provision of information about the project. The interpreter interpreted word by word in both directions. Furthermore, she read out loud the informed consent in Luganda. The participants introduced themselves by providing information about their profession or representative function and responsibility within the community and the wetland.

Seven key informants participated in the study. The key informants were contacted several days in advance of the meeting and asked to suggest a meeting point. According to Manzo (2005, 73), the interviews were carried out in places selected by the interviewees. Some key informants invited the research team to their private houses allowing the interviews to take place in familiar settings. In most cases, the houses were located directly on the hillsides of the wetland. One interview took place in the market, due to the informant's selling business. In this case, the interview atmosphere was stressful due to many directly or indirectly watching eyes and many children present around the interview scene. The researcher team had never met this interviewee before and the interviewee did not know what to expect, which influenced their willingness to answer. Therefore, this interview was the shortest.

Table 2.4-3: Metadata of the interviews with key informants

	Interview Partner	Represented Unit	Talk [Minutes]	Gender	Farming Business	Farming Subsistence	Landowner	Tenant	ID
1	LC I	A 1+2	34	m		X	X		LC1 A
2	LC I	B	55	m		X		X	LC1 B
3	LC I	C1	25	m		X		X	LC1 C1
4	LC I	C2	37	f		X		(X)	LC1 C2
5	Staff	Institution NaCRRRI	40	m			X		FM
6	Farmer	Private	37	m	X	X		X	PF M
7	Farmer	Private	48	f	X	X	X		PF F
	Summary	3 Actors	276	2 f / 5 m	2	6	3	3	

The interviews took place during the daily life of the informants and thus were interrupted occasionally. Furthermore, the political situation in Uganda was tense at the time the interviews took place; in some cases, the interviewees refused to answer questions, which could reflect critically on the government. Two out of the

seven key informant interviews were conducted in English, allowing direct communication between the interviewees and the primary researcher, while the remainder were conducted in Luganda, which made interpretation necessary. The talks run for between 25 and 50 minutes. Table 2.4-3 summarises metadata of the conducted interviews.

Qualitative data analysis

In a follow-up of every qualitative research method, the research team reflected on the course of every (group) interview and shared their personal impressions. Firstly, the interpreter transcribed the records of the group interviews as well as the key informant interviews word by word into Luganda. Secondly, a neutral translator, who was not present during the interviews, translated the transcripts from Luganda to English. The neutral translator was a Ugandan man living in Kampala. He was a professional translator specialised in Luganda, English, French and German. In close consultation with the research team, the translator translated the scripts meaning-based, however, the different Luganda words for wetland were written in brackets behind the English translation in order to make visible the different meanings for this ecosystem.

Each translated document was imported as a *primary document* into a *hermeneutic unit* in Atlas TI 6.2 software. Therefore, two hermeneutic units were created. The first one contained all primary documents from the group interviews, while a second hermeneutic unit contained all primary documents of the key informant interviews. The group interviews were analysed separately from the interviews with the key informants.

The metadata were analysed to obtain a general overview of the received information. A list of all participants including short descriptions about their background, such as their occupation, their number of children, the years spent at the wetland as well as their languages, was constructed. Additionally, all documents were read again and commented on meta-information occurring “between the lines”, such as misunderstandings during the talk, “unspoken words” or other emerging peculiarities of any interview. Concerns about answering as well as sensitive topics could be detected as well as unwanted influences on the content by the research team became visible. Hierarchies and influences of persons who had higher social positions in the group could be detected and their data specifically attended or if necessary excluded. A content analysis of the group interviews was conducted to visualise the reported emotions provoked by the wetland. A hierarchical selective procedure was chosen (see Table 2.4-4), in which text passages were coded and selected, and again coded and selected. The *codes* arose from previously developed

keywords (Bowling 2014, 401) out of the theoretic framework. The codes were assigned to whole-text parts to understand in context.

Emotional expressions about the wetland were tagged by codes. A code could be any spoken emotional expression or association to the wetland, e.g. (A) *"when I think about the wetland I never imagine myself building anything since I cannot protect myself effectively from the much water. I want to build a house as far away as possible [...]"* or (B) *"I pride myself a lot in the swamps simply because of the presence of water. Since water is life, as we all know"*. Core affects as a reaction on the wetland were assessed. The intuitive and spontaneous change of an emotional state, e.g. from pleasantness to unpleasantness was issued in environmental psychology, such as reaction on the aesthetic appearance of natural environments (Russell and Pratt 1980; Ulrich 1983). Russell's circumplex model visualizes these core affects (Russell 1980), which are *"neurophysiological state[s] consciously accessible as the simplest raw (nonreflective) feelings evident in moods and emotions"* (Russell 2003, 148) (see Figure 2.4-2). Here, wetland-directed attributed affects were investigated.

An attributed affect is the change of an emotional state due to a prior event. Such events can be, for example, the appearance of a person, the start of an event, or exposure to a place. An object-directed core affect is understood as a change in a neurophysiological state in moods and emotions. It is an initial point of an emotional reaction, such as facial and emotional oral expressions. *"Attribution is the perception of causal links between events and allows room for individual and cultural differences."* (Russell 2003, 149). In this study, the wetland-directed attributed affects were investigated on basis of mental imagination and associations of the wetlands, since imaginations of landscapes have the same effect as being physically in the landscape (Andrews 2004). These *"attributed affects"* (Russell 2003, 149) then were further coded and classified.

The coded text passages were selected and sorted according to two *code families*, namely *pleasure* and *displeasure*. In the example provided above, expression (A) was assigned to the code family *displeasure*, while expression (B) was categorised as *pleasure*. The code families were then categorised into feelings arising from Russell's core affect model (Russell 2003; 1980). Excerpts of the code family *pleasure* were coded as *excited/ebullient*, *elated/happy*, *serene/content* or *placid/calm*. Excerpts of the code family *displeasure* were coded as *tired/lethargic*, *sad/gloomy*, *upset/distressed* or finally *tense/jittery*. This was done in consultation with the literature, by analysing emotions and emotional reactions (Edelstein and Shaver 2007; Russell and Pratt 1980; Russell 2003; Shaver et al. 1987). These affects finally were analysed in terms of gender, location and stakeholders.

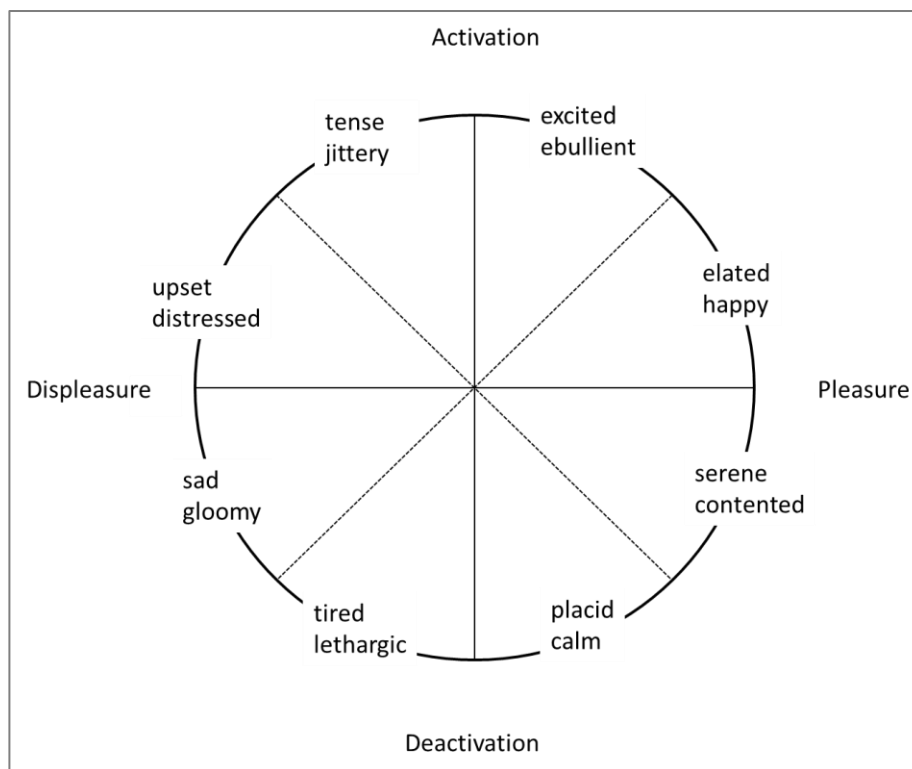


Figure 2.4-2: Russell's core affects

The association of the wetlands, as well as associations concerning the place of residence, evoked feelings and emotional expressions. Especially in group interview (GI) 6 (see Table 2.4-1) the participants imitated noises of special birds and frogs, which they associated with the swamps. In the six group interviews, 54 separate emotional expressions were detected. Most of them came from the communities A (23 items) and C2 (25 items). Community D associated also many items with the wetland, nevertheless, they used more objective language, and so only six emotional expressions could be detected. In site A, 13 positive expressions were taken in relation to the wetland, while 10 negative expressions were stated. In community C2, on the other hand, only 9 expressions were positive, while 16 expressions addressed negative feelings.

The content of the semi-structured interviews with the key informants was analysed by an *integrated approach* (Bradley et al. 2007) coding deductively and inductively. In a two-step coding procedure, the interviews were *deductively coded* according to keywords, which arose from the previously prepared questions (see Table 2.4-2). The *deductive coding* was followed by an *inductive coding* from codes emerging from the content of the interviews (Bradley et al. 2007). Twenty-three codes were assigned to different text passages. After the coding, the coded text passages were accumulated to emerging *code families*, which were based on co-occurrences of the same codes for same text passages or related contents (see Table 2.4-5).

Table 2.4-4: Data analysis for the group interviews

	Method	Specification
1	Deductive Coding: Code Families from Theory	Pleasure Displeasure
2	Deductive Coding: Codes from Theory	Excited / Ebullient Elated / Happy Serene / Content Placid / Calm
		Tired / Lethargic Sad / Gloomy Upset / Distressed Tense / Jittery
3	Framework: Rearranging of Coded Excerpts in the Framework	Insertion into the Circumplex Model
4	Content Analysis	Excerpting of Contents and Generation of Keywords
5	Meta Analysis	Gender / Location Statistics

The code families served to preliminary classify historical events and occurrences. The coded passages were excerpted and collected into in a *thematic framework* (Ritchie and Spencer 2002, 313) as a temporal appraisal of the sense of the wetland. The excerpts were re-arranged and overlapping contents either summarised or listed. The content was then arranged in a text, explaining the historical emergence and change of a sense of place in terms of the wetland. The results were finally substantiated with numbers and data from other sources. The complex development of a sense of place could be explained and a theoretical concept could be developed (Bradley et al. 2007, 1767f.) and mapped (Ritchie and Spencer 2002, 320).

Table 2.4-5: Data analysis for the interviews with key informants

	Method	Specification
1	Deductive Coding: Hierarchical Coding with Super Codes	Codes Interview Questions: <ol style="list-style-type: none"> 1. Behaviour Changes 2. Changes in the Occurrence of Diseases 3. Debriefing 4. Environmental Change 5. Future Perspectives 6. Future Imagination 7. Introduction 8. Land Properties 9. Laws 10. Population Change 11. Personal Responsibility 12. Governmental Responsibility
2	Inductive Coding: Codes Emerging from Interview Content	Codes from Content: <ol style="list-style-type: none"> 1. Advantages of the Wetland 2. Alcohol Consumption 3. Education 4. Economic Well-being 5. Personal Concern 6. Place Attachment 7. Sense of Wetlands 8. Solastalgia 9. Wetland Territory 10. Working Conditions in the Wetland
3	Code Families: Organizing Co-occurring Codes and Related Contents in Topic Groups	<ol style="list-style-type: none"> 1. Starting Point <ol style="list-style-type: none"> a. Sense of Wetland b. Place Attachment 2. Changes <ol style="list-style-type: none"> a. Population Change b. Land Properties c. Behaviour Change d. Advantages of Wetlands 3. Results of the Changes <ol style="list-style-type: none"> a. Environmental Changes b. Changes in the Occurrence of Diseases c. Working Conditions in the Wetlands d. Economic Well-being e. Alcohol Consumption 4. Negative Perspectives <ol style="list-style-type: none"> a. Future Perspectives b. Personal Concerns c. Solastalgia 5. Positive Perspectives <ol style="list-style-type: none"> a. Future Imagination b. Governmental Responsibility c. Laws d. Education e. Personal Responsibility
4	Framework Elaboration: Rearranging of Coded Excerpts in the Framework	Temporal Development of Perception and Sense of Wetlands. Summarizing Overlapping Contents. Inserting Background Information.
5	Elaboration of a Theoretical Concept	Visualisation, Mapping

2.4.5 *Quantitative data collection and analyses - Assessment of place identity and dependence, and mental well-being in the wetland*

The quantitative study consisted of a cross-sectional study assessing factors which influence the development of place attachment and the status of well-being in the research area. The interviews were conducted in groups of three to five women or men. The contact person, who provided access to the participants, took responsibility for the group order. Each interview took 30-60 minutes of time. Interview setting in all sites differed largely (see Photo 2.4-4, Photo 2.4-5 and Photo 2.4-6) since occasionally the research team changed the place of interrogation. In site A, the interviews were conducted in seven different outdoor places, which were either in a silent atmosphere under trees or within busy trading centres. Similar conditions appeared in site C. Here, the research team interviewed in five different places. Solely in site B, the local council could make the classroom of a primary school available.



Photo 2.4-4: Setting in sample site A (Heinkel, 2016)



Photo 2.4-5: Setting in sample site B (Heinkel, 2016)



Photo 2.4-6: Interview setting in sample site (Heinkel, 2016)

Questionnaire and variables

The questionnaire assessed data about the individual's educational, cultural, and professional background. Furthermore, the feeling of safety and comfort at their place of residence as well as migrations in the participant's biography were identified. These data were treated as independent variables as summarised in Table 2.4-6.

Table 2.4-6: Questionnaire of independent variables

Assessed information, provided answer opportunities and data preparation approaches						
Open Questions Nominal Scale Classification	Ethnicity Religion Profession Place of birth What is the place that you now consider to be your home, no matter where you are actually living now? (Semken 2005) If you could choose, where do you would like to live? Why do you would like to live there?					
Binary Questions Nominal Scale Coding 0-1	Gender: Do you feel comfortable here? Do you feel safe here? Do you enjoy living in this place?			m Yes Yes Yes	f No No No	
Closed Question Coding 1-4	Marital Status:		Single	Married	Separated	Widowed
Closed Question Ordinal Scale Coding 1-5	Educational level:	No Very Good	Primary Good	Ordinary Fair	Advanced Poor	Tertiary Very Poor
	How is your health in general? ¹³	By Foot	By Bus	By Bike	By Taxi	Others
Open Questions Metric Scale	How long does the journey take you? How long do your children walk to school? Age: Number of Children: Number of Persons in the Household: Length of Residence at the Place: Length of Residence in the Same House:			Minutes to access Minutes to access Years Number of Children Number of Persons Years Years		

¹³ OECD Health Data 2007

The mainly nominal and metric data were used to explain the results of the dependent variables. The dependent variables consisted of five psychometric scales, which have been applied in other research studies and for clinical diagnoses of mental disorders.

The Well-being Index 5 of the WHO (WHO-5) measures the individual's short-term *emotional well-being* (see Table 2.4-7). It contains five positive statements about emotional well-being referring to the last two weeks. The question response options are assigned to a six-point Likert scale and reach from zero to five. Single scores are multiplied by a factor of four in order to translate them into a percentage (Topp et al. 2015, 168). The 50% mark is a cut-off score to distinguish a good status of well-being from a poor (Topp et al. 2015, 170). The WHO-5 is evaluated as an adequate screening tool for depressions (Bech 2004, 15; Topp et al. 2015, 174).

Table 2.4-7: Psychometric scale emotional well-being (WHO-5)

WHO-5	WHO Well-being Index 5	0	1	2	3	4	5
	Over the last two weeks,						
1	I have felt cheerful and in good spirits	At no time	Some of the time	Less than half of the time	More than half of the time	Most of the time	All of the time
2	I have felt calm and relaxed						
3	I have felt active and vigorous						
4	I woke up feeling fresh and rested						
5	My daily life has been filled with things that interest me						

The Satisfaction with Life Scale (SWLS) is a tool assessing the individual's global judgement of life on basis of a set of subjective criteria (Shin and Johnson 1978, 478) (see Table 2.4-8). The scale projects a comparison of living standards. Life satisfaction does not contain affective reactions, but rather a long-term evaluation of personal living standards (Diener et al. 1993). The SWLS scale addresses "*more stable than affective aspects of well-being*" (Ryff 1989, 1069). The SWLS consists of five statements and response opportunities reaching from *strongly disagree* to *strongly agree* on a symmetric seven-point Likert Scale. The scores most likely appear in a range from 23 to 28 (Diener et al. 1993).

Table 2.4-8: Psychometric scale life satisfaction (SWLS)

SWLS	Satisfaction With Life Scale	1	2	3	4	5	6	7
1	In most ways, my life is close to my ideal.	Strongly disagree	Disagree	Slightly agree	Neutral	Slightly agree	Agree	Strongly agree
2	The conditions of my life are excellent.							
3	I am satisfied with my life.							
4	So far I have gotten the important things I want in life.							
5	If I could live my life over, I would change almost nothing.							

The Rosenberg's Self-Esteem scale (RSE) is a common tool for measuring global self-esteem (Heatherton & Wyland, 2003, p. 225 according to Demo 1985) (see Table 2.4-9). Self-esteem is defined as *"the attitude about the self"* and it *"is related to personal beliefs about skills, abilities, social relationships, and future outcomes"* (Heatherton and Wyland 2003, 220). RSE consists of ten items with a symmetric four-point Likert scale providing response options from *'strongly disagree'* to *'strongly agree'*. Five of the ten items are negative posed statements, which require a reverse of the Likert scale. Higher scores implicate a better self-esteem. The most likely range is between 15 and 25, while typical scores are around 22 (Heatherton and Wyland 2003, 230).

Table 2.4-9: Psychometric scale self-esteem (RSE)

RSE	Rosenberg's Self-Esteem Scale	0	1	2	3
1	On the whole, I am satisfied with myself.	Strongly disagree	Disagree	Agree	Strongly agree
2*	At times, I think I am no good at all.				
3	I feel that I have a number of good qualities.				
4	I am able to do things as well as most other people.				
5*	I feel I do not have much to be proud of.				
6	I certainly feel useless at times.				
7	I feel that I'm a person of worth, at least on an equal plane with others.				
8*	I wish I could have more respect for myself.				
9*	All in all, I am inclined to feel that I am a failure.				
10	I take a positive attitude toward myself.				
* Reverse Likert scale					

The Perceived Stress Scale 10 (PSS10) is applied to assess whether respondents perceive *"their lives unpredictable, uncontrollable, and overloading"* (S Cohen, et al. 1983, 387) and to which degree life circumstances were perceived as stressful during the last four weeks (see Table 2.4-10). Ten items on a five-point Likert scale provide response opportunities from *'never'* to *'very often'*. Six of the ten items are negative posed questions with reversed scores. High scores

implicate high stress levels and vice versa. In different surveys, the mean values of PSS10 ranged from 11.41 to 20.21 (Sheldon Cohen and Janicki-Deverts 2012, 1325).

Table 2.4-10: Psychometric scale perceived stress (PSS-10)

PSS-10 Perceived Stress Scale		0	1	2	3	4
	In the last month,					
1	How often have you been upset because of something that happened unexpectedly?	Never	Almost never	Sometimes	Fairly often	Very often
2	How often have you felt that you were unable to control the important things in your life?					
3	How often have you felt nervous and “stressed”?					
4*	How often have you felt confident about your ability to handle your personal problems?					
5*	How often have you felt that things were going your way?					
6	How often have you found that you could not cope with all the things that you had to do?					
7*	How often have you been able to control irritations in your life?					
8*	How often have you felt that you were on top of things?					
9	How often have you been angered because of things that were outside of your control?					
10	How often have you felt difficulties were piling up so high that you could not overcome them?					
* Reverse Likert scale						

Place Attachment Scale (PAI) assesses the people’s functional and emotional bonding to a place (D. Williams and Vaske 2003, 831; D. Williams and Roggenbuck 1989) (see Table 2.4-11). The scale comprises *place identity* and *place dependence*, which “constitute two distinct dimensions of a single general construct of place attachment” (D. Williams and Vaske 2003). Six statements measure *place identity* and six statements measure *place dependence* on the considered wetland. The response opportunities range from ‘strongly disagree’ to ‘strongly agree’ on a five-point Likert scale.

Table 2.4-11: Scale place attachment (PAI PI and PAI PD)

PAI	Place Attachment Inventory	1	2	3	4	5
PI	Subscale Place Identity					
1	I feel that the wetland is a part of me.	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
3	This wetland is very special to me.					
5	I identify strongly with this wetland.					
7	I am very attached to this wetland.					
9	Being at this wetland says a lot about who I am.					
11	This wetland means a lot to me.					
PD	Subscale Place Dependence	1	2	3	4	5
2	The wetland is the best place for what I like to do.					
4	No other wetland can compare to this wetland.					
6	I get more satisfaction out of being in this wetland than at any other.					
8	Doing what I do at this place is more important to me than doing it in any other place.					
10	I wouldn't substitute any other area for doing the types of things I do at this place.					
12	The things I do at this wetland I would enjoy doing just as much at a similar site.					

Data preparation

The quantitative data were analysed with IBM SPSS Statistics 22. The dataset was described by the assessment of location parameters as well as quartiles for all discrete variables, as well as by visualisation with boxplots, where possible. Bar charts and circle diagrams were made for all other variables. After visualization, the data were checked for plausibility. The sample sites were described and statistically verified as a rural or urban area on the basis of the descriptive data. In order to select applicable statistical methods, all data were tested for normal distribution by Q-Q diagrams and Kolmogorov-Smirnov tests. In case of normally distributed variables, means were provided in the descriptive data and methods for normally distributed variables were chosen. If not, only the medians and interquartile ranges ($IQR = Q_{75} - Q_{25}$) were provided and non-parametric tests for the analysis were applied.

As shown in Table 2.4-12, the Kolmogorov-Smirnov test was significant in all cases, indicating that no metric variable was normally distributed. Therefore, only median values have been provided and non-parametric tests have been applied for the further analysis¹⁴.

Table 2.4-12: Test for normal distribution

	Kolmogorov-Smirnov test	n	test statistics	p-value
Independent variables				
1.	AGE	235	0.11	p < 0.01*
2.	PPH	235	0.09	p < 0.01*
3.	KIDS	233	0.12	p < 0.01*
4.	LOR HOUSE	235	0.23	p < 0.01*
5.	LOR PLACE	232	0.20	p < 0.01*
6.	MIN SCHOOL	162	0.22	p < 0.01*
7.	MIN MC	231	0.24	p < 0.01*
Psychometric scales				
8.	WHO-5	234	0.10	p < 0.01*
9.	SWLS	235	0.11	p < 0.01*
10.	RSE	235	0.10	p < 0.01*
11.	PSS-10	233	0.09	p < 0.01*
12.	PAI PI	235	0.18	p < 0.01*
13.	PAI PD	235	0.11	p < 0.01*
1. Age; 2. Persons per household; 3. Number of children; 4. Length of residence in the same house; 5. Length of residence at the same place; 6. Way to assess school in minutes; 7. Way to assess medical centre in minutes; 8. Well-being Index 5; 9. Satisfaction with life scale; 10 Rosenberg's self-esteem scale; 11. Perceived stress scale 10; 12. Place identity; 13. Place dependence *Significance correction according to Lilliefors.				

Every psychometric scale was tested for internal consistency with Cronbach's α , which is an "index for the reliability" (Tavakol and Dennick 2011, 54). Thus the items of one scale were tested for internal relatedness, in order to evaluate how concisely the scale items measured the same concept (Cronbach 1951, 299). Cronbach's α is calculated with the formula:

$$\text{Cronbach's } \alpha = \frac{n}{n-1} \left(1 - \frac{\sum_i \sigma_i^2}{\sigma_t^2} \right)$$

¹⁴ The majority of international study papers treat the applied scales as normally distributed and apply parametric tests for analyses (Anton and Lawrence 2014; Raymond, Brown, and Weber 2010; D. Williams and Vaske 2003; Bricker and Kerstetter 2000; D. Williams and Roggenbuck 1989). In case of the study presented, the Q-Q plots as well as equivalent tests of normal distribution definitively showed no normal distribution. On basis of those results, exclusively non-parametric tests have been applied, which impacts the comparability with international study results.

where n is the number of items, i is the item, σ^2_i is the variance of item scores, and σ^2_t is the variance of the total score. The higher Cronbach's α , the higher the reliability of the score. If Cronbach's α increased by the exclusion of a single scale item, this item was removed. Cronbach's α -values were interpreted as shown in Table 2.4-13. The scores were assessed and a new variable per score was created in SPSS. Those new additional variables were treated as a discrete variable and named according to the psychometric scales.

Table 2.4-13: Interpretation of Cronbach's α

Cronbach's α - value	Interpretation of the internal consistency
$\alpha < 0.5$	Unacceptable
$0.5 \leq \alpha < 0.6$	Poor
$0.6 \leq \alpha < 0.7$	Questionable
$0.7 \leq \alpha < 0.8$	Acceptable
$0.8 \leq \alpha < 0.9$	Good
$0.9 \leq \alpha$	Excellent

WHO-5 ($\alpha = 0.68$) and SWLS ($\alpha = 0.69$) appeared with a questionable level of reliability. In previous studies, the SWLS has been tested as "highly" reliable with α -values ranging from 0.79-0.89 (Pavot and Diener 1993; Delle Fave et al. 2011). These scales needed to be critically considered in the construct validity test (see Table 2.4-14). In case of the RSE and PSS-10, the Cronbach's α -values did not reach acceptable values ($\alpha = 0.32/0.35$). The interrelatedness between the items revealed only moderate correlation coefficients. Thus the measurement errors in both tests, the RSE and the PSS-10, were unacceptably high.

Table 2.4-14: Cronbach's α of the scales

Scale	Acronym	Cronbach's α	Internal Consistency
Well-being Index 5	WHO-5	0.68	Questionable
Satisfaction With Life Scale	SWLS	0.69	Questionable
Rosenberg's Self-Esteem Scale	RSE	0.32	Unacceptable
Perceived Stress Scale 10	PSS-10	0.35	Unacceptable
Place Identity	PAI PI	0.79	Acceptable
Place Dependence	PAI PD	0.82	Good

PAI PI and PAI PD appeared with an acceptable and good reliability ($\alpha = 0.79/0.82$). Both subscales in further studies appeared with a Cronbach's α ranging from 0.81-0.94 (Raymond et al. 2010; D. Williams and Vaske 2003). Thus, the study presented reached comparable α -values. The test for reliability revealed, that item 12 of PAI PD had to be excluded due to no correlation with the other scale

items ($r < -0.01$). The exclusion of item 12 resulted in an increase of the PAI PD's α - values from $\alpha = 0.73$ up to $\alpha = 0.82$ (see Table 2.4-15). Thus the further analyses were conducted with only five items of this scale.

Table 2.4-15: Procedure of item exclusion for PAI PD

PAI PD Items	Scaled Mean if Item Deleted	Scaled Variance if Item Deleted	Corrected Item-Scale-Correlation	Cronbach's α if Item Deleted
2	16.76	13.55	0.50	0.68
4	17.02	13.18	0.58	0.66
6	17.08	12.83	0.62	0.65
8	16.69	13.14	0.63	0.65
10	16.85	13.71	0.55	0.67
12	17.03	18.07	-0.01	0.82

Correlation analysis

Correlation analysis was carried out with Spearman rank correlations. This correlation coefficient is applicable in case of non-normal distribution and therefore chosen for analysing the survey sample.

Table 2.4-16: Interpretation of Spearman correlation coefficient

Correlation Coefficient r	Quality of the Correlation (according to Cohen, 1988, p. 25)
$r = 0$	No
$ r > 0.1 $	Slight
$ r > 0.3 $	Moderate
$ r > 0.5 $	Strong
$ r = 1 $	Perfect

Correlation analyses with all metric variables were conducted, which should assess the relationship between well-being and place attachment as well as associations with external factors such as the biographical background. Significance levels of $p < 0.05$ were considered and the quality of correlation coefficients interpreted as in Table 2.4-16.

Furthermore, the test assessed the construct validity of the applied scales. Very strongly correlating scales ($r > 0.7$) measure the same construct and hence one of the strongly correlating scales can be treated as redundant. The scales in the sample correlated slightly or moderately (see Table 2.4-17), thus none of the assessed scales was redundant or unexpectedly overlapping. As expected, the two sub-dimensions place dependence and place identity correlated strongly, since they measure two aspects

of the same concept of *place attachment*. According to the validity check, all tested scale constructs of the survey were seen valid.

Table 2.4-17: Interconnectivity of the psychometric scales

Spearman-Rho		SWLS	RSE	PSS-10	PAI PI	PAI PD
WHO-5	r	0.32	0.16	-0.28	0.13	0.04
	p	0.00	0.01	0.00	0.05	0.53
	n	234	234	232	234	233
SWLS	r	1.00	0.34	-0.01	0.33	0.39
	p		0.00	0.88	0.00	0.00
	n	235	235	233	235	234
RSE	r		1.00	-0.15	0.16	0.02
	p			0.02	0.02	0.73
	n		235	233	235	234
PSS-10	r			1.00	-0.15	-0.03
	p				0.02	0.71
	n			233	233	232
PAI PI	r				1.00	0.61
	p					0.00
	n				235	234

WHO-5 = Well-being Index 5; SWLS = Satisfaction with life scale; RSE = Rosenberg's self-esteem scale; PSS-10 = Perceived stress scale 10; PAI PI = Place identity; PAI PD = Place dependence; r = Spearman's correlation coefficient; p = significance level; n = number of cases

Dependence analyses

Since the variables are not normally distributed (see Table 2.4-12) non-parametric tests were applied. The Kruskal-Wallis test is intended to provide statistical evidence on the dependencies of the psychometric scales on biographical and geographical factors. Non-parametric tests based on rank coefficients provide the advantage of being more resistant concerning statistical outliers (Bühl 2012: 383). The Kruskal-Wallis test divides the samples into different groups (independent variables) and compares the median values. Therefore, the score of every case was brought in a rank order: the lowest score received rank 1 and the highest score received rank x. Furthermore, the rank sum of each tested sample group R_i was assessed (Sachs and Hedderich 2009). SPSS assesses rank sums automatically. Kruskal-Wallis was assessed with the formula:

$$H = \frac{12}{N(N-1)} \sum_{i=1}^k \frac{R_i^2}{n_i} - 3(N+1)$$

where H is the test size, N is the sample size, k is the amount of groups, R_i are rank scores for every group i , and n_i is the size of every group i . The size of every group (n_i) had to fulfil the conditions of: if $k = 5$, then $n_i \geq 4$; if $k = 4$, then $n_i \leq 5$; if $k = 3$, then $n_i \leq 9$. Ethnicity and religion, as well as the marital status as independent variables, were excluded due to a high amount of groups and small group sizes ($n_i < 3$). Thus those variables did not meet the required conditions for testing with Kruskal-Wallis test.

For all tests, significance levels of $p < 0.05$ were taken into consideration. Significant differences in the sample were assessed and further analysed. Significant results were *post hoc* tested with Mann-Whitney test. The *post hoc* testing required an adjustment of the significance levels. All significance levels were adjusted by Bonferroni correction:

$$\acute{\alpha} = \frac{\alpha}{k}$$

where $\acute{\alpha}$ is the adjusted significance level, α is the significance level, k is the amount of groups.

Mann-Whitney is a two-tailed test comparing two independent sample groups by rank sums (Sachs and Hedderich 2009). The pairwise comparison of groups provides a detailed insight on which groups and how groups of the tested variable differ from each other. Differences in the sample between the two groups of binary variables were tested directly and a significance level of $p < 0.05$ was considered. The Mann-Whitney test assesses the test size U -values as follows:

$$U_1 = n_1 n_2 \frac{n_1(n_1+1)}{2} - R_1 \quad \text{and} \quad U_2 = n_1 n_2 \frac{n_2(n_2+1)}{2} - R_2$$

where U_1 is the test size 1, U_2 is the test size 2, n_1 is the sample size 1, n_2 is the sample size 2, R_1 is the rank sum of n_1 , and R_2 is the rank sum of n_2 . Test size U is the smaller size of U_1 and U_2 . This test size subsequently was transferred to the standardised z -score. Significant results ($p < 0.05$) implicated a z -score above the critical z -value (± 1.96) for two-tailed tests (Sachs and Hedderich 2009). The z -score was calculated as follows:

$$z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

where z is the z -score, n_1 is the sample size 1, n_2 is the sample size 2, and U is the lower value of U_1 and U_2 .

2.4.6 Demographic and socio-economic description of the sample

Chapter 2.4.6 describes the research area on basis of demographic and socioeconomic results of the survey (sub-study II). This Chapter does not represent the entire quantitative data. For a better reading flow, findings of the psychometric scales will be presented in separate chapters (see Chapters 3.2 and 3.3). Not significant results were excluded or only presented if this result was relevant for the discussed topic.

Sample size

In 2009, estimated 10% of the population in Uganda was supplied directly or indirectly by subsistence employment dependent on Uganda's wetlands (WMD et al. 2009, 3). Thus, in 2014 approximately 3.4 million persons received livelihood from wetlands. In order to generate results representing these people, the sample size was calculated with the following formula, with a confidence interval of 90%, a precision level of five percent, and a response error of 50%:

$$n = \frac{z^2(SD*(1-SD))}{d^2} = \frac{1.645^2(0.5*0.5)}{0.05^2} = 271 \text{ persons}$$

where n is the required sample size, z is the critical value of the standard normal distribution at 90% confidence interval (1.645), SD is the standard deviation of the sample (0.5), and d is the margin of the error (0.05).

The sample size of the survey (sub-study II) was calculated to 235 persons. Additionally 55 persons in total were involved in the group interviews (48) and expert interviews (7). The total number of participants in the study was calculated to 290 persons (see Table 2.4-18).

Table 2.4-18: Metadata of the sample

Amount of Participants								
Community Code		A1	A2	B	C1	C2	D	Summary
	Survey	39	39	91	27	39	-	235
Research Method	Group Interviews		16	-	-	15	17	48
	Key Informants		1	1	1	1		4+3
	Total							290

Survey sample characteristics

The following presents the wetland by means of the survey data of sub-study II (see Figure 2.4-1). It outlines specific population characteristics of the research area and compares the research area with data from an official source. Additionally, in this

chapter geographical specifications of the sample sites are presented and narrowed down to statistical outcomes at household level.

All participants of the survey sourced their livelihood directly or indirectly from the wetland. The majority were subsistence farmers and field workers. Other participants had their own business based on the wetland's ecosystem services, e.g. drivers of motorcycle taxis, who washed their vehicle in the wetland. The gender ratio of the sample had a surplus of women (86.5 men per 100 women). This differed from the gender ratio in the sub-county Busukuma (see Chapter 2.3.1), which was roughly balanced with 101.9 men per 100 women (UBOS 2016, 269). The median age was 35 years, with a range of 15 to 78 years (see Table 2.4-19).

Table 2.4-19: Results of the biographical data

	n	\tilde{x}	min	max	IQR
AGE	235	35	15	78	20
PPH	235	6	1	18	4
KIDS	233	4	0	20	5
LOR HOUSE	235	8	0	75	17
LOR PLACE	232	10	0	75	25
MIN SCHOOL	162	30	2	240	50
MIN MC	231	30	2	240	30

n = number of cases; \tilde{x} =Median; min = Minimum value; max = Maximum value; IQR = Interquartile range; AGE = age; PPH = Persons per household; KIDS = Number of children; LOR HOUSE = Length of residence in the same house; LOR PLACE = Length of residence at the same place; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes;

The survey represented the middle-agers mainly between 20 and 59 years. Even though they form the majority in the district, the young people were under-represented in the study due to the exclusion of persons under 15. By contrast, the survey consisted of a disproportionately large number of old (40-59) and very old (60+) persons (see Table 2.4-20). This was the target group of the survey, as it was intended to represent the working population.

Table 2.4-20: Compared age-classes

Age Class	Population Wakiso District (UBOS 2016, 265)		Survey Population	
	Total Number	%	Total Number	%
0-19	1,047,209	52.4	13	5.5
20-39	725,236	36.3	130	55.3
40-59	178,559	8.9	69	29.4
60+	46,414	2.3	23	9.8
Total	1,997,418	100	235	100

Eighty-six percent of the participants had attended primary or ordinary schools, while eleven percent had attended secondary (here named as advanced) or tertiary educational institutions. Four percent were illiterate. In comparison with the sub-county of Busukuma, the survey participants had above-average educational backgrounds due to education levels in the local council area C2 were higher than in all other areas (see Table 2.4-21). Therefore, the survey was most representative for the sub-county by excluding cases of C2. Nevertheless, the sample is described and analysed with all cases included, since the research focused on both the varieties of the different sample locations as well as between different population groups.

Table 2.4-21: Representativeness of the sample on basis of education

Highest Grade Completed (15+ years in %)	Never been to School	Primary	Secondary and Above	Total
Sub-County Current Schooling	7.9	46.0	46.2	100.0
Survey	3.8	43.0	53.2	100.0
A	9.0	55.1	35.9	100.0
B	1.1	45.1	53.8	100.0
C	1.5	25.8	72.7	100.0
Survey - C2	4.7	49.7	45.6	83.4

The sample presented a high level of cultural heterogeneity. Twenty-three different ethnic groups were assessed, which all differ in culture and language. Differentiation between the sample sites A, B, and C provided insights into the different compositions of ethnic groups. In the villages (sites A and B) more than 70% of the survey population were Baganda, but a minority of other ethnic groups were present (see Figure 2.4-3). In comparison, in site C fewer than 50% of the inhabitants were Baganda.

Also, the occupational background differed distinctively between the sample sites (see Figure 2.4-4). While in site A the majority of participants identified themselves as self-employed farmers and businesspersons, sites B and C had a high diversity of jobs and professions. In location C fewer than 50% were farmers, while the number of unemployed people and housewives was noticeably higher than in the villages. Few persons had more than one profession. Farming in many cases was done to afford subsistence and for having a side income.

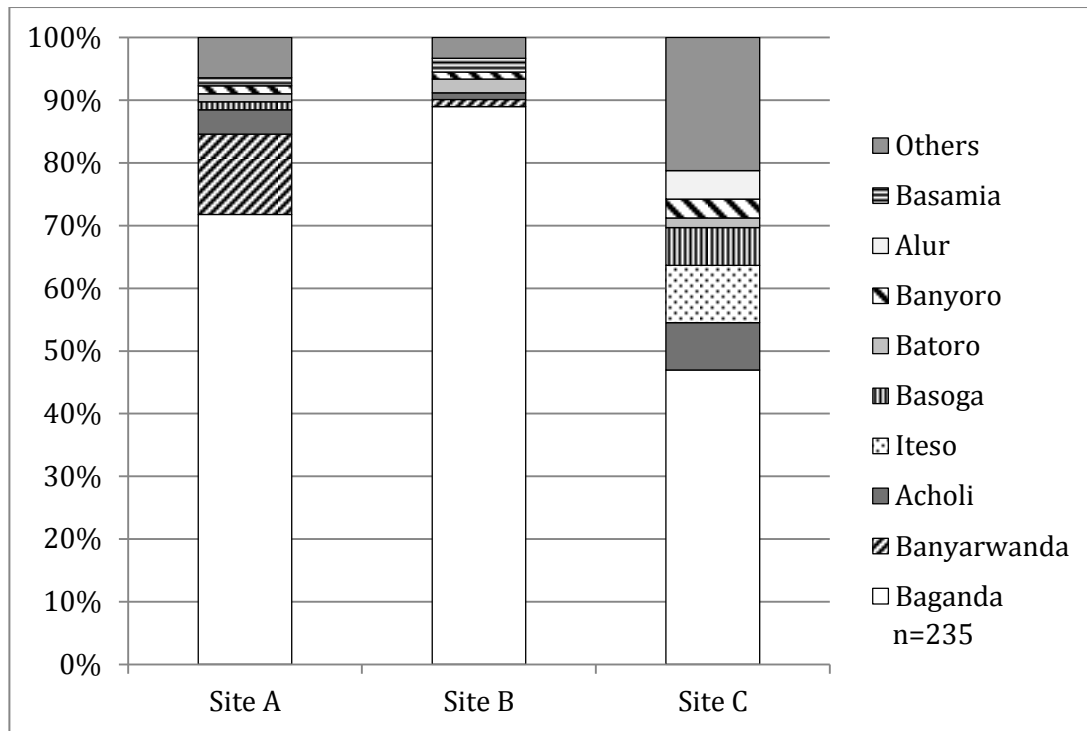


Figure 2.4-3: Ethnic groups in the research area

Seven religious orientations were detected. The majority of the participants were Catholic (40%) or Protestant (32%). Also Born Again-Christians (12%) and Muslim (10%), and Seventh Day Adventists (5%) took part in the survey. Catholics and Protestants together composed more than 70% of the population in most of the research areas. Area A2 had a broader Muslim community, while community C2 presented many Born Again-Christians. The regional pattern of religious groups in the survey might have emerged from the selection method of participants, which was undertaken by the local chairpersons themselves (see Chapter 2.3.1).

The majority of the sample was married (59%), while 36% classified themselves as singles. A minority of 5% was widowed or separated. The locality played a subordinate role in terms of marital status.

The majority of the sample reported their own perceived health as fair (58%), while many others perceived their general health as good or very good (35%). A minority found their general health in a poor (5%) or very poor (2%) status. Perceptions of general health did not vary by location.



Figure 2.4-4: Occupational groups in the research area

Geographical characteristics of the sample sites

High interquartile ranges appeared in the variables describing time required to access medical and educational facilities (see Table 2.4-19). The medians were calculated on a sample site-specific basis. The sample sites differed significantly from each other (see Figure 2.4-5).

People of site A and B went by foot (60%) to the next medical centre (see Figure 2.4-6) and spent 30 minutes on average for this journey. In site C people spent an average of 22 minutes for this journey. The maximum values, however, differed between site A and the sites B and C. Due to limited availability of motorcycle taxis and low access to public transport in the site A, the median school distance differed even more between the communities (Figure 2.4-5). Here, site A had significantly higher values than site B and C. In order to classify urban and rural areas, in Census 2014 the UBOS defined “all areas gazetted as City, Municipality, Town Council or Town Board as of March 2016” (UBOS 2012, 1) as an urban area. In the survey area, site C was gazetted as town and therefore classified as of urban area, while site A and B were gazetted as villages and thus officially classified as rural areas.

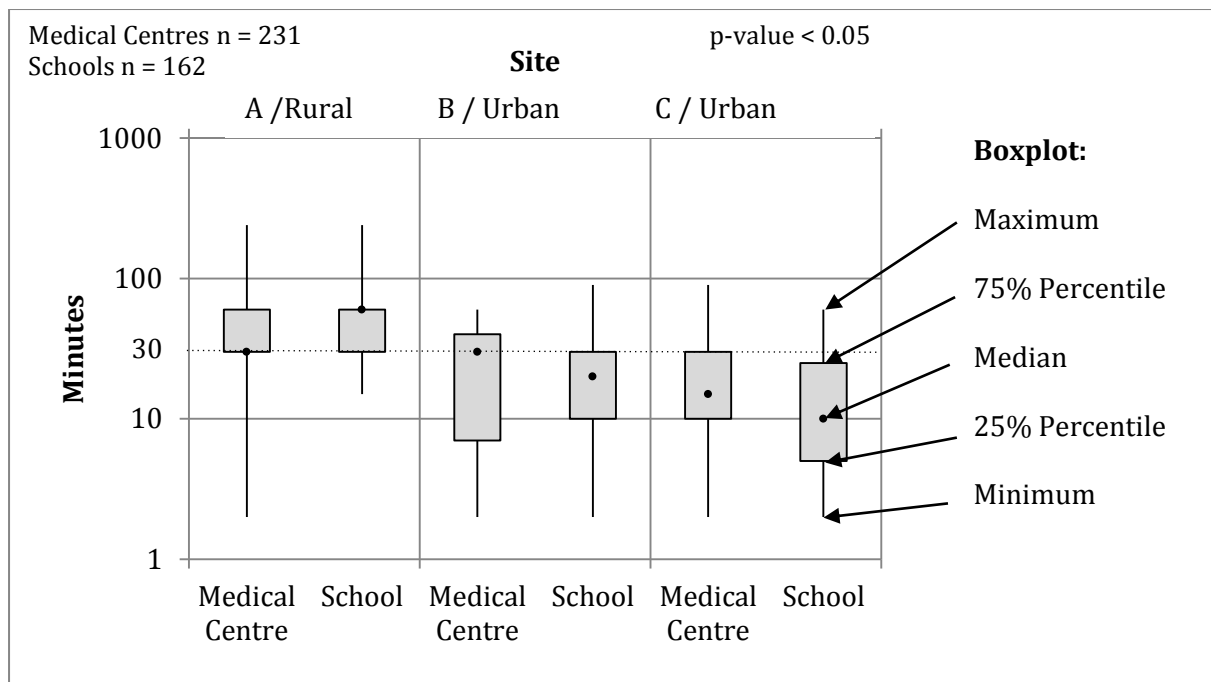


Figure 2.4-5: Time required to access medical centres and schools

On basis of the time required to access medical centres and schools, the sample sites of the survey were classified as *urban* or *rural areas*. The researcher followed the approach of Voigtländer and Deiters (2015), who distinguish urban and rural areas by the cut-off value of 30 minutes in order to access health facilities. Under this classification, sample sites B and C were classified as urban areas due to people of these sites spending on an average *less* than half an hour for the journey to medical facilities as well as schools. By contrast, 75% of the residents in site A required *more* than 30 minutes to access medical facilities as well as schools. Thus site A was classified as a rural area (Voigtländer and Deiters 2015, 955).

Based on the census data 2014, in Wakiso district 40.8 % of the population lived in rural areas, while 59.2 % of the population lived in urban areas (UBOS 2016, 290). Due to the new classification of urban and rural areas, the urban population was slightly over-represented at 66.8 % of the study, while 33.2 % of the study sample lived in rural areas. In the study, the terms *village* and *town* are used to describe the social fabric and population density on-site, while the differentiation between the qualities of infrastructure at the places is stated by the differentiation of urban and rural areas.

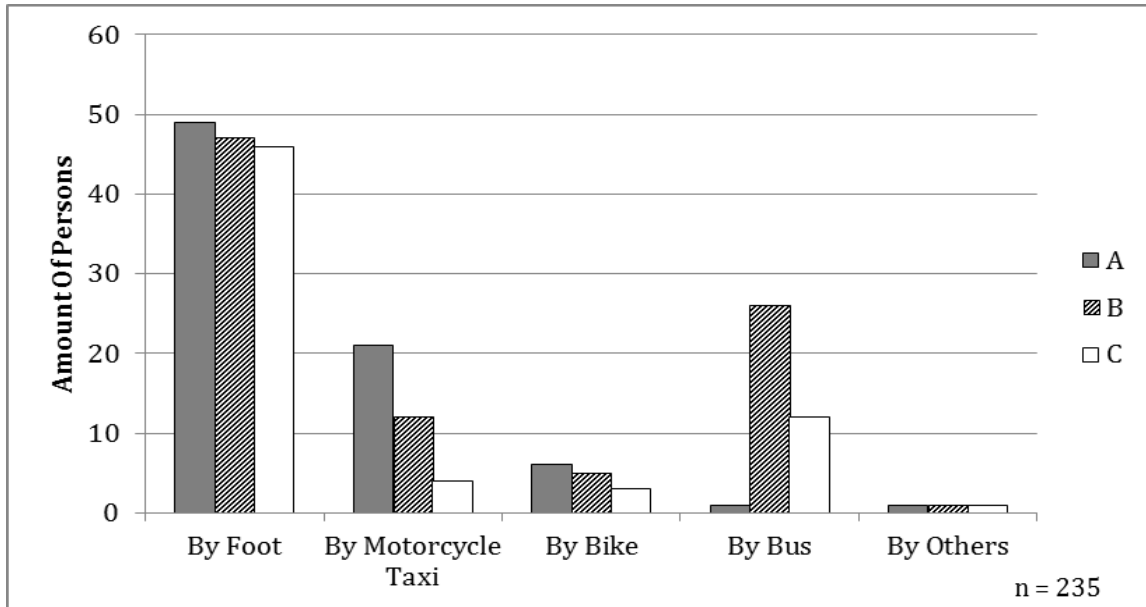


Figure 2.4-6: Vehicles used to access the next medical centre

Household characteristics

The majority of the participants of the survey lived in houses together with their family members. Household sizes ranged from one to 18 persons per house, while on average six persons shared one household. This was above the Busukuma average of 3.8 persons per household (see Chapter 2.3.1). The participants of the survey had 4.0 children on average, while UBOS published a total fertility rate for Busukuma of 6.2 children per women in 2014. Results from the study showed that in the *rural area* people had 5.0 children on average while in the *urban areas* they had only 3.0 children on average, as shown in Figure 2.4-7. Some male participants had two or more wives. One participant did not know the amount of his children.

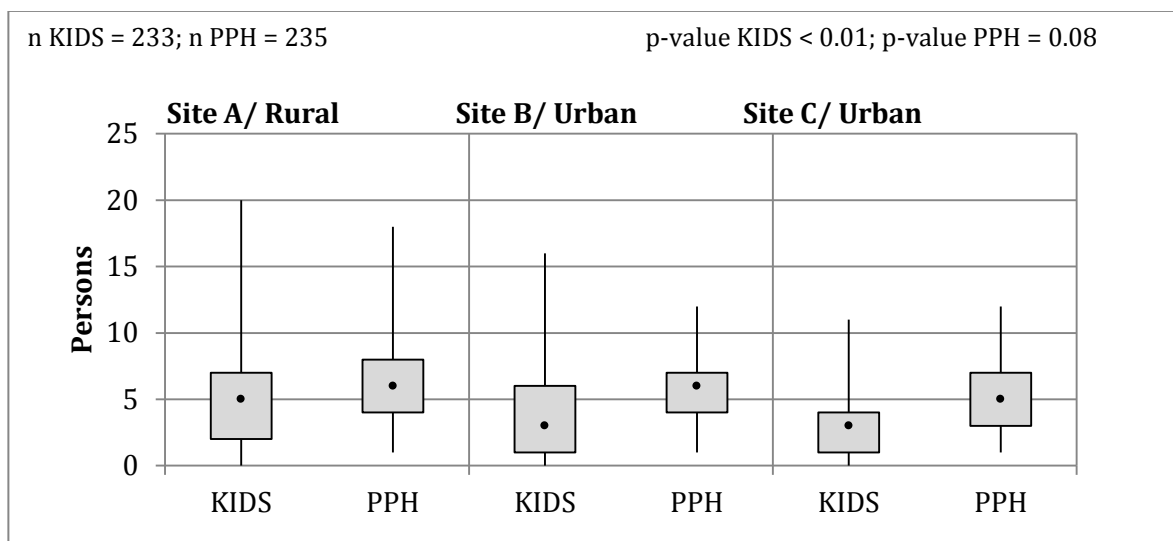


Figure 2.4-7: Amount of children (KIDS) and persons per household (PPH)

The presence of children correlated significantly with age as well as length of residence in the community and in the same house. The correlation analyses revealed that all the biographical items were slightly up to strongly interconnected (see Table 2.4-22).

Table 2.4-22: Interconnectivity of biographical items

		PPH	KIDS	MIN SCHOOL	MIN MC	LOR PLACE	LOR HOUSE
AGE	r	0.19	0.59	0.20	0.17	0.53	0.48
	p	0.00	0.00	0.01	0.01	0.00	0.00
	n	235	233	162	231	232	235
PPH	r		0.48	0.09	0.13	0.28	0.26
	p		0.00	0.26	0.05	0.00	0.00
	n		233	162	231	232	235
KIDS	r			0.26	0.16	0.41	0.36
	p			0.00	0.01	0.00	0.00
	n			161	229	230	233
MIN SCHOOL	r				0.32	0.17	0.12
	p				0.00	0.03	0.13
	n				158	159	162
MIN MC	r					0.09	0.07
	p					0.16	0.30
	n					229	231
LOR PLACE	r						0.74
	p						0.00
	n						232

AGE = Age; PPH = Persons per household; KIDS = Number of children; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes; LOR PLACE = Length of residence at the same place; LOR HOUSE = Length of residence in the same house; r = Spearman's correlation coefficient; p = significance level; n = number of cases

People had spent ten years on average living in the same place. Few of the respondents had changed houses during this time, so the length of residence in the same house was two years fewer. The sample sites also differed distinctively ($p > 0.01$) concerning their length of residence as well as in their age. In the villages, the interquartile ranges (9-38 years in site A and 5-32 years in site B) were higher than in town (5-15 years). People in the villages were elder than in towns where more migrants and younger people were present (see Figure 2.4-8).

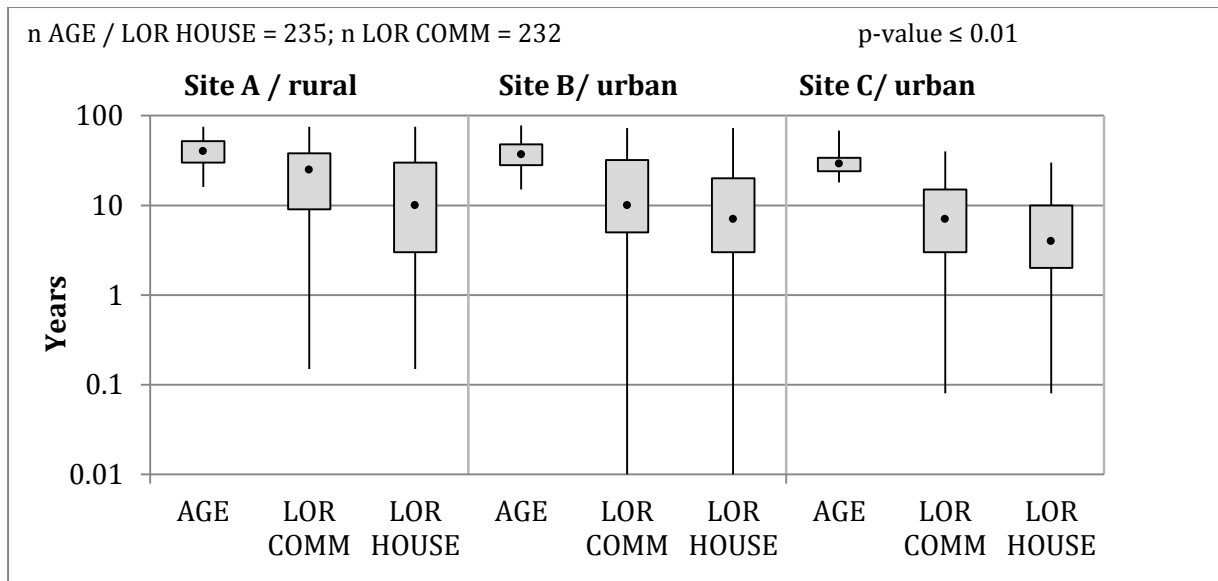


Figure 2.4-8: Age and length of residence in the sample sites

2.4.7 Method reflection - Limitations and Bias

The mixed-method approach was necessary to assess a holistic perspective on the circumstance of life in the study area. The research results uncovered local conditions and provided a detailed perspective on the research topics. A broad picture of the people's perception of the wetland became visible. The triangulation of the results was very important in the context of assessing the people's well-being and local place attachment.

The sub-studies could detect important results in order to answer the research questions and to broaden the scientific knowledge on place attachment and the local perception of wetlands. Results from the survey could be underpinned and critically evaluated by the results from the group interviews, while the interviews with the key informants related the current perspectives to a timescale.

The participants were free to refuse to answer any question at any time; however, most of the 290 interviewees were very willing to answer and to contribute to the survey. The reflection on the wetland and life conditions was rather perceived as a lesson and as valuable gathering of information for people on-site. Locals learned about the perspectives of others and jointly discussed the advantages and challenges of their lives. Some of the key informants, who were interviewed after the group interviews and the survey, demanded further capacity buildings initiatives on environmental topics.

Setting and Conditions

As described in Chapter 2.4.4, the interview setting sometimes was challenging. During the data collection, noisy soundscapes of open-air interviews and those conducted in public areas posed a challenge. Here, other people were interested in the research activity as well as traffic and, sometimes, loud music disturbed the atmosphere and hampered the concentration of the participants.

The language competencies of the interview partners differed, including those of the interviewer team. Sometimes, expressions were difficult to translate from English to Luganda and needed a comprehensive description or very detailed examples from the interpreter. This might have influenced the answers of the participants. None the interview partners were native English speakers, which might have been a source of *language bias*.

Additionally, some participants struggled to understand Luganda, as they had migrated to this region; and as an alternative, they spoke English instead of their mother tongue. While usually the interview was conducted in Luganda, in a few cases the researcher decided to switch to English due to the fact that nobody in the group was a native Luganda speaker and all members felt more comfortable with speaking English.

The interviews of the survey had been conducted in gendered groups of between two and four persons. Those groups were spontaneously organised by local chairpersons or mobilizers. The interview team had no information about the relationships of the group members. In terms of privacy, this was a potential source of *response bias* due to social expectations and peer pressure might have limited the participant's freedom of responding.

Women spoke more quietly than men or the research team. This behaviour was explainable by the culture of Ugandan women, who are expected to be reserved and polite. Often women were shy to answer; nevertheless, the interviews in groups gave them security to answer and could reduce *cultural bias* in data. Sometimes, shy participants tend to copy responses of previously speaking persons. In this case, those participants were encouraged to give their own answer, with the clarification that every answer is "correct", and the order of persons was changed so that the shy person was chosen as the first person to answer.

The interview team consisted of two women, one researcher and one interpreter. The behaviour of both was not in accordance with the traditional women's role, but more dominant and emancipated. Although the interview team tried to be culturally

sensitive, the different way of speaking (volume of the voice, intonation, body language, physical expressions) could not be hidden. Participants might feel intimidated by the research team as being female, which also might have resulted in a *cultural bias* in the data. A clash of cultures also appeared in terms of communication between the Ugandans, who are always polite and avoid saying “no” or giving negative answers, and the German way of “straight-forward-communication”, which could be perceived as impolite. Even though participation was voluntarily and the informed consent was read out loud before starting the interview, a potential source of *interviewer bias* could not be excluded.

The interpreter was an Ugandan woman, who grew up in Kampala and lived in Mukono. She also had only a limited relation to the villagers of this area. Nevertheless, she is a social scientist, who had worked in Switzerland and the United Kingdom and she managed to translate in a culturally sensitive manner. The continuity of the interview team, which consisted always in the same persons, was one of the strengths in conducting the study.

Quantitative Methods

Each interview took between 30 and 120 minutes of time. This required a high level of concentration, especially for those participants who had never attended school. It might have caused an *attention bias* in the data. The research team took care to motivate participants in the last phases of the interviews. When the participants appeared unfocused, the interview team let them know about the remaining time the interview would take. At the end of every interview, the participants received a small present, which left them leaving the interview situation in a good mood.

Initially, the questionnaire contained questions assessing the real health state of people. It was planned to assess the body mass index (BMI). Onsite, it seemed that the assessment of weight and height was too sensitive and would have injured their personal privacy. Thus the assessment of the BMI was omitted and the information about the health status of people was only assessed by their personal perception through the General Health Scale of the OECD.

Distances to schools and medical facilities were self-reported data, and not independently verified. Thus the self-reported values about the time required for access to the nearest medical centre, as well as to schools, differed strongly.

In some cases the participants did not know their date of birth, thus also the question about their age sometimes posed a problem, especially for elder

participants and those who were not good at estimation. The open question about the people's income was sensitive. Subsistence farmers could often not answer precisely, as they had no regular income and revenues from markets fluctuated strongly. Other participants, who were employed and who had a regular income refused to answer the question due to the high poverty in the area. They were afraid of being attacked by persons who knew about their income or being regarded as rich persons in comparison to the majority of people in the area.

Correlations between religious groups in different communities might be based on the selection of participants, which has been done by the local chairpersons and was dependent on where they had announced the research activities. For example, some local councillors might have told their participants about the study during the Sunday church service or in other religious meetings, as this provided a good opportunity to address many people at one time. Nevertheless, the correlation analysis generally showed that most of the significantly correlating variables ($p < 0.05$) only appeared with slight or very slight positive correlations.

In terms of the psychometric scales, results of this study were comparable to other studies, but only to a certain extent. Through direct comparison to other studies and global averages, local results could be classified and globally compared. Nevertheless, higher or lower results do not necessarily imply that the local region performs worse or better than other regions. Cultural peculiarity might have resulted in a general underrating of the Likert scales. Hence, low scores of the WHO-5, as well as the RSE, do not only result from a limited status of mental health but also are explicable by a cultural uniqueness. A *cultural bias* is also possible in case of the comparable high average of the PSS-10.

In few cases, the statements of the *WHO-5* were hard to understand for the participants. Problems resulted mainly from the variety of the five response options, which were a source of irritation and posed a high difficulty for translation into Luganda. The differences between 'some of the time' and 'less than half of the time' were difficult to understand and to evaluate, as was the difference between 'more than half of the time' and 'most of the time'. Secondly, the time reference of the last two weeks posed a challenge for the participants. The subsistence farmers appeared to have a different concept of time than people from cities. In the subsistence farmers' lives, the usual Christian calendar matters less than the date of the last precipitation or heavy rainfall. Thus people talked readily about either today or tomorrow and rarely about the past four weeks if there had not been a special weather or cultural event.

All statements of the SWLS were easy to understand for the participants. A critical point was the 7-point Likert scale, which was somewhat confusing for the participants. In this case, a 5-point Likert scale would have been sufficient. Nevertheless, the response opportunities were easy to understand. Only the last statement 'If I could my life over, I would change almost nothing' often required explanation due to the answer opportunities. The intuitive positive answer to this statement would be 'no', but on the Likert scale the same positive answer was given by the statement 'I agree'. This was a source of confusion.

The coefficient reliability of RSE and PSS-10 showed unacceptable values (RSE $\alpha = 0.34$ / PSS10 $\alpha = -0.04$). The main problems were negative correlations between the items having their origins in negative statements and questions of both scales. Those posed difficulties in understanding, since for native Luganda speakers it was very uncommon to express things in a negative way. Thus response opportunities for the negatively posed statements and questions were a source of irritation. Furthermore, as mentioned in relation with the WHO-5, the time reference of the PSS-10 to the last four weeks was uncommon and difficult to remember.

The PAI proved to be a good tool to assess place identity and place dependence. People could easily understand the statements and answer intuitively. The scale, in general, seems to refer to places, which people visit for relaxation and other recreational purposes. The reflection on these places requires knowledge of and comparison with other places. Not all participants had left the area and had seen other wetlands to compare. Nevertheless, participants who had an emotional bonding to the wetland could answer intuitively and very fast. In contrast to that, persons who had no emotional relation to the wetland required a short explanation of the first question of the PAI.

Comparing global scores to local results poses a challenge, due to this comparison implying the existence of a general global score. The value system of the participants was predominantly shaped by the life circumstance in the wetland as an ecosystem, which hardly is comparable to the life circumstance of e.g. a manager of a bank. There is no general definition of stress and well-being valid collectively and in all cultures. The local context needs to be assessed and to be brought into relation to the scale scores. The group interviews and interviews with key informants provided a broader picture of the situation and to a certain extent could explain the results of the survey. This has been done with the triangulation of the quantitative and qualitative studies.

Qualitative Methods

The group discussions and interviews with key informants provided useful information to assess the attachment of the residents to the wetland as well as to embed this information into a broader socio-cultural context. The previous contact with the interviewees and the local councils was very important to a trusting and untroubled talking atmosphere. While the group interviews detected a snapshot of the current feelings and attachment to the wetland and its current status, the interviews with the key informants classified these findings with temporal accuracy.

The simultaneous interpretation during the interview sometimes resulted in misunderstandings and loss of information. The interpreter was very familiar the researcher's topic, which sometimes in the heat of the moment resulted in a translation with the researcher's wording and not a word-by-word interpretation of the participants. These differences only became visible in the transcribed and neutrality-translated documents; this process could avoid the use of the interpreter's words for the analyses of the results.

The PRA methods turned out to be very accurate in assessing the key questions of the study. The information could be gathered easily and the participants experienced PRA methods as interesting and funny. From school, they only knew *frontal teaching*, thus they were positively surprised that learning could also be done in a more interactive way. The principal researcher initially did not consider that some of the participants might struggle to write and read numbers, but in the first group interviews, a selection of the group obviously struggled with these tasks, e.g. when they had to write numbers on post-its. The interview team thus adapted the PRA method and took care of the integration of every participant.

Associations of wetlands and well-being turned out to be easy to understand for the participants, even though often only those items were mentioned which were not available at present and perceivably missing. The actor mapping was very helpful and provided interesting information. Four flipcharts with a system of stakeholders in the wetland were visualised. The combination of all flipcharts provided a broad actor map on the social space of the wetland and served as the basis for the selection of key informants. Unfortunately, only a limited number of the mapped stakeholders could be represented as key informants in the study.

In contrast, it was hard to conduct a transect walk if this was not communicated in advance. While in community A the *kiseniy* was directly accessible, it was too far to visit from the location of the group interview in site D. Especially in the urban areas, the wetland was too far away and thus this PRA method could only be conducted in

the rural area, where the wetland was only a five minute walk away. Conducting a transect walk needs special preparation and communication with the local chairperson in advance since this method depends strongly on the location, where the group interview takes place.

Assessing the emotional expressions towards the wetland turned out to be very difficult. In this case, it could rely only on words which people used. Facial expressions, as well as gesticulation, were not included into the analysis since there was no opportunity to record the interviews with cameras but only with an audio recorder. Furthermore, the cultural differences between the participants and the researcher in expressing anger or happiness or any other feeling by body language could not be overcome. In this context, it is not clear how much information was lost by the transcription of the interpreter and the translation into English. Here the *cultural bias* posed a challenge and might have hampered the gathering of better and clearer information on feelings and expressions provoked by the wetland. Further studies on the emotional expressions would need local research teams speaking the same language as the participants as well as using the same body language.

Self-reflection

The results and discussion of the data as well as the collection of data are influenced by the researcher's perspective. Thus it is necessary to reflect on the researcher position (Dixon and Durrheim 2000). The researcher tried to be objective when collecting data by accepting answers without prejudging and analysing data and without expecting any fixed results. However, the pure objective neutrality has to be scrutinised, since the familiarization with as well as critical reflection on the collected data imprint the description of results. Even though, it is recommended to stay naïve in order to get to know new cultures and different ways of thinking (Russel Bernard 2006, 366f), it is hardly possible to go into the field like blank book, being as naïve as at the first day of school; in other words collecting data without a personal view and prejudices.

The researcher of this study has a personalised attitude towards nature, which is influenced by her cultural background of Germany, her education as well as her study background as a geographer, biologist and anthropologist. In her childhood, she spent most of the time playing outside and doing outdoor activities as a pathfinder. These personal experiences strongly influenced her approach to nature. The researcher's personal overarching aim is the protection of nature and the

sustainable use of nature. She would like to see people living in accordance with the wetland, without overexploitation and the knowledge about the wetlands role for their own well-being. This perspective, however, may differ from time to time diametrically from the perspective of the residents, who are dependent on the productivity of the wetland for their survival.

The way the researcher appeared in the research area, the way she communicated with people as well as the vehement manner she paid attention to the wetland, definitely influenced the residents and thus the data collection and the sense of the wetland (Williams and Stewart 1998). This impact on the wetland's sense stays even if the researcher is not present in study area anymore.

At the very beginning of the research, the researcher classified herself as an *outsider* regarding the study area. According to Shamai's (1991) seven levels of sense of place, she assigned herself to the ones having not any sense of place. While spending time within the wetland and living there for several months, the researcher became familiar with nature and people and gained knowledge about the wetland as well as familiarity with the landscape and the place. At the end of the first research stay after three months, the researcher felt already belonging to the wetland and its residents. After one year she returned for the second research stay in the research area. People were welcoming her enthusiastically and the researcher felt happy to be at the place again and a bit like coming home. She got friends and a social network at the place and already was known as the "researcher from Germany".

Shamai's (1991) levels of being intensively involved into a place are the characterised by taking an active role in the community and being committed to a place. By the researcher's activities in the communities and highlighting the need for the wetland's protection she temporarily fulfilled even this state. Thus as an individual and as a researcher she made a way through different states of place attachment, starting from an outsider to a feeling of being bonded to a certain extent with the investigated wetland. Thus it is not easy to position one's self, but maybe it helps to realize that positions may change during a research process and to highlight that it is a highly dynamic concept.

3. HEALTH-PROMOTING EFFECTS OF A WETLAND IN WAKISO DISTRICT, UGANDA

The case study is divided into three sub-chapters representing different-scaled research perspectives. In accordance with the concept of therapeutic landscapes, the symbolic, the social, and the activity and experienced spaces of the wetland are outlined.

Semantic meanings and the sense of place represent the symbolic space of the wetland, which strongly reflects the socio-cultural and historical context of Uganda. The focus of Chapter 3.1 is on this macroscale (see Figure 3-1). Findings might be valid also for other wetlands in the country. Chapter 3.2 zooms down to a mesoscale in which the social fabric of the wetland is outlined. Finally, the individual's activities and experiences happening at microscale in the wetland are jointly considered in Chapter 3.3.

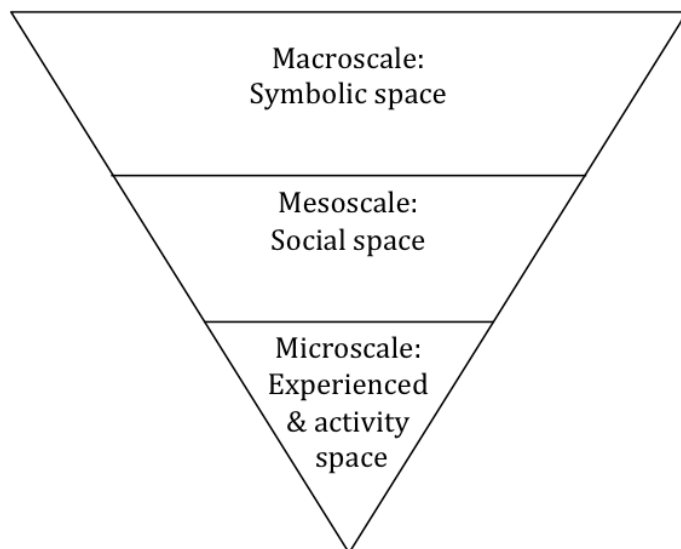


Figure 3-1: The scales of the appropriative spaces

3.1 MACROSCALE: SYMBOLS AND SEMANTIC MEANINGS OF THE WETLAND

Semi-structured interviews with different stakeholders provided information on the historical development of the wetland. Private farmers and tenants, as well as landlords, local councillors and National Crop Resources Research Institute (NaCRRRI), served as interview partners. If possible, information of the sense of the wetland from the informants was verified by external sources and linked to Uganda's history as stated in Chapter 2.3.2. It shows challenges and benefits of living in a wetland.

3.1.1 *Wastelands and no-go-areas - the beginning of the Museveni-era*

When Uganda became independent in 1963 (see Chapter 2.3.2), the wetlands were "handed over to the Ugandan government" (FM). The British had highly restricted access to the wetlands (FM), thus they had been left abandoned and perceived as redundant *wastelands* (Aryamanya-Mugisha 2011; Ministry of Natural Resources

1995). After independence, the wetlands were designated as public land. Before the wars in the 1980s, the pristine wetlands consisted mainly of papyrus as well as springs and many fresh-water flows (FM/ LC1 C1). Some areas were in use for fish farming but the main utility was the provision of clean drinking water (LC1 C1). Proper cultivation took place on the *mainland*¹⁵ only (LC1 B). On the establishment of Museveni's rebel group in the 1980s (see Chapter 2.3.2), he took ownership of the swamps as public space and abandoned areas. For the guerrillas, the *bush*¹⁶ provided a source of concealment from the military. For all other residents of the basins, wetlands gained a bad reputation as *no-go-areas*.

It was very risky to start coming to work in the wetland during the war because they [the guerrilla forces] could easily take you as one of the guerrillas during the government elections. This was one of the areas where they used to lie in ambush a lot. It had been thick, you know, the papyrus was thick, so they could easily hide there and be able to attack... (FM).

The pristine state of the wetland was also due to the fact that, during the time of political insecurity, they were perceived as dangerous and forbidden areas. People fled from their villages and also from the wetlands to refugee camps (FM). After the wars in 1987 (see Chapter 2.3.2), when the guerrilla forces with Museveni as leader had taken power, political stability returned. The displaced population, as well as those hiding in the bush, returned to their villages. The wetland regained the original status as public land. Only the governmental research institutes, such as NaCRRI, demarcated areas for their experiments, while all other parts were open to enter (FM). People returned to their homes, restarted their lives under political stability, and they were “*very vigorous to do their farming*” (FM). The wetland's meaning, however, as a dangerous area persisted after the war and was emphasised by the existence of snakes and other venomous animals living in the wetland. People cultivated rather on the mainland, as “*they had not yet known the importance of wetlands*” (LC1 A), even though access to the mainland was restricted by law. In contrast, people refused to work in the wetlands, since their cultivation required “*too much energy*” (PF M), due to the

¹⁵ In the following the expression *mainland* is used for arable land, which is located in the upper areas of the wetland basin or outside the catchment. The expression *mainland* emerged from the interviews as synonym for arable land outside the *kiseniy* or *lutobazi*. In some cases also the expression *dryland* was used.

¹⁶ <http://www.bbc.com/news/world-africa-12421747>

difficult working conditions. As before the wars, the wetlands were perceived as redundant and useless “wastelands” (Uganda Wetland Policy 1995: iii ff.) (see Box 3.1-1).

Box 3.1-1: Extra energy for cultivation in the wetlands

In the past and still today, the cultivation in a wetland is an outstanding hard work in comparison to the cultivation of mainland (FM/ PF M). Firstly, to open a field, it has to be drained. This requires some extra energy, which implies also the need for additional food and calories. Those ones who can afford, employ grabbers to dig trenches for the water flows.

Especially, when you find a paddy, [...] there is a way it strains somebody. So you find that somebody, who has worked in the wetland for some [...] years, he gets weaker because it keeps using a lot of strength. And actually [...] you will realize that many of those who have stayed for quite long years; these will be old weak people (FM).

Secondly, during the season the permanent growing of wilts and unwanted weeds keep people busy (LC1 C2/ PF F). Those farmers who cannot afford peasants are forced to reduce their size of fields in order to manage the workload (FM). Cultivation in a wetland requires extra time. People get [...] isolated from the normal environment [...]. A wetland engage somebody a lot, [...] you have to stay there for long hours, so you may miss some of these social activities. So you see some of these people becoming a bit quiet or lonely because of the environment they are used to be in, working in. (FM)



Photo 3.1-1: Drainage in the wetland (Heinkel, 2014)

3.1.2 *No-Man's-Land - Social-ecological developments*

When Uganda's government had stabilised, a new constitution was passed in 1995 (see Chapter 2.3.2) and reforms concerning the wetlands were established (FM). During the following years, physical infrastructure improved significantly; roads were paved and health centres and schools were installed. Uganda was successful in achieving the Millennium Development Goals, halving its poverty rate to become one of the best performers in Africa¹⁷. The life situations of people changed positively due to the development of the country. The reproduction rate was still high, while the life expectancy at birth increased from 43.7 years in 1995 up to 58.5 years in 2014¹⁸, which resulted in a large growth of the population. By the increasing population also the demand for land increased (FM, LC1 A, LC1 B, LC1 C2, LC1 C1, PF M, PF F).

The land tenure system of the Baganda was based on *gavelkind*:

[...] For instance: there were two acres, which belonged to one person long ago. He gave birth to children who shared the whole chunk amongst them. Every child has its own portion. This means that one chunk of land was partitioned into five pieces of land owned separately (LC1 B).

In combination with a tremendous increase of population, this inheritance system led to a further and further subdivision of land. Smaller fields needed to gain yields for more persons, which resulted in the necessity to access other lands in order to ensure the families' livelihood. Forced by this incrementally increasing need to open new fields, people entered the wetland in greater numbers. The newly constructed road crossing the central area of the wetland allowed people to enter the rough terrain. Innovative farmers started experimenting with crops, which could persist and grow under the wetland's conditions. The farmers figured out that yams and sugar cane were convenient crops for their subsistence farming, while others did not survive in the swamps (LC1 B, PF M). *"It was basically not because of the financial value. They initially grew sugar cane because sugar cane can thrive where there is a lot of water"* (LC1 B). People entered the wetland without restrictions (FM).

¹⁷ The level of extreme poverty set by having \$1.90 per day could be reduced from 62.2 % in 1992/93 to 33.2 % in 2012/13 (<http://www.worldbank.org/en/country/uganda>).

¹⁸ (<http://www.worldbank.org/en/country/uganda/overview>)

People realised that cultivation in the wetland yielded money (LC1 B, LC1 A), thus *“more people started coming to the wetland. And here now the agriculture transformed from sugar cane [...] [to] vegetables”* (FM). Subsistence farmers now started to do small business in the swamp (LC1 C2). People realised that the wetland helps them to sustain their livelihood and also serves as a source of income. They were *“just running to the institution as fall back a specific wetland. [...] So everybody looks at the wetland as free **no-man’s-land**. Yes, they look at it as no-man’s-land”* (FM). Original crops such as yams and sugar cane were replaced by those ones, which brought good yields at the market. *“They resorted to other crops after realizing that sugarcanes and yams no longer give better yields. It is for this reason that they resort to growing rice in order to earn money and acquire food security”* (LC1 B).

The use of the wetlands as a source of financial income became common practice. In every season, the farmers retained *“some provision for the home and then sell the rest to the market”* (PF M). Since farmers did not have any other financial sources, *“sale from the market”* helped them to gain income (PF M). Money was *“earned through the wetland activities. This was not so in the past”* (LC1 C1). Even though farming within the wetlands was seen as exhausting, people tended to detect the advantages and values of the wetland. Gaining yields provided new opportunities to the farmers such as building houses *“while others pay[ed] their children’s school fees”* (LC1 C1). The fertile soil of the wetland gained good yields. Variable cash crops like cabbages and tomatoes could be cultivated. Due to sufficient availability of water, the wetland was *“on high demand”*, which remains the case today. *“[...] Many people are looking for viable farmland to realize good yields. That is why some even resort to opting for tentative land leases* (PF F).

The farmers take advantage from *“off-seasonal cultivation”* (LC1 C1, LC1 C2, FM, PF F, PF M) since the wetland provides fertile soils and water also during the dry season. *“When the sun begins to shine we resume cultivation of the wetlands. It was always like this and it is still my practice”* (PF M). The wetland and their adjusted farming techniques enabled farmers *“to sell food crops during the hot seasons. Food sold during the hot seasons is relatively more expensive than planted and sold during the cold season. Everyone farms during the normal wet seasons. Additionally, the quantity of food crops grown in wetlands is little”* (PF F). By cultivating the wetland during the dry season, farmers now resist the droughts and food scarcity and even earn a reliable income. During the wet season, the villagers still go to the mainland (FM, PF M).

3.1.3 *Best Land - Agricultural turn from subsistence to commercial farming*

Nowadays, farmers start to intensify their cultivation in the wetlands. Especially in the areas where the population density increased, people tend to cultivate the mainland and the wetland simultaneously. The cultivation of wetland and mainland enables permanent farming. While farmers usually have been “*pushed out*” of the wetlands when the first rain started, it turned into the “*opposite*” (FM), since “*the swamps don’t have seasons, you can use it almost throughout the year*” (LC1 C2). The farmers cultivate their plots within the wetlands continuously and with a high variability of crops resulting in an intensive use of the land. “*In the past, people did not know the importance of wetlands. With time this has changed. Since they know that these regions have moist soils, many have resorted to do continuous farming on wetlands*” (LC1 C1). Where people used to rotate crops or let the land lay fallow during the rainy season, they “*now are using it more than before*” (LC1 C2). The farmers have adapted to the hard work especially in the wetland such as digging trenches in order to drain the land.

Besides cash cropping, the wetland’s ecosystem services also provide other opportunities to gain income. Since the soil of the wetland is highly suitable for bricks and the demand for bricks increases, especially young people changed their source of income from crop cultivation to brickmaking, while “*the adults still stick to agriculture*” (LC1 C1). Bricks from the wetland, which are high quality, yield good sales. “*Good bricks cannot be made with any other soil*” (LC1 C1). Furthermore, stockholders graze their livestock in the wetland, papyrus is harvested and other income-related activities take place within the wetland (see Chapter 2.3.3). The farmers “*[...] are capitalizing on doing their activities [...]. This is now no longer crop for subsistence farming, but they do commercial farming*” (FM). People recognize the advantages of the wetlands ecosystem services as a source of livelihood and source of income. The wetland’s reputation has changed and its meaning has completely shifted from a wasteland to the *best land* to guarantee the farmers’ well-being.

More and more people want to form a plot in the wetland and live nearby. Even those “*who were supposed to operate in Tororo their livestock, [...] they came back for growing pasture*” (LC1 C2). Furthermore, arable land is being turned into construction land (FM). “*Every business or subsistence farmer, who gains little yields, resorts to cultivating the wetlands*” (PF F). Additionally, “*encroachers or outsiders*” (FM) from densely populated areas come to the wetland and “*want to capitalize usually the advantage of the dry season, to be producing crop off-season. They just do come in and be able to use the place*” (FM). Use of the wetland is effectively unregulated.

The demand for land has increased tremendously, but the amount of land has, of course, remained the same (LC1 C2):

The same land cultivated by my grandmother is the same land I have cultivated. It is also the same land my children are cultivating and the land my grandchildren will cultivate. The land gets exhausted. The population increases yet the land does not change (LC1 B).

The impacts of urbanization are visible in the wetland, which is located in the outer-skirts of the capital: *“This place is as crowded as Kampala. Many people have built houses in places, which were bushes originally. On the other hand, though, some have chosen to sell their land, too”* (PF F). Many foreigners bring a high variety of wetland uses, some are used for food and crop farming, some are used for brick making, while some are turned into real estates. *“So they are flopping now in the wetland. Uncontrolled! [...] But now it is all everywhere”* (FM).

The villagers benefit from the wetlands as a source of financial income. Now they can send their children to school and build better houses. Regular income was previously perceived as a luxury but has become a necessity. Income relies on permanently high yields and high competition on markets forced locals to rethink their traditional farming techniques. The high yields can only be ensured by the application of fertilizers and pesticides as well as fungicides. Using herbicides reduces the farmer’s workload in the fields by the eradication of noxious weeds and increasing yields (FM). Due to their positive properties, pesticides are perceived as medicine for the plants: *“[...] When one grows tomatoes, for instance, much money is required to buy the medicine to be sprayed and the spraying utensils as well”* (PF F).

3.1.4 *Land of fortune – The increase of well-being*

The change of the sense of the wetland results in a movement of investors and business farmers from outside into the wetland. Many *“encroachers”* from outside build houses in the region. The wetland’s good reputations as a source of income land and the increased demand for plots raise land prices. The increase of prices affects people in different aspects. Firstly, the subsistence farmers cannot afford to buy land themselves, which reduces the accessibility of the land resource for their growing families. Secondly, many of their neighbours sell their land to outsiders. The wetland’s population is now mixed and consists of villagers who have spent their whole life at this place, as well as people from Kampala. Those newcomers, on the one hand, work in Kampala and commute there every day, and on the other hand

are investors, who speculate on the increasing value of the wetland's plots. The new composition of people influences the social interaction. There is a clear line of segregation between locals and newcomers, who are perceived suspiciously by the locals: *"Some are social while others are not. Others enclose themselves in their fences"* (PF F).

In the past, the research station had strongly influenced the area, due to the production of new seeds and the conduction of experiments with cash crop in the wetlands. Local farmers used to buy vegetables from the research station and benefited from the availability of new varieties of seeds. Furthermore, they obtained new farming ideas and capacity building by contact between field workers and researchers, *"all the people around also come and adopt these methods and they have tried to do their commercial farming"* (FM). The commercialization makes the farmers independent from the research institution. They now have the opportunity to decide on their own which crops they want to cultivate. Main drivers of decisions are market prices of crops, *"so the sugar cane has remained as one of the main crops we grow here. But then we have also yams, the yams because they are so costly, they sell highly"* (FM). Knowledge of wetlands has increased (LC1 A) and the population growth has driven the further opening of new fields in the wetland. Due to the continuous cultivation and the diversification of income opportunities, people reach a new level of resilience against economic struggles (LC1 C2). The farmers can sustain their basic need and have the opportunity to improve living standards. *"Many good things have happened. For instance, as the local councillor, I am thrilled when I see young people build houses and are raising up good families and providing school fees for them"* (LC1 C1).

"Financial well-being has [...] improved. Before, the houses we lived in were small. I believe one can tell the difference" (LC1 A). The families now use the money for education, social activities and entertainments. Nevertheless, the behaviour of the people *"has changed, mainly due to the fact that they have begun engaging more in a lifestyle associated with entertainment. I assume that nowadays people are not as poor as before. They can afford some money to spend at a disco (or dance party) and also have a drink or two"* (LC1 A). Entertainment and spending leisure time in clubs is a relatively new development and meets a lack of understanding by authorities and elders since it is directly associated with excess consumption of alcohol. *"This should not be the way to behave because it is destructive. Most people who indulge through useless entertainment end up achieving nothing"* (LC1 A). In Uganda, alcohol consumption increased, especially from the end of the 1990s through the 2000s (Fact sheet Risk factor alcohol Uganda, WHO 2014). In comparison to other East

African countries, Uganda had one of the highest rates of alcohol consumption per capita per year in 2010 (WHO 2014).

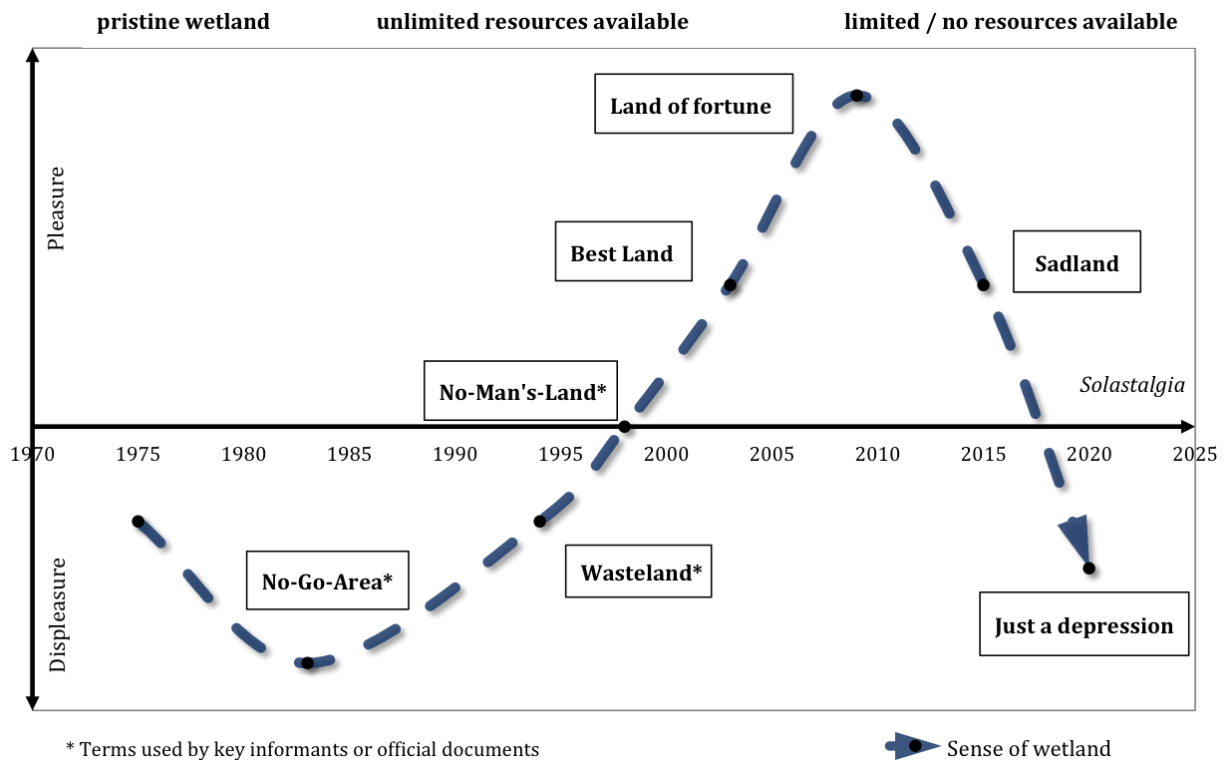


Figure 3.1-1: Macroscale - Senses of the wetland in a historical order

3.1.5 *Sadland – Irreversible environmental changes*

Two particular agricultural technologies have been central to the economic development of the wetland's residents: off-seasonal cultivation of crops, and the use of pesticides. This agricultural turn, however, resulted in irreversible impacts on the environment, as *"people have dug carelessly through the wetlands"* (PF F). Changes in the environment are clearly visible. The more pesticides that have been applied, the more people have realised that this *"medicine"* is very unhealthy for the environment. *"The pesticides, which are used nowadays to spray the weeds, reduce the land's fertility. When one sprays the pesticides, it is retained in the soil. The useful organisms in the soil (like snails) will be killed or would flee because of the pesticide"* (LC1 B). Although these increased farming activities contradict the *National Environment Regulations* (see Chapter 2.3.3), NEMA has not put in place *"very stringent measures"* (FM) against *encroachment*. Lack of controls concerning the wetlands is perceived as a problem by locals and is requiring a solution.

The commercialised cultivation and capitalisation of the wetland has created a certain dependence on additional chemicals. Local farmers realised the harmful

aspects of pesticides, but in order to maintain their yields and level of income, they are forced to use them. *“Much indeed has changed; one used to harvest ripe paw paws, but things have changed. Unless one sprays the plants, one cannot harvest anything. Just look over there, someone is spraying!”* (PF F). Due to *“permanent deforestation”* for new fields, firewood and the construction of bricks as well as *“consistent cultivation of the wetland”* (PF F), the water table is reportedly falling (LC1 B, LC1 C2, FM). Thus, one of the wetland’s most important resource is no longer limitlessly available; in fact, it is sometimes scarce (LC1 C1). This is a source of concern for the residents, as one respondent points out: *“When it comes to lowering of the water table that affects me!”* (LC1 C2).

The water cycle is influenced by the changes of the wetland’s surface, and so too by the local climate. The unpredictability and high variability of rainfalls is affecting the farmers, whose yields depend on them. As reported by the interviewees, over the last years the dry seasons prolong and the start of the rainy seasons is more uncertain. The rain comes unexpectedly but is absent when farmers expect it (FM). Due to irregular seasons, the farmers’ yields and, therefore, their sources of income are under threat (PF M): *“Indeed these changes are not permanent and predictable. So they do affect me. I hope this is clear. [...] This leads to losses. Yes indeed, they do lead to losses! It does affect my income since I do not earn what I planned to earn”* (PF M).

Indeed, the whole composition of the natural environment of the wetland is changing (LC1 B, PF M). The wetland’s original vegetation *“is being wiped out”* (FM), which impacts the wetland’s provision of fresh air. *“The constantly use of pesticide had changed the environment massively and left areas [...] almost bare without any vegetation apart from those crops they have been growing it”* (FM). The use of chemicals also changes the infiltration of the soil, which dries out. The wetland’s capacity to store water reduces. *“Whenever the sun shines, the wetlands lose water”* (PF F). The climate in the wetland is basically the same as on the mainland. In some spots, there is excessive heat during the dry season. As a result, the types of crops grown there must be adapted to new environmental conditions. Cassava and sweet potatoes, which cannot grow in very wet areas, can now be cultivated also in the lower areas of the wetland (LC1 B). Different crops and vegetables tend to suffer from plant diseases, which have emerged during the last decade. In particular, farmers report the presences of a tomato disease, which makes tomatoes grow prematurely and wilt very fast. The farmers also observe a *“systematic drying out of the Matooke banana leaves”* (LC1 B), changes in the growth behaviour of cassava and the wilting of bitter berries and eggplants (LC1 B, PF M, PF F).

Box 3.1-2: Perception of pesticides as threat to human health

Especially those people, who dig in the wetlands, when they are not well protected, in especially the legs, the foot, I think, they get some diseases. That could be due to the use of these chemicals and also contamination of the water with other kind of chemicals. But I don't think we have very serious diseases for the human. Maybe as a result, maybe of using those who have the crops grown and they have sprayed (quietly) (FM).

I think now there is no testing, but we are taking polluted water because people now spray in the wetlands and streams, which are passing through and even the sewer that goes down by itself. So maybe there hasn't been much testing of the water, but we might find that the water we are taking is also polluted with chemicals (LC1 C2).

Personally, I am concerned about the increase in population. Right now the food we eat is no longer harvested right here, where we live because there is no more land for cultivation. People are many. The sprayed food is taken to the market where it is sold. Personally, I have no market of my own. Unfortunately, it is the market from which I buy (LC1 B).

Yes! Many [diseases] have just surfaced. For instance AIDS and cancer (of the stomach) Many people are being operated. I suspect there are many toxic foods out there, which we eat (PF F).

So now they have been using those herbicides, which can almost kill you (FM).

Apart from agriculture, the prevalence of brickmaking is perceived as a risk for human health and environment. *"Now where the wetland is being drained out with clay or original soil, you just remain with areas which can't even have or just get waterlogged areas, but it cannot be used for anything. [...] So you will leave those gullies, which is not right" (FM).* These gullies fill with water and provide a good habitat for mosquitoes. Eventhough water-related diseases, such as diarrhoea, have been reduced (LC1 C2), malaria is a constant threat. Residents get sick very frequently, due to the short distance between mosquito breeding areas and their houses: *"I don't think somebody can spend a season when he is frequently working in the wetland not getting malaria attack..." (FM).*

All interviewees had concerns about the impact of chemical and pesticide on the environment and resources. One of the most commonly perceived threats to the personal health is the "slow killer" (LC1 C2) of chemicals in the water from the wetland. The residents also feel threatened by the intake of pesticides from water and food (see Box 3.1-2). The informants report about increasing incidence of skin diseases and flu and coughs have affected both young and old (LC1 B). Ulcers and back pain have also emerged in the area (PF M).

3.1.6 *Tricky social-ecological development*

Increased use of the wetland offers many advantages to the residents but increases their concerns about environmental damages and health risks. No solution for this “tricky” (LC1 B, LC1 C2) paradox has yet been found. The short-term benefits of income generation from intensive use of the wetland provide stronger immediate incentives than sustainable use. The building of factories by investors has a great impact on the well-being of their employees: “[...] when they have put a factory, then people are employed and happy, but after some time, there are some diverse effects” (LC1 C2). Long-term effects “might be disastrous” (LC1 C2) for the ecosystem and therefore also for the residents.

While investors and commercial farmers have increased their financial well-being and improved their living standards, subsistence farmers, who have not yet commercialised their farming, are at risk of remaining in poverty. The farmers perceive themselves as being under “pressure [...] on how somebody’s feeding” (FM). A decrease in land availability has led to a reported increase of “theft of food” (LC1 C2). Poverty forces people into intensive use of the wetland in order to gain a small income e.g. producing and selling charcoal (PF M). One local chairperson said: “I know that all, but it is all tricky. One cannot be told ‘do not cultivate here’ yet they need something to eat!” This phenomenon is visible across Uganda, “someone is so secure food-wise but the other one is very bad. It is general. It is not just wetlands”. Especially during the 2000s, the social gap between the rich and the poor grew across the whole country. The GINI Index has been steadily increasing since the implementation of the new constitution, from 39.04%¹⁹ in 1996 to 45.17% in 2002.

The increased land value in the wetland has led to reported instability of existing contractual arrangements. “The main problem you find is, that the landlords now are taking back land from the tenants. [...] For the landlords [it is economically better], but it becomes a problem for the tenants” (LC1 C2). Obviously, the tenants and subsistence farmers, in this case, suffer due to the lack of farming opportunities. “Right now it is hard to encroach on one’s portion of wetland since all the owners treasure their respective portions” (PF F).

¹⁹

<http://data.worldbank.org/indicator/SI.POV.GINI?contextual=aggregate&end=2012&locations=UG&start=1989&view=chart> (last check 18.04.2017)

Due to the land scarcity and degradation, also the research institute is obliged to increase research projects in order to provide new sustainable agricultural techniques as well as to ensure food security. “[...] We are used to using their allocated land, but as per now, they are using more of their land for their experiments. There is now scarcity of land for use within the institute” (LC1 C2). This reaction of the institute is also perceptible in the border villages, where peasants and private farmers were living. “[...] The people who were working in this area were stopped so that research experiments would be carried out” (LC1 B).

The elder residents of the wetland observe the change of behaviour in the new “encroachers” and institutions suspiciously:

Most people here behave like animals, without empathy. This pattern of thinking has caused them to do the unimaginable. For instance, one may want to buy this portion of land. If one finds crops one does not care about them, the crops are immediately dug out by the tractor without anyone’s consent. Such selfishness is common (PF M).

They criticise the overarching focus on money, which destroys the peoples’ empathy: “Many people are clear-headed but most of them have money on their minds. Money is their main focus. Others are worried about the hurting poverty” (PF F).

As a reaction to the changing situation, families who depend on the subsistence economy also change their behaviour. The main worry of farmers is the threat of evictions. “God willing, if I had the ability, I would buy land settle and be secure, knowing that no one is going to evict me. This way I could then advance my business activities the way I want” (PF M). Tenants are permanently in fear of being forced to leave their land without further opportunities to sustain their families’ livelihood. A few had already left the area, to start new lives in other places and to construct houses in safer areas (LC1 C2). “The population somehow is becoming a bit less but the demand for sustaining themselves is high. One needs at least an acre land of which you can’t get because the land is not yours” (LC1 C2). Land availability is a simmering issue for people in the wetlands and has been reported in the local press (Heinkel 2014).

3.1.7 *Just a depression - The wetland's future?*

The past aims of the Ugandan government have been achieved, in that by the provision of knowledge about farming technologies the “*traditional lack of recognition of wetlands*” (Wetlands planning policy 1995) has been altered. The suggested farming techniques, however, have changed the wetland. Since the government has recognised the looming threat of environmental degradation of the wetland, NEMA has intervened and restricted stakeholders in their activities. Nevertheless, “*these officers came when it was too late. The destroyed reeds and water can never be regained. Many houses have now been built in spots where wetlands thrived*” (LC1 C1). In densely populated areas of the wetland the impacts on intensive land use assumed alarming proportions; here the wetland is expected to disappear within the next few years and to become mainland (LC1 C1, FM).

In the long-term perspective, all respondents speak with the same and highly emotional voice: in ten years, the wetland will no longer exist. The degradation is obvious and causes sadness in the interviewees (see Box 3.1-3). This feeling is made worse when people think about their personal existence. This farmer despairs for his own future:

Things will not be promising. I hardly see any success! Because the times and the seasons we are living in are becoming tougher. Secondly, our presence here is insecure. The landlord can evict us anytime. Such a situation leaves us insecure. Sadly, we do not have the required money to buy land. This land does not belong to us (PF M).

Why do you think the landlord can evict you all suddenly? (Researcher).

People are madly in need of money, quick money. Ultimately my future is destroyed!” (PF M).

He feels hopeless and a victim of his situation, which teaches him helplessness (Maier and Seligman 1976). Even though people are cognitively aware of the wetland's destruction, the thought of its elimination is emotionally unbearable. No future for the wetland implies no future for them and their families, as one key informant vigorously clarified: “*We need the wetland! We definitely need the wetland!*”

Laws to control the wetlands' encroachment exists, however, the main need, which is requested from the key informants, is their consequent enforcement by NEMA. The preferred action of the locals is to prevent more *outsiders* from coming to the wetland and encroaching further upon it, since “*still the cultivation is a gain to the inhabitants*” (LC1 B). Policies and laws are known even in the villages, but “*they have not been put into practice*” (LC1 A). The locals accept the necessity of regulation and

are keen to see it enforced (LC1 A, LC1 B, LC1 C1, LC1 C2), although restrictions may result in land use conflicts between wetland users and the government. Subsistence farmers would lose their central means of support.

Box 3.1-3: Sadness about the wetland's appearance in ten years

We keep on losing this wetland, because of the maximum activities. [...] Oh (laugh) If we don't get control over the agriculture, I think, we are likely to get into a desert situation, kind of, because [...] I see the problem having no any fallback. If we had controlled agriculture, that you have some areas opened in the wetland and you use them during maybe the dry season and when the rainy season comes, they allow them to get back to protect that water, then that would be ok. But now with this continuous farming non-stop, we are likely to carve a desert situation. We are getting a lot of more prolonged droughts, if it is not controlled because it is not only here. This happens now all over the country that we find even some of the wetlands, where people are already now pouring soil for construction. So because I can tell you that just outside this institute (because this wetland is like a belt, it runs all over) it connects all the wetlands to your lake, Lake Victoria. But many of those parts are being wiped out (FM).

I think they [wetlands] will not exist anymore (LC1 C1).

Unless the policies are enforced, if it is not done, we will end up with no wetlands. And I don't know...with urbanization...I don't know, because how will the wetlands' future end up in what? Urban areas might...cause the wetlands to go... because in some places, they are draining and then building. So with this urbanization, I am much afraid [laughing], unless there is a policy, there is enforcement because it is more on paper (LC1 C2).

I do not see them in existence anymore. Many people will have encroached on them and built in them. Some people these days fetch lorries full of sand and dump them in the wetlands in order to build their houses. Remember when the water flow of one area is spoilt, the entire water flow is destroyed (PF F).

No, it [the wetland] will not be there anymore. Because of the increasing population, people have begun selling land situated within the wetlands. One can easily build within a wetland. This means that with time water will not be available where buildings are. Many inhabitants have already built houses and farms. In ten years, they will dig deeper into the earth in order to access water (LC A).

They [the wetlands] will be no more. Currently, there are places where there were wetlands. Right now we see sandy soils. The above notwithstanding, the state of the environment is deteriorating, the wetlands are becoming smaller, we, the inhabitants are increasing. I suspect that we might have serious challenges in the future. The following might occur: we could no longer have any cultivation space (because of the increasing population) and therefore leave. Or factories might be built in these areas (LC1 B).

The local councillors are aware of the consequences of their claim, however, local councillors from densely settled areas in particular suggest far more restrictive measures than those from the villages (see Box 3.1-4).

Box 3.1-4: Law enforcement concerning restrictions of the wetland's use	
Local chairpersons from the villages:	Local chairpersons from town:
<p><i>Although I am one of the beneficiaries of the wetlands, I would like NEMA to strengthen their policies. If for instance, NEMA hinders me from cultivating the wetland on my plot, I have to realize that NEMA is not helping itself but helping me. I think we ought to use the water to the wetlands to irrigate our dry plots of land instead of cultivating them (LC1 A).</i></p> <p><i>For the wetlands privately owned? I really do not know [how the government could come in]. In case laws prohibiting any cultivation are enforced, how can one effectively disseminate this to the individual owners? This can only be possible for government-owned wetlands (LC1 B).</i></p>	<p><i>The current residents who bought the wetlands are at a loss since the land was acquired wrongly. When the law enforcement officers come, they will have to force them to break down their houses and plant trees instead. [...] In all circumstances the law enforcers make sure they penalize the one residing [or carrying out any activity] in the wetlands. The law enforcers also command residents to plant trees. By all means residents are at a loss. [...] I think the law enforcement officers should evict all occupants from the wetlands. Those who have had houses built should be evicted (LC1 C1).</i></p> <p><i>I think we could leave in fences [...]. Because with urbanization there is pollution and then if there is no greenware, you might find, that they should have been at reserves. There is one to gazette the wetland, maybe that could save (LC1 C2).</i></p>

In terms of enforcing laws, the local councillors find themselves in a “tricky” position. On the one hand, they are representatives of their communities but do not necessarily have supremacy and wield only “limited power” (LC1 C2) in their social environment. On the other hand, they are in charge of all community issues and represent also the policies of the government. Local councillors are aware of their responsibilities to prevent people from cultivating in the wetland by perceiving themselves as “watchdog to see, whatever the government says is implemented” (LC1 C2, LC1 A). That means that they could deprive themselves of their own livelihood. Thus, fulfilment of their tasks as local chairpersons seems to be “not that easy” (LC1 C2) or even “not possible” (LC1 A). Due to the need for immediate enforcement,

which produces unavoidable disharmony and discrepancies, they feel that they need a neutral observer from a high hierarchy or more support from the government. The lack of judiciary power is one of the main problems of the local councils at first level as well as the governmental powerlessness in the land ownership system (see Chapter 3.2.1). Thus private persons already lost the trust in the government. *“I do not think that people [the landlords and the government] are still concerned about their people. The government could have done something but unfortunately, the people in it [the government] are insensitive to the needs of the people here”* (PF M). Land conflicts and this hopeless situation have strong consequences on peoples’ mental well-being.

The people of the wetland are used to uncertain outcomes requiring hard work: *“This is what I am doing: working as hard as I can with my whole body, my strength, and my knowledge and doing so the best way I can. Sometimes one is lucky but unfortunately, others are not”* (PF M).

3.1.8 Chapter summary: *The contemporary sense of place of wetlands in Uganda*

Uganda’s wetlands have a clear sense of place, which change continuously as well as it is partly overlap. The sense of the wetlands is highly related with the country’s history, such as historical events have influenced the symbolic meanings of wetlands. Certain episodic senses of places can be clearly differentiated, and entitled with characteristic expressions: during the wars, for example, wetlands were perceived as no-go-area.

Negative feelings about wetlands dominated the sense of place until the early nineties. Only when the need for crop land increased through the rapidly growing population the wetlands became of interest as additional farmland. Political stability and decreasing mortality rates caused the need for more agricultural production and, therefore, for resources such as land and water. At this time, nobody seemed to be the owner of the wetlands, so farmers entered the wetlands and tried to tame the wild land. The farmers began to detect the advantages of the wetlands as crop lands, which enabled the increase of income through off-seasonal cropping. The farmers accepted the intense work in the wetlands, such as digging drainages and permanent weeding. The use of herbicides and pesticides reduced the physical work in the wetlands tremendously.

The landscape helped people not only to sustain their livelihoods but also to gain financial well-being. The wetlands' sense turned into a positive one. It had changed in a way that now also investors recognised the advantages of the wetlands' fertile soils and the availability of land. Many persons bought a piece of land in a wetland and built houses on it or made business with the available resources. The government's restrictions concerning the use of wetlands seemed to play only a subordinate role in the investors' decisions-making. The prices for lands were exponentially increasing due to the high demand on land in general as well as wetlands' advantages. Nowadays, small scale farmers cannot afford to rent a plot in the wetland for their own sustenance. Many young people leave the wetlands and search for jobs in towns and cities. In contrast, private investors and rich people from cities build houses in the rural areas nearby the wetlands.

For its residents the sense of the wetlands is turning again. Now, the extremely positive meaning changes to a feeling of loss of social belonging and the need to leave the wetlands area due to lack of business opportunities and personal growth. Negative feelings are also increasing through the dramatically overuse and degradation of these ecosystems. The wetland has no future, nor have the local farmers. The historical development of the sense of place in the case study is a sad story. It sheds light on missed chances of interventions on the wetlands destruction in the past, but also shows potentials to protect wetlands in the future.

3.2 MESOSCALE: THE WETLAND'S SOCIAL LAYER

The social space plays a distinctive role in the place-people relation and influences the acting patterns of residents as well as the therapeutic character of the landscape. Chapter 3.2 reflects on the socio-ecological development of the wetland. The social space in the wetland was assessed by the stakeholder analysis as shown in Chapter 3.2.1. Qualitative results of the group interviews provide insights into a complex local network of actors in the wetland and explain the role of the wetland in the local understanding of well-being. Quantitative results (see Chapters 3.2.2 and 3.2.3) could underline findings from the group interviews as well as enlarge knowledge about the state of well-being at this mesoscale (see Figure 3-1). The assessment of information about the wetland dimensions as therapeutic landscape also revealed problematic issues, which hamper the wetland's therapeutic properties and in contrast boost the risk for mental diseases. Reflections on the socio-ecological situation are discussed and provide information for a health-focused wetland management (see Chapter 3.2.4).

3.2.1 *The social space of the wetland*

In four group interviews, actor mappings resulted in four flip charts. The combination of all flip charts was a key result of the study, which is described in the following section and, if possible, undermined by information from websites of official institutions.

The participants described the actors in the wetland as follows:

The government and on its behalf the National Environment Management Authority (NEMA) is in charge of the preservation of ecosystems, especially wetlands (see Chapter 2.3.3). Thus the wetlands are the responsibility of NEMA. In compliance with the environmental laws of Uganda, they allocate land title of pieces of land to organisations and institutions as well as to investors. NEMA provides land title to the National Agricultural Research Organisation (NARO), and to the Buganda Land Board, who allocate a land title to an individual. Additionally, NEMA is free to grant permission for land use also to private investors (GI 5+6), who build factories and access water and other resources (GI 5+6). Permission to use land, however, does not imply ownership; they are free to use it without “*sole ownership of the wetland*” (G5). Private investors usually need large amounts of land and are in no way associated with the private landowners and locals cultivating in the wetland (GI 6).

NARO coordinates, oversees and set rules on all agricultural research activities of the country and is assigned to the government²⁰. NARO decides which agricultural research activities will be carried out (GI 3+4). It is the most powerful organisation in the research area. The counterpart institution for private land ownership is the Buganda Land Board (BLB). BLB is the supreme authority of land (GI 3) in the Kingdom of Buganda²¹ and “*is a professional body set up by His Majesty the Kabaka of Buganda to manage land and properties returned under the Restitution of Assets and Properties Act of 1993*”²². The BLB acts in the interest of local governments and works closely with other state organs such as NARO (GI 3). It provides land title to the local governments, where chiefs and landlords can officially receive a piece of land (GI 3). In the research area, NARO and BLB seem to be competing for land,

²⁰ <http://www.naro.go.ug/>

²¹ The Kingdom of Buganda is a constitutional monarchy, which states the legislative of cultural laws. Other political organs are assigned to the government of Uganda. The legislative Assembly of the Kingdom is composed of 68 directly elected members and 18 Buganda county chiefs. Additionally six members, who are accounted by the majesty the Kabaka and his cabinet ministers (<http://www.buganda.or.ug>).

²² <http://www.bugandalandboard.or.ug/index.php/about-us/who-we-are>

since *“if the government needed part of this land, the members of Uganda Land Board would have to convince NARO that indeed this land is needed”* (GI 3).

The BLB advocates the individuals to a certain extent. *“The [local] government cannot just say we are taking this chunk, it has to negotiate with NARO. If NARO starts to fight that it needs the land, then it is kept”* (GI 3). NARO dominates the region as an official landowner. NARO’s land holdings are administered by smaller organisations (GI 3). In the research area, there is the National Crops Resources Research Institute (NaCRRI) (GI 3+4) and on the other hand a non-governmental research organisation (IITA) (GI 4), which both manage parts of the area and employ field workers. They initiate research projects with funds from international donors, which are under contracts with NaCRRI and NARO (GI 4). Research funds are disseminated by NaCRRI in the research area to other research initiatives, which rent land from NaCRRI. Often, qualified personnel come from outside and are employed by the research institute or IITA (GI 4). The opportunity to work as an employed farmer in the research fields attracts labour migrants. These labour forces usually do not earn much money, thus they usually perform additional farming for their subsistence. For this purpose they are allocated small plots inside the research area, which they are allowed to cultivate (GI 3+4). It is not possible for the workers to buy land (GI 4) and they can be vacated from their plots without notice if the research institute requires land for their projects (GI 3).

The practice on land dissemination in state-owned areas differs strongly from the system in privately owned areas (GI 4+5+6+). It is impossible for individuals to buy land from governmental organisations. *“Individuals (or landlords) may own chunks of wetlands”* (G6), however, there is basically no relationship between individuals and the government. Private *landlords* and *chiefs* have the opportunity to rent or sell their land to individuals or use it for their own purposes (GI 5+6). Individuals can easily buy land from a landlord, if they can afford it (GI 5). An official land title does not play a role in such agreements between individuals; common and more traditional rules about the use of rented land are instead applied. Tenants are, for example, not allowed to plant trees such as coffee or matooke; furthermore, they are obliged to dig trenches in order to control the water flows and to set borders to other fields (GI 6). Nevertheless, these terms and conditions about farming activities and the treatment of the land are dependent on negotiation between tenant and landlord (GI 5+6). Landlords are very free in their decisions. They also have the freedom to use pesticides and fertilizers (GI 4+5+6) and they feel unobliged to follow restrictions or guidelines concerning environmental or health protection from higher authorities.

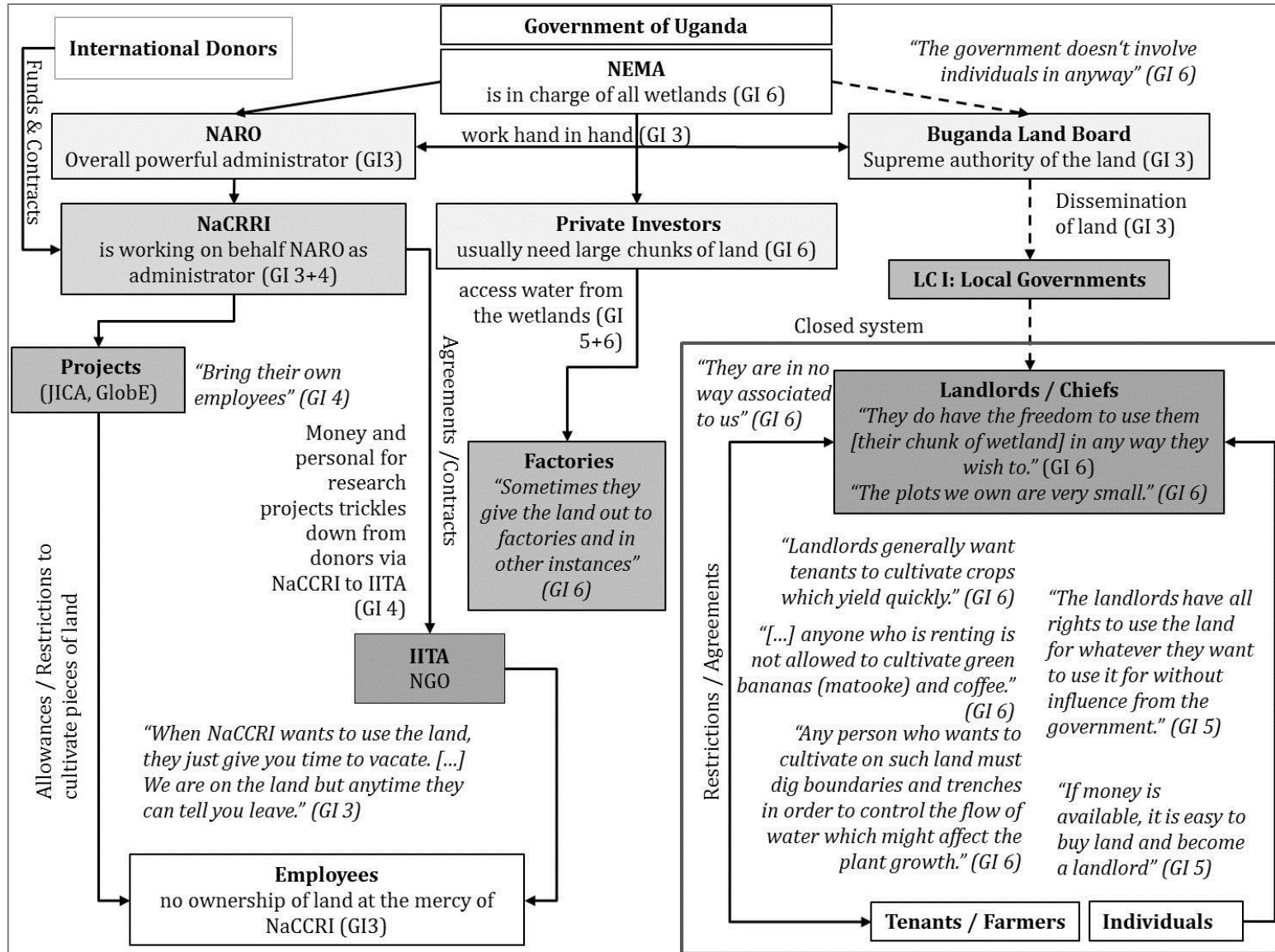


Figure 3.2-1: Actor map of the investigated wetland

Landlords make overall decisions about the products tenants are allowed to plant, and they receive a part of the harvest or part of the earned money from the harvest (GI 5+6). There is no neutral instance, who is in charge in case of conflicts (GI 5). Oral agreements between landlords and tenants are based more or less on traditional laws and rules as well as “unwritten convention”. The private land tenure system is completely separated from the government. The wording “*chiefs (omutaka)*” (GI 5) as well as the land distribution by the BLB being in charge of a “kingdom’s” land properties, suggests that this system is based on a pre-colonial land tenure systems.

3.2.2 *The general state of mental well-being in the wetland – Assessment of WHO-5 and SWLS*

The following chapter outlines the well-being of people quantitatively on basis of psychometric scales. The scales assessing long-term and short-term well-being (WHO-5 and SWLS), both showed a questionable internal consistency (see Chapter 2.4.5). However, in the reliability analysis, they performed well. The survey represents stakeholders of the wetland in different villages. Only one part of the sample is living in the state-owned area (C2). Participants of these areas mainly are employees of the organisations as mapped in Figure 3.2-1. The main part of the survey participants is associated with the private landowner system.

Table 3.2-1: Location parameters WHO-5 and SWLS

Scales	n	\tilde{x}	Min	Max	IQR
WHO-5	234	60	12	100	28
SWLS	235	23	8	35	8

WHO-5 = Well-being Index 5; SWLS = Satisfaction with life scale; n = number of cases; \tilde{x} =Median; Min = Minimum value; Max = Maximum value; IQR = Interquartile range

In the research area, the SWLS median is 23 (IQR = 8), which suggests an average score of life satisfaction (see Table 3.2-1). The residents are satisfied with their lives, however, they notice a need for improvements either more generally or only in certain areas of their lives. Furthermore, assumes that individuals in this range would improve their lives by changing it proactively.

The participants of the survey had a moderate emotional state of well-being (\tilde{x} = 60), however the IQR of WHO-5 was high (28) (see Table 3.2-1). According to Bech (2004) the mean in general *European* populations is around 70, which also would be the goal of antidepressive treatment (Bech 2004) and a good emotional state of well-being.

The age class of 20-39 year old participants is moderately satisfied with their lives. Participants of all other age classes have higher median scores, meaning that they accept their living standards and develop a positive attitude to their surroundings. They know how to manage with difficulties in their lives (Diener 2006).

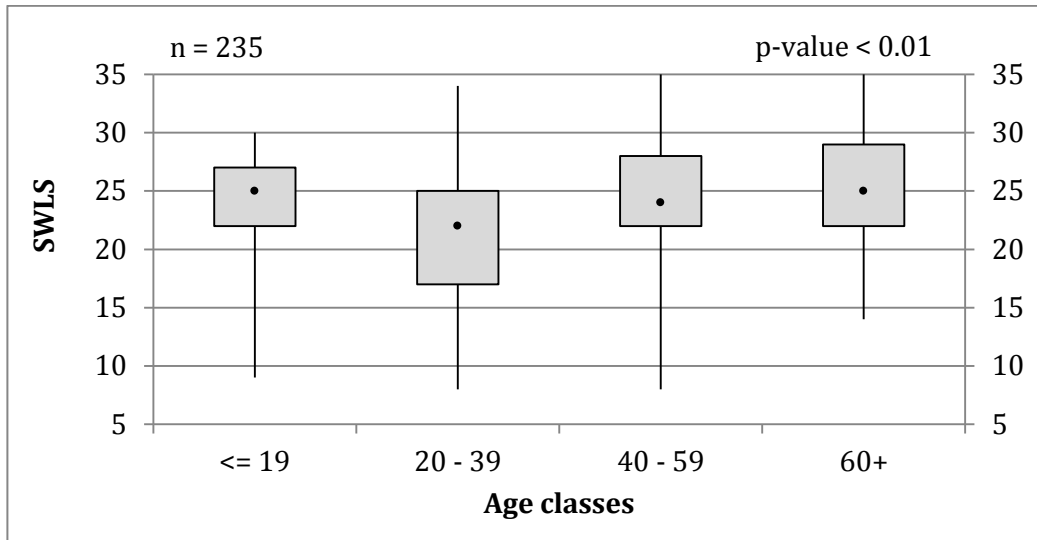


Figure 3.2-2: Life satisfaction in age classes

In comparison to life satisfaction, short-term emotional well-being does not significantly differ between age classes. People of age below 20 appear as happier and with lower interquartile ranges than people of higher age classes (see Figure 3.2-3). People above 20 up to the highest age classes show comparable states of emotional well-being. The results show that age is no indicator of the state emotional well-being.

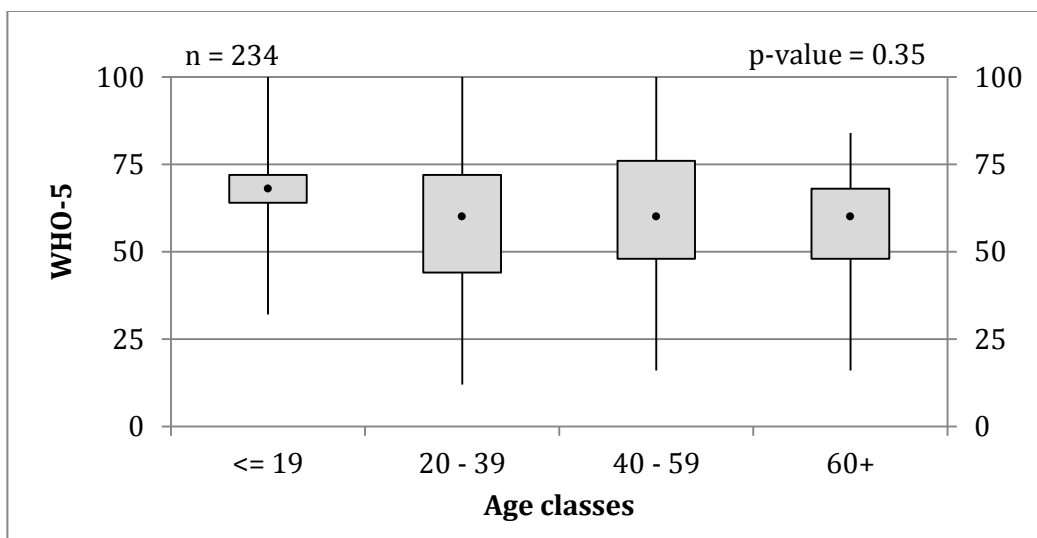


Figure 3.2-3: Short-term well-being in age classes

SWLS is a good indicator for social embeddedness: the scale correlates with age, the number of persons per household as well as the number of children (see Table 3.2-2). The more children people have, the more satisfied they are with their lives.

This corresponds to other correlations (see Table 2.4-22) since the older people are the more children they have.

Table 3.2-2: Correlations of life satisfaction with biographical and local factors

SWLS	AGE	PPH	KIDS	MIN SCHOOL	MIN MC	LOR PLACE	LOR HOUSE
r	0.15	0.16	0.22	0.15	0.15	0.13	0.06
p	0.02	0.01	0.00	0.06	0.02	0.05	0.38
n	235	235	233	162	231	232	235

SWLS = Satisfaction with life scale; r = Spearman's correlation coefficient; p = significance level; n = number of cases; AGE = Age; PPH = Persons per household; KIDS = Number of children; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes; LOR PLACE = Length of residence at the same place; LOR HOUSE = Length of residence in the same house;

Life satisfaction differs significantly between the sample sites and further between the local council areas (see Table 3.2-3). The status of perceived health is also an indicator of life satisfaction.

Table 3.2-3: Life satisfaction subject to location, profession, education and health

	Kruskal-Wallis-H Test		SWLS		Bonferroni Correction
	Sample Groups	n _i	IQR	p	
Sample Site	Sample Site A	76	23.0	9	<0.01
	Sample Site B	91	24.0	5	
	Sample Site C	65	20.0	7	
Community	Community A1	39	24.0	9	<0.01
	Community A2	37	22.0	9	
	Community B	91	24.0	5	
	Community C1	26	21.0	10	
	Community C2	39	19.0	9	
Education	No Education	8	23.5	9	0.05
	Primary Education	100	24.0	8	
	Ordinary Education	99	23.0	9	
	Advanced Education	10	19.5	8	
	Tertiary Education	15	22.0	9	
Profession	Business	26	23.5	8	0.07
	Self-Employed Farmer	126	24.0	7	
	Employed Farmer	14	23.5	6	
	Educational sector	23	24.0	11	
	Unemployed. Housewife	20	20.5	8	
	Others	23	22.0	9	
General Health	Very Good	16	26.0	7	<0.01
	Good	66	23.5	7	
	Fair	135	22.0	9	
	Poor	10	22.0	6	
	Very Poor	5	10.0	12	

Life satisfaction in the communities A1 and B has a comparable intensity. While the median of community C1 is at the same level as in community A2, the interquartile range of C1 is higher than in A2 (see Figure 3.2-4). Community C2 appears as significantly less satisfied with life than all other communities.

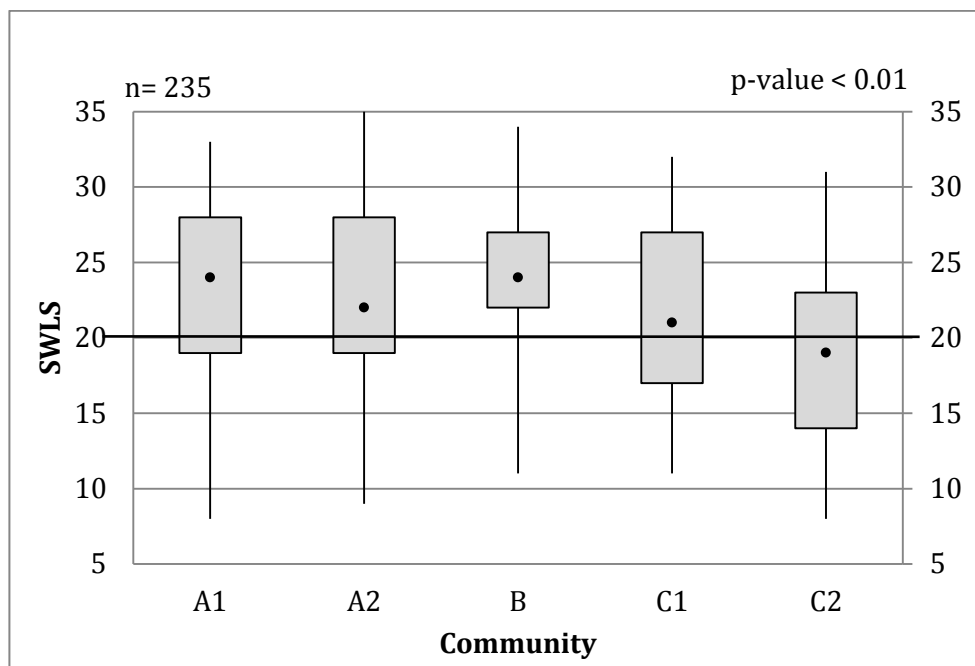


Figure 3.2-4: Boxplots of life satisfaction in the communities

This result is underpinned by Mann-Whitney-U test. SWLS appears with significantly lower mean ranks in C2 as in comparison to the villages A1, A2 and B (see Table 3.2-4). The residents of C2 reach only a medium score of 19, which is a small but significant dissatisfaction in life triggered by an event or the general situation in place. Interestingly, community C2 was the only community which was associated with the state-owned system (see Figure 3.2-1).

Life satisfaction also correlates moderately with indicators of place attachment (PAI PI $r = 0.33$; $p < 0.01$; PAI PD $r = 0.39$; $p < 0.01$) (see Table 2.4-17). The more attached people feel to the wetland, the more satisfied they are with their lives. Furthermore, the higher their emotional well-being ($r = 0.32$; $p < 0.01$) and self-esteem ($r = 0.34$; $p < 0.01$), the more satisfied people are with their lives.

Table 3.2-4: Life satisfaction in the communities

SWLS Community	Mann-Whitney-U Test				
	n _i	Mean Rank	N	z	p-value
A1	39	39.12	78	-0.15	0.88
A2	39	39.88			
A2	39	62.42	130	-0.61	0.54
B	91	66.82			
A1	39	35.67	66	-1.10	0.27
C1	27	30.37			
A1	39	46.59	78	-2.77	0.01
C2	39	32.41			
A2	39	62.71	130	-0.56	0.58
B	91	66.7			
A2	39	35.73	66	-1.14	0.26
C1	27	30.28			
A2	39	46.88	78	-2.89	0.00
C2	39	32.12			
B	91	62.86	118	-1.97	0.05
C1	27	48.17			
B	91	75.5	130	-4.63	0.00
C2	39	42.17			
C1	27	37.83	66	-1.53	0.13
C2	39	30.5			

Life satisfaction is dependent on attitude to the place of residence (see Table 3.2-5). People who feel comfortable and safe in their place of residence, and consider the place as nice and joyful, are more satisfied with their lives than others.

Table 3.2-5: Life satisfaction depending on the attitude to the place of residence

SWLS Attitudes to place of residence		Mann-Whitney-U Test				
		n _i	Mean Rank	N	z	p-value
Comfort at Sample Site	No	31	76.1	235	-3687.00	0.00
	Yes	204	124.4			
Safety at Sample Site	No	38	80.2	235	-3755.00	0.00
	Yes	197	125.3			
Enjoyment at Sample Site	No	28	69.4	228	-3871.00	0.00
	Yes	200	120.8			

Biographical factors play a subordinate role in life satisfaction. It does not matter to life satisfaction whether people were born at the place of residences or considered it as their *home*. Only the fact that people had chosen their place of residence autonomously plays a role in their life satisfaction (see Table 3.2-6).

Table 3.2-6: Life satisfaction depending on biographical aspects

SWLS Biographical aspects		Mann-Whitney-U Test				
		n _i	Mean Rank	N	z	p-value
Sample Site is Birthplace	No	157	118.6	235	-0.20	0.84
	Yes	78	116.7			
Sample Site is Considered as Home	No	72	123.5	235	-0.83	0.41
	Yes	163	115.6			
Sample Site is Place of Choice	No	144	107	235	-3142.00	0.00
	Yes	91	135			

In the study, short-term emotional well-being (WHO-5) is not connected with biography, like the number of children or the length of residence (see Table 3.2-7). There is also no correlation between the distances to medical facilities and schools and the WHO-5.

Table 3.2-7: Correlations of short-term well-being with biographical and local factors

WHO-5	AGE	PPH	KIDS	MIN SCHOOL	MIN MC	LOR PLACE	LOR HOUSE
r	0.00	0.12	-0.03	0.03	-0.1	0.08	0.04
p	0.96	0.07	0.60	0.69	0.13	0.22	0.55
n	234	234	232	162	230	231	234

WHO-5 = Well-being Index 5; r = Spearman's correlation coefficient; p = significance level; n = number of cases; AGE = Age; PPH = Persons per household; KIDS = Number of children; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes; LOR PLACE = Length of residence at the same place; LOR HOUSE = Length of residence in the same house;

Besides life satisfaction, the short-term well-being is also connected with the perceived stress level and (see Table 2.4-17). The higher the perceived stress, the lower the emotional well-being of participants ($r = -0.28$; $p < 0.01$). In line with this, the correlation analysis shows: the higher the life satisfaction, the higher the short-term well-being ($r = 0.32$; $p < 0.01$). Additionally, a slight correlation between self-esteem and emotional well-being showed also: the more self-esteemed people are, the higher their short-term well-being ($r = 0.16$; $p < 0.01$).

Table 3.2-8: Emotional well-being subject to location, profession, education and general health

	Kruskal-Wallis-H test		WHO-5			Bonferroni Correction
	Sample groups	n _i	\bar{x}	IQR	p	
Sample Site	Sample Site A	76	60.0	28	0.34	<0.02
	Sample Site B	91	64.0	24		
	Sample Site C	65	60.0	32		
Community	Community A1	39	60.0	28	0.18	0.01
	Community A2	37	60.0	28		
	Community B	91	64.0	24		
	Community C1	26	68.0	20		
	Community C2	39	52.0	36		
Education	No Education	8	50.0	39	0.80	0.01
	Primary Education	100	60.0	24		
	Ordinary Education	99	64.0	28		
	Advanced Education	10	52.0	42		
	Tertiary Education	15	52.0	32		
Profession	Business	26	62.0	30	0.74	<0.01
	Self-Employed Farmer	126	60.0	28		
	Employed Farmer	14	54.0	23		
	Educational sector	23	60.0	28		
	Unemployed. Housewife	20	60.0	27		
	Others	23	68.0	36		
General Health	Very Good	16	76.0	27	<0.01	0.01
	Good	66	64.0	28		
	Fair	135	60.0	28		
	Poor	10	58.0	20		
	Very Poor	5	40.0	26		

The WHO-5 scale does not differ significantly between locations. Neither educational background nor profession significantly influences the emotional state of well-being. Perceived state of health, however, is an indicator for the state of short-term mental well-being (see Table 3.2-8).

The visualisation of the WHO-5 in the different communities, however, revealed that villages A and B reached comparable median scores between 60 (A) and 64 (B) (see Figure 3.2-5). Unexpectedly, the median of C1 (\bar{x} = 68) differs essentially from the median of C2 (\bar{x} = 52). Around 50% of location C2 has an state of emotional well-being above the 50%-cut-off score. This suggests that a high amount of participants from this area suffer from depressive moods or, at least, need further tests for diagnostics.

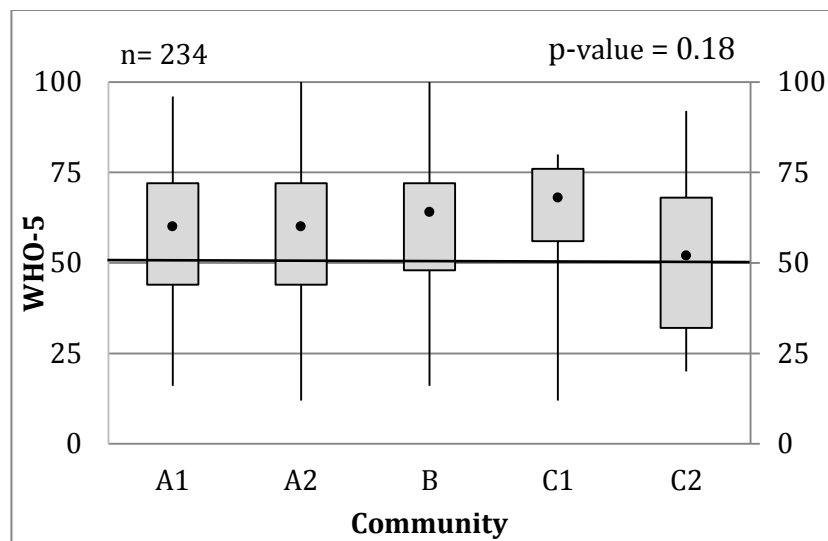


Figure 3.2-5: Boxplot of short-term well-being in the communities

The differences of emotional well-being between the communities are not a significant result; this might be a result of a very specific constellation in the moment of assessment.

Table 3.2-9: Short-term well-being subject to the attitude to the place of residence

WHO-5 Attitudes to place of residence		Mann-Whitney-U Test				
		n_i	Mean Rank	N	z	p-value
Comfort at Sample Site	No	31	98.9	234	-1647.00	0.10
	Yes	203	120.3			
Safety at Sample Site	No	38	87.7	234	-2971.00	0.00
	Yes	196	123.3			
Enjoyment at Sample Site	No	28	69.8	227	-3813.00	0.00
	Yes	199	120.2			

Feelings of social security, as well as the feeling of comfort onsite, significantly influences emotional well-being (see Table 3.2-9). The feeling of being comfortable in the place of residence, however, plays no role in the development of short-term well-being. Other biographical parameters have no influence on emotional well-being. Participants who were born in the wetland or call it as their *home* do not differ in the state of emotional well-being from others (see Table 3.2-10).

Table 3.2-10: Short-term well-being depending on biographical factors

WHO-5 Biographical aspects		Mann-Whitney-U Test				
		n _i	Mean Rank	N	z	p-value
Sample Site is Birthplace	No	157	113.1	234	-1421.00	0.16
	Yes	77	126.5			
Sample Site is Considered as Home	No	72	117.8	234	-0.05	0.96
	Yes	162	117.4			
Sample Site is Place of Choice	No	143	116	234	-0.50	0.62
	Yes	91	120			

3.2.3 Internal and external indicators for well-being (RSE and PSS-10)

The following chapter presents the results of Rosenberg's Self-Esteem Scale as well as the Perceived Stress Scale. It needs to be mentioned that both scales appeared with unacceptable low internal consistency, however, performed well in the reliability test (see Chapter 2.4.5).

Table 3.2-11: Location parameters RSE and PSS-10

Scales	n	\tilde{x}	Min	Max	IQR
RSE	235	17	11	26	2
PSS-10	233	19	3	29	4

RSE = Rosenberg's self-esteem scale; PSS-10 = Perceived stress scale 10; n = number of cases; \tilde{x} =Median; Min = Minimum value; Max = Maximum value; IQR = Interquartile range

The sample shows a median score of 17 and a small IQR (2) in the self-esteem scale (see Table 3.2-11). The majority of the survey has a state of self-esteem, ranging between 15 and 20. According to Heatherton and Wyland (2003), the "typical" self-esteem of other studies is between 15 and 25. Only a small minority of the presented study has the "most likely" scores around 22, implying a good and stable self-esteem. These lower scores of the study might rely on the cultural uniqueness of the research area in comparison to other studies from other areas.

The sample has a median score of 19 in the perceived stress level with a small interquartile range of 4 (see Table 3.2-11). This is a higher score of perceived stress than other studies assessed (Hur et al. 2014; Remor 2014; Carson et al. 2015).

All age classes have comparable scores of self-esteem with an interquartile range between 15-19. Due to non-significant results, self-esteem cannot be indicated by age classes. Furthermore, age classes also do not significantly differ in their perceived stress levels. This result is underpinned by the correlation analysis of the scale with biographical and local factors (Table 3.2-12); age and self-esteem do not correlate. Instead, the smaller the distance to the next medical centre, the higher the

self-esteem of people. The distance to medical centres was a classification of the communities to be urban or rural (see Chapter 2.4.6). Thus self-esteem might be lower in rural areas than in more equipped towns. Self-esteem shows no significant connections with other social or local factors.

Table 3.2-12: Correlations between self-esteem and biographical and local factors

RSE	AGE	PPH	KIDS	MIN SCHOOL	MIN MC	LOR PLACE	LOR HOUSE
r	0.04	0.05	-0.02	-0.13	-0.18	-0.04	-0.05
p	0.52	0.44	0.73	0.10	0.01	0.51	0.42
n	233	233	231	160	229	230	233

RSE = Rosenberg's self-esteem scale; r = Spearman's correlation coefficient; p = significance level; n = number of cases; AGE = Age; PPH = Persons per household; KIDS = Number of children; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes; LOR PLACE = Length of residence at the same place; LOR HOUSE = Length of residence in the same house

The more satisfied people are with their lives, the higher their self-esteem ($r = 0.34$; $p < 0.01$) (see Table 2.4-17). Additionally, self-esteem correlates with emotional well-being ($r = 0.16$; $p = 0.01$) suggesting the better the status of short-term well-being, the higher the self-esteem. Rosenberg's self-esteem scale slightly negatively correlated with the perceived stress scale ($r = -0.15$; $p = 0.02$), meaning the lower the stress level, the higher the self-esteem. Lastly, the more people identify with the wetland, the higher their self-esteem ($r = 0.16$; $p = 0.02$).

Self-esteem differs significantly between the participants in the sample sites as well as between the communities (see Table 3.2-13) and further between different educational groups. The Kruskal-Wallis-H test shows also a significant difference in self-esteem depending on the perceived status of health.

Table 3.2-13: Self-esteem depending on location, education, occupation and health

	Kruskal-Wallis-H Test		RSE			Bonferroni Correction
	Sample Groups	n _i	\bar{x}	IQR	p	
Sample Site	Sample Site A	76	17	3	0.01	<0.02
	Sample Site B	91	18	3		
	Sample Site C	65	17	3		
Community	Community A1	39	16	4	0.01	0.01
	Community A2	37	17	2		
	Community B	91	18	3		
	Community C1	26	16	3		
	Community C2	39	17	3		
Education	No Education	8	15	1	<0.01	0.01
	Primary Education	100	17	3		
	Ordinary Education	99	17	3		
	Advanced Education	10	18	2		
	Tertiary Education	15	19	3		
Profession	Business	26	16	3	0.15	<0.01
	Self-Employed Farmer	126	17	3		
	Employed Farmer	14	16	3		
	Educational sector	23	18	3		
	Unemployed. Housewife	20	17	3		
	Others	23	17	4		
General Health	Very Good	16	18	3	0.02	0.01
	Good	66	18	4		
	Fair	135	17	3		
	Poor	10	16	1		
	Very Poor	5	15	2		

Residents of village B have slightly higher scores in self-esteem than residents of all other locations (see Figure 3.2-6). Interestingly, community C2 has a level of self-esteem, which is comparable to the other communities, which is probably based on the higher educational background of the labour migrants in the area.

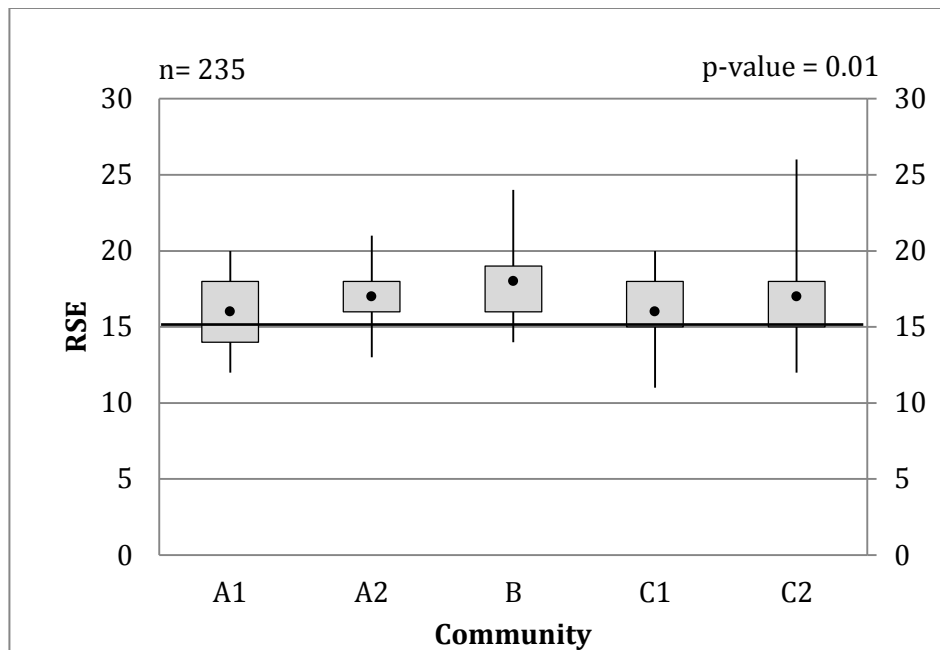


Figure 3.2-6: Self-esteem in the communities

However, only village B performed significantly better than village A2. The other communities do not show significant difference in the Mann-Whitney-U tests (see Table 3.2-14).

Table 3.2-14: Self-esteem subjected to the location

RSE Community	Mann-Whitney-U Test				
	n_i	Mean Rank	N	z	p-value
A1	39	34.68	78	-1.90	0.06
A2	39	44.32			
A2	39	50.59	130	-2.99	0.00
B	91	71.89			
A1	39	32.72	66	-0.40	0.69
C1	27	34.63			
A1	39	37.19	78	-0.91	0.37
C2	39	41.81			
A2	39	60.82	130	-0.94	0.35
B	91	67.51			
A2	39	36.36	66	-1.47	0.14
C1	27	29.37			
A2	39	42.27	78	-1.09	0.28
C2	39	36.73			
B	91	63.41	118	-2.31	0.02
C1	27	46.31			
B	91	69.66	130	-1.94	0.05
C2	39	55.79			
C1	27	32.28	66	-0.44	0.66
C2	39	34.35			

It seems that a high educational background boosts the people's self-esteem. Especially persons without education have a lower self-esteem as higher educated ones (see Table 3.2-15). In terms of the stakeholder analysis (see Figure 3.2-1), this means that the self-esteem increases with higher hierarchical levels, since at higher positions, people have higher educational backgrounds.

Table 3.2-15: Self-esteem subject to educational background

RSE Education level	Mann-Whitney-U Test				
	n _i	Mean Rank	N	z	p-value
no	9	27.72	110	-2.75	0.01
primary	101	57.98			
no	9	28.11	109	-2.70	0.01
ordinary	100	57.42			
no	9	6.17	19	-2.84	0.00*
advanced	10	13.45			
no	9	6.78	24	-3.10	0.00*
tertiary	15	15.93			
primary	101	102.74	201	-0.43	0.67
ordinary	100	99.25			
primary	101	54.72	111	-1.35	0.18
advanced	10	68.95			
primary	101	55.47	116	-2.55	0.01
tertiary	15	78.93			
ordinary	100	53.99	110	-1.59	0.11
advanced	10	70.60			
ordinary	100	54.68	115	-2.79	0.01
tertiary	15	80.13			
advanced	10	10.95	25	-1.15	0.26*
tertiary	15	14.37			

No difference in self-esteem was detected between certain professions. Similarly to WHO-5 and SWLS, the perception of the general health appears as an indicator for self-esteem in the Kruskal-Wallis-H test.

Table 3.2-16: Self-Esteem depending on the attitude to the place

RSE Attitudes to place of residence		Mann-Whitney-U Test				
		n _i	Mean Rank	N	z	p-value
Comfort at Sample Site	No	31	96.7	235	-1896.00	0.06
	Yes	204	121.3			
Safety at Sample Site	No	38	90.2	235	-2779.00	0.01
	Yes	197	123.4			
Enjoyment at Sample Site	No	28	99.2	228	-1322.00	0.19
	Yes	200	116.6			

People who feel safe at their place of residence appear with higher self-esteem than others (see Table 3.2-16). Hedonic feelings, like comfort and feelings of joy in the place, do not influence the people's self-esteem. Persons with higher self-esteem report that their current place of residence was their free choice (see Table 3.2-17).

Table 3.2-17: Self-esteem depending on biographical aspects

RSE Biographical aspects		Mann-Whitney-U Test				
		n _i	Mean Rank	N	z	p-value
Sample Site is Birthplace	No	157	119.8	235	-0.60	0.55
	Yes	78	114.3			
Sample Site is Considered as Home	No	72	123.9	235	-0.89	0.37
	Yes	163	115.4			
Sample Site is Place of Choice	No	144	110	235	-2370.00	0.02
	Yes	91	131			

There is no connection between the stress levels and age. The perceived stress level also does not correlate with any social or local factors (see Table 3.2-18).

Table 3.2-18: Correlations of perceived stress with biographical and local factors

PSS-10	AGE	PPH	KIDS	MIN SCHOOL	MIN MC	LOR PLACE	LOR HOUSE
r	-0.02	0.02	0.06	-0.14	0.11	-0.05	-0.1
p	0.73	0.76	0.39	0.08	0.09	0.48	0,15
n	233	233	231	160	229	230	233

PSS-10 = Perceived stress scale 10; r = Spearman's correlation coefficient; p = significance level; n = number of cases; AGE = Age; PPH = Persons per household; KIDS = Number of children; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes; LOR PLACE = Length of residence at the same place; LOR HOUSE = Length of residence in the same house;

The stress level correlates slightly negative with the emotional state of well-being. The better the status of emotional well-being, the lower the perceived stress (see Table 2.4-17). Additionally, place identity and the perceived stress correlate very slightly, suggesting the lower the perceived stress level the more people identify with the wetland.

The stress level also does not differ between the communities but on the educational background (see Table 3.2-19). The perception of stress is independent of professional backgrounds and also independent from the general health status.

Table 3.2-19: Perceived stress depending on location, education, occupation and perceived health

	Kruskal-Wallis-H Test		PSS-10			Bonferroni Correction
	Sample Groups	n _i	\bar{x}	IQR	p	
Sample Site	Sample Site A	76	19.0	4	0.30	<0.02
	Sample Site B	91	20.0	6		
	Sample Site C	65	19.0	6		
Community	Community A1	39	19.0	4	0.63	0.01
	Community A2	37	19.0	6		
	Community B	91	20.0	6		
	Community C1	26	18.0	4		
	Community C2	39	20.0	5		
Education	No Education	8	19.0	7	0.04	0.01
	Primary Education	100	19.0	5		
	Ordinary Education	99	20.0	4		
	Advanced Education	10	16.0	3		
	Tertiary Education	15	15.0	10		
Profession	Business	26	19.0	5	0.43	<0.01
	Self-Employed Farmer	126	19.0	5		
	Employed Farmer	14	20.0	5		
	Educational sector	23	18.0	4		
	Unemployed. Housewife	20	20.0	4		
	Others	23	19.0	5		
General Health	Very Good	16	17.0	4	0.07	0.01
	Good	66	19.0	6		
	Fair	135	19.0	5		
	Poor	10	20.0	5		
	Very Poor	5	18.0	2		

The higher the educational background, the lower the perceived stress (see Table 3.2-20). Those with advanced or tertiary education experience lower stress levels than persons with ordinary education or without school education.

Table 3.2-20: Perceived stress subject to education

PSS-10 Education level	Mann-Whitney-U Test				
	n_i	Mean Rank	N	z	p-value
no	9	67.28	108	-1.29	0.20
primary	99	53.34			
no	9	60.17	109	-0.52	0.61
ordinary	100	54.54			
no	9	13.56	19	-2.66	0.01*
advanced	10	6.80			
no	9	15.83	24	-1.79	0.07*
tertiary	15	10.50			
primary	99	91.95	199	-1.97	0.05
ordinary	100	107.97			
primary	99	57.16	109	-2.25	0.02
advanced	10	33.65			
primary	99	58.96	114	-1.22	0.22
tertiary	15	47.83			
ordinary	100	58.63	110	-3.27	0.00
advanced	10	24.20			
ordinary	100	60.43	115	-2.03	0.04
tertiary	15	41.80			
advanced	10	13.45	25	-0.25	0.81*
tertiary	15	12.70			

Regarding the social network, as shown in Figure 3.2.1, people at higher hierarchical positions perceive lower stress.

Table 3.2-21: Perceived stress level subject to the attitude to the place of residence

PSS-10		Mann-Whitney-U Test				
		n_i	Mean Rank	N	z	p-value
Attitudes to place of residence						
Comfort at sample site	no	30	136.4	233	-1.69	0.09
	yes	203	114.1			
Safety at sample site	no	38	119.8	233	-0.28	0.78
	yes	195	116.5			
Enjoyment at sample site	no	26	135.0	226	-1.79	0.07
	yes	200	110.7			

The perceived stress level is not influenced by the attitude to the place of residence. Although the mean ranks of persons perceiving the place of residence comfortable and joyful is lower, this result is not significant (see Table 3.2-21). Biographical aspects have no significant influence on the perceived stress level (see Table 3.2-22).

Table 3.2-22: Perceived stress level subject to biographical aspects

PSS-10 Biographical aspects		Mann-Whitney-U Test				
		n _i	Mean Rank	N	z	p-value
Sample Site is Birthplace	No	155	121.9	233	-1.57	0.12
	Yes	78	107.3			
Sample Site is Considered as Home	No	71	110.6	233	-0.97	0.33
	Yes	162	119.8			
Sample Site is Place of Choice	No	142	123.0	233	-1.71	0.09
	Yes	91	107.6			

Educational background appears as a core factor influencing self-esteem and stress perception. This is closely related to the social fabric of the wetland. The feeling of safety and the autonomy of choice stays in relation to self-esteem.

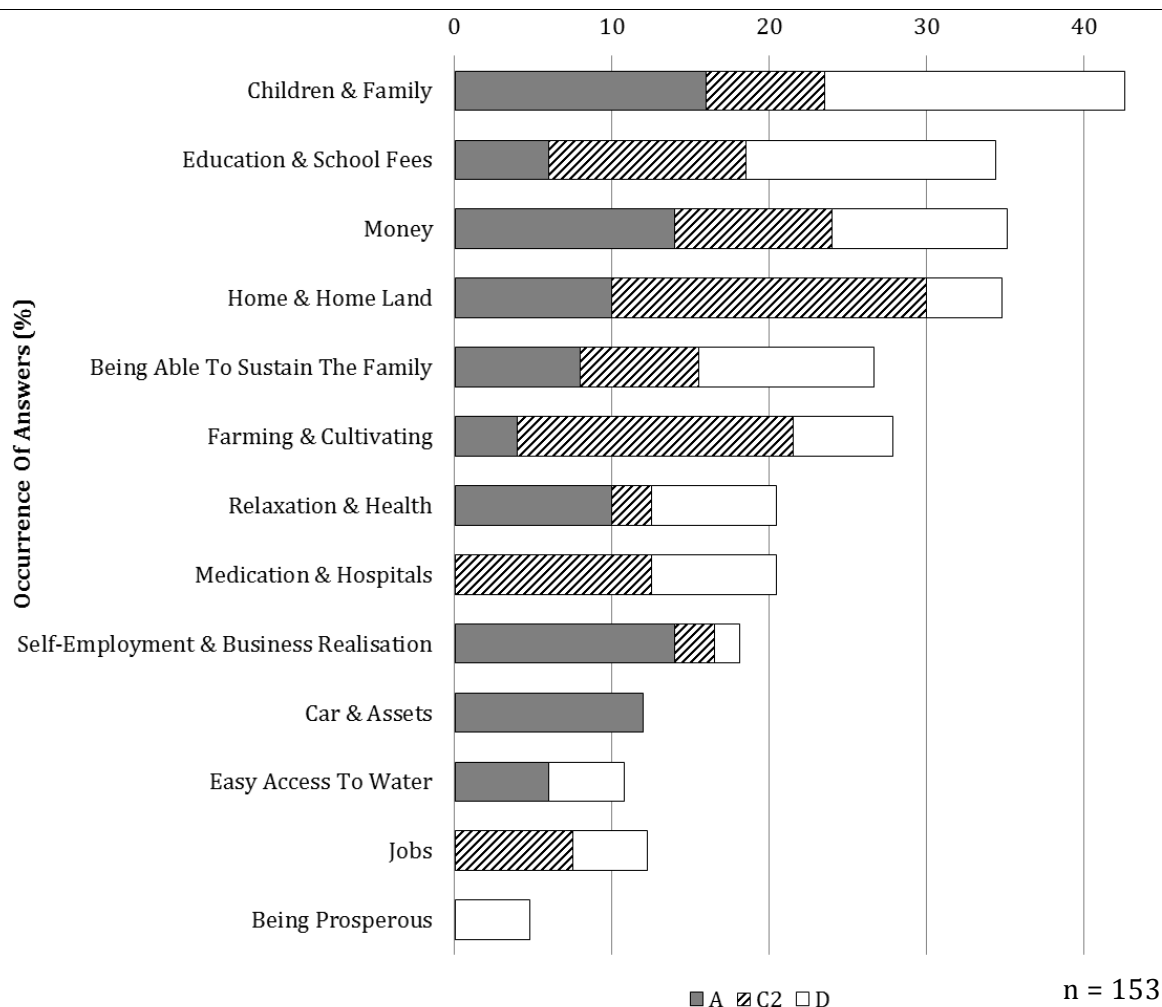
While WHO-5 and PSS-10 assess more affective aspects of the mental status, satisfaction with life and self-esteem require a retrospective consideration. SWLS and RSE also require a comparison to other places. Well-being is also dependent on other factors, which seemed to be based on cultural background (see Box 3.2-1).

Box 3.2-1: Cultural influence of well-being

In the group interviews, the local understanding of well-being was discussed. The personal situation of people in the research area differs from community to community, however, some items could be detected which were perceived as important in more than one community (see Figure 3.2-7).

People's well-being depends strongly on cultural and social settings. Social embeddedness is important for the participant's well-being. Having the family around and living nearby one's relatives has great importance. So, in December during Christmas as a social event, people feel *"in good health"* and *"excited"* (GI 4). This is perceived by women as well as by men.

The existence of children plays a crucial role in the participants' sense of well-being. A general lack of money to afford school fees for a high amount of children, however, is a strong concern of the farmers. Three times a year, when school fees fall due, a lack of financial means becomes an issue for many families. Parents want their children to have a better life as their own, *"that's why we are crying for our school fees"* (GI 4). They support education and academic careers but struggle to provide adequate means and materials for learning. *"Whenever I see my child being promoted to a higher class but under these learning conditions, I feel helpless"* (GI 2). Many participants associated a prosperous life with an educated family.

Box 3.2-1 to be continued: Cultural influence of well-being**Figure 3.2-7: Important items for the residents' sense of well-being**

Living a joyful life in the research area requires the ownership of land. As Figure 3.2-7 shows, there is a high value of the own *homeland*. Cultivating crops as well as living on one's own piece of land is a standard of living, to which subsistence farmers aspire. "[...] For me I feel, that in order to improve or to have a good life, the major factor to talk about would be land. If I happen to access land then the rest may come by. Because all activities that may increase the income are basing on land" (GI 4). Farmers perceive the work of digging as a source of motivation and mental well-being.

Cultivation of crops contributes to the farmers' capability to sustain their families; therefore, the receiving of livelihood from the wetland is a crucial part of their lives. Independently of markets and anthropogenic factors, they are able to provide food to their children and families. "When sufficient food is available, one does not easily fall sick, even one is satisfied" (GI 3).

3.2.4 *Social-ecological place attachment*

The study shows that mental well-being is highly dependent on the social fabric onsite. The relationship of residents to their wetland needs to be considered under socio-cultural aspects. It is influenced by the feeling of being safe in relation to the social environment (Kaplan and Kaplan 1989). The feeling of safety significantly impacts mental well-being (see Table 3.2-9).

Social constellations in state-owned areas and social fabrics of private areas showed significant differences in life satisfaction and self-esteem, which impact also emotional well-being and stress perception. The development of place attachment is essentially dependent on social-ecological and cultural-ecological factors. The wetland builds the basis of a value system and social fabrics (see Figure 3.2-1). The social fabric in space provides written and unwritten rules on who is allowed to settle or use the ecosystem for which purposes.

Tenants and landlords have the freedom to elaborate contracts on the use of the land. They have the autonomy to decide about their personal subsistence. For local farmers, the ownership of a plot on the wetland results in a high identification with the wetland. The landscape then is complemented in its function of a source of livelihood by a source of income as well as financial investment. Landowners and tenants of private land tenure system have an advantage in mental health; they are privileged to make relative autonomous decisions and experience the freedom to act, which strengthen their psychological well-being (Ryff and Keyes 1995). Landowners are in a good position to react to unpredicted changes and to cope mentally with challenges emerging in relation to the wetland.

In the case of state-owned areas, the managing institution allocates local farmers to plots in the wetland without formal contracts or agreements. Due to the population increase, there is a need for research on cultivation of agricultural products in wetlands. In the institutionally managed parts of the research area, privately cultivated plots are replaced or are likely to be replaced by research field for international and national projects. This *top-down* distribution of the wetlands impacts the individual's mental health. *"We are on the land but anytime they can tell you leave"* (GI 3). Especially the farmers are lacking autonomy in decision-making.

The insecurity in terms of land availability poses a problem concerning the farmers' economic well-being, as well as the users' ability to plan their future causing insecurity among residents. Even in the nearest future, the existence of the residents is insecure. Under this conditions, the risk of "learning" helplessness (Maier and Seligman 1976) appears in relation to the unpredictability of shifts in the social space. Changes in the social fabric and hierarchical construction in place are sources

of tension and nervousness. Mental health issues such as stress in relation to the wetlands evolve in terms of land use conflicts in e.g. political restrictions. Especially people of densely-populated areas feel displeasure and injustice in terms of the social rules and land ownership in the wetland.

The provision of resources, however, attracts numerous additional stakeholders from outside to settle or invest in the wetland. The government assigns private investors from outside to plot in the wetland. Due to perceived land scarcity, those governmental activities result in tensions in the social fabric, and both cause and aggravate social segregations in the settlements: *“There are investors who work on these wetlands. They are in no way associated with us”* (GI 5+6). *Insiders*, who feel deeply attached to the wetland, are separated from *outsiders*, who do not have any sense of the place (Shamai 1991) and just use the resources as long as they are available. The activities of foreign stakeholders change the sense of the wetland, thus outsiders settling in the areas, as well as their activities in the wetland, are considered as disparaging by the locals. The social distance between locals and outsiders was also observed in the study of Davenport and Anderson (2005).

Unequal distribution of resources like land and water is the great issue in the region. The permanent fear of being evicted (see Chapter 3.2.1) impacts the residents' self-determination as well as their long-term perspective on life. Moreover, it affects their resilience against environmental challenges and their ability to cope with insecurities concerning the wetland (PF M). The missing ability of future planning and the inability control baseline in their lives are central impacts on mental well-being (Ryff and Keyes 1995). People from state-owned areas are more likely to suffer from depressive moods than others (see Figure 3.2-5). The restriction to land and land properties also hamper people in their development of identity-related to the wetland. Permanent conflicts about wetlands and their resources became a political issue and were taken up from public newspapers in Uganda (Heinkel 2014). Examples from other studies already showed that relocation and resettlements affect locals in their traditional housing and cause social tension, and encroachment destroys the traditional territories leading to social impacts (Rosenberg et al. 1995).

Governmental interventions in the wetlands have a huge impact on social-cultural dynamics in the wetland. Whether the attributed feelings towards a place result in pleasure or displeasure is highly dependent on this specific sense of place as well as on the distribution of resources and power. It is driven by the society in space as well as the historical context and social interaction and is highly dynamic and dependent on the geographical conditions. The unequal distribution of wetland resources affects human well-being (Parkes and Horwitz 2009). Belton (2016), however, showed that similar management interventions in wetlands with

apparently comparable life conditions might have ambiguous impacts in different locations on the people's well-being and health.

3.2.5 *Chapter summary: Social layer as driving force of development*

Well-being and life satisfaction highly depend on the resources, which are available in the wetland. Due to a high diversity of products and resources, there is a high number of stakeholders and a complex social fabric. The accessibility of resources in a wetland differs in dependence on the status and role of every stakeholder.

The exemplary wetland is divided into two separate social systems. In the private land ownership landowners and farmers can decide by themselves, which lease contract they agree on. Autonomy in decision making is one of the key drivers for short-term well-being and life satisfaction. Furthermore, social and environmental safety at the place of residence are important. Farmers in the state owned-areas lack of these privileges due to crop restrictions and missing agreements between the state and locals. This results in a measurable lower status of well-being and life satisfaction in this area.

In the case study, qualitative and quantitative data sets fit exactly together. They show that the social structure in a wetland to a large extent is based on the natural resources. Owning a piece of a wetland is a status symbol and is culturally aspired. Regarding the central research questions the findings show, that people aspire also to be well educated as well as to educate their children properly. Higher school degrees are seen as an advantage and increase self-esteem. People with higher educational degrees tend to feel less stressed.

Investors from outside need to be restricted more clearly by the government concerning the exploration and extraction of natural resources from the wetland. Furthermore, the governmental interventions must be tailored to the day-by-day life of residents and prioritize the equal distribution of resources.

3.3 MICROSCALE: ACTIVITY AND EXPERIENCED SPACE

The study provided information about the local understanding of the landscape. The following chapter outlines the individual perspective on the landscape concerning activities carried out and experiences made in the wetland (see Figure 3-1). It firstly focuses on descriptions and emotional expressions about the wetland collected from the group interviews. On basis of these data an inventory of the residents' emotional perceptions and cognitive representation of the wetland in the participants was assessed (Chapters 3.3.1). Gender-related differences in the perception of the wetland are considered in Chapter 3.3.2. Additionally, other determinants and supporters of a positive or negative perception of the wetland are quantitatively and qualitatively assessed in this chapter. The functional dependence on the wetland is quantitatively assessed in Chapter 3.3.3 and represents the wetland as activity space. Emotional attachment to the wetland in form of place identity will be outlined in Chapter 3.3.4, where statistical evidence on the wetland's identity forming function is provided. Changes in the wetland and the impact on mental aspects are considered in the Chapters 3.3.5 and 3.3.6.

3.3.1 *Functional and emotional understanding of the wetland*

For residents who actively use the wetland, the wetland consists not merely of the shore zones between water and the land, but is understood as landscape that includes hills and valleys (GI 1) as well as certain species of animals and plants (GI 6), all of which depend on the encompassing resource of water (GI 1+2+5+6). In contrast to definitions of wetlands by international organisations and researchers (Ramsar 1971; Horwitz et al. 2012; Finlayson et al. 2005), where the wetland is defined only by specific parts of a landscape (see Chapter 1.1), the participants define a *wetland* as a whole basin area.

The wetland is seen as the provider of food during the dry season as well as a provider of jobs and materials. It emerged during the group interviews that there are at least two different expressions for *wetland* used by locals. *Lutobazi* is commonly understood as the area in the part of the wetland, which is wet and never dries out during the dry season. This area is characterised by the permanent coverage of water and a broad variety of animals and plants. Residents receive fresh and cold air from these *swamps*. The *lutobazi* contains clay, silty soils and quicksand. It was associated with natural wild animals and plants and is also in use for fish farming. During the rainy season, this part of the wetland is not in use, since the masses of water push subsistence farmers out of the *lutobazi* up to the higher and thus drier area, the *kiseniy*. This fringe zone differs from the *lutobazi* in terms of

humidity and types of soil, though the *kiseniy* consists of more sandy soils. Nevertheless, the participants struggled to clearly allocate special types of soil to one or another area. The farmers cultivate crops in the *kiseniy* and irrigate the area with water from the *lutobazi*. Particular crops such as yams, vegetables, sugar cane and rice are more convenient to grow in the *kiseniy*. The *kiseniy* is associated with farming activities including animal husbandry as well as food- and cash-crop farming (see Table 3.3-1).

The free listing and the subsequent assignment of the items to *kiseniy* or *lutobazi* in the different sites A and D revealed a different understanding of the two terms depending on the location of the communities surveyed. This difference emerges most clearly in the classification of papyrus reeds, which the women in community A associated with *lutobazi* and all participants of community D assigned explicitly to *kiseniy*. For most of the mentioned items, there is no clear assignment to one or other of the areas.

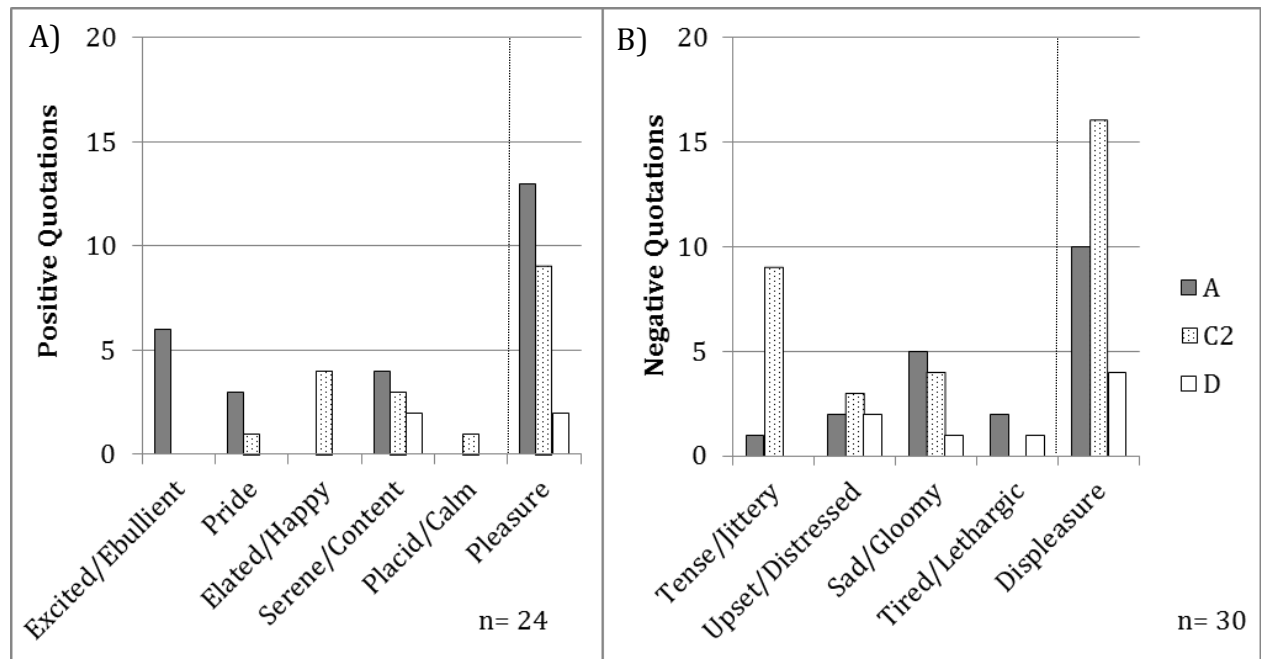


Figure 3.3-1: Wetland-attributed feelings of pleasure A) and displeasure B)

The wetland is connoted with positive and negative emotions. In community A positive expressions overweight, while in community C2 negative feelings about the wetland dominate (see Figure 3.3-1).

Table 3.3-1: Wetland inventory by free listing and classification of wetland items

<i>Lutobazi</i>	Group Interview	Both	Group Interview	<i>Kiseniy</i>	Group Interview
Always Water	1+2+5+6	Water	2+5+6	Sand (For Construction)	1+2+6
Animals	2+5+6	Shrubs	1+5+6	Yam	2+5+6
Feels Fresh	2+6	Food In Dry Season	2+5	Use For All Seasons	2+6
Covered With Water	2	Clay	1+6	Sugar Cane	2+6
Fish Farming	1	Palm Leaves	1+6	Drys Out In Dry Season	1+2
Farming	1	Water Is Life	2	Brick Making	2
Drainages To Transport Water	1	Fish Farming	2	Cattle Food	2
Papyrus Reeds	1	Hills	1	Pig Keeping	2
Soil	5	Valleys	1	Farming	2
Mud	6	Soil	1	Source Of Food	2
Quicksand	6	Pottery	1	Happiness	2
Grasses	6	Jobs, Working People	1	Playing Children	1
Wild Berries	6	Mud	5	Papyrus Reeds	5+6
Small Fish	6	Good Soil	5	Vegetables	5+6
Expanse Of Land	6	Sugar Cane	5	Rice	5
		Bush	6	Every Plant That Grows In Water	6
		Tree Leaves	6	Trees	6
		Frogs	6	Maize	6
		Insects	6	Potatoes	6
		Mosquitoes	6		

As shown in Figure 3.3-2, a wetland generates pleasure through its appearance and the provision of resources such as water. The green colour and the various types of grasses are recognised (GI 6). People mentioned the important function of this landscape in terms of temperature regulation during hot days. This makes residents really proud of “their” wetland since they see it as “essential to humanity” (GI 2). Thinking of the wetland as an intact ecosystem inspired the participants’ creativity. Immediately a whole picture was painted in their minds (GI 1+2+6), as well as a whole range of business ideas and opportunities based on materials from the ecosystem came up (GI 1+2+4).

When I hear about the term wetland (lutobazi) or see it, I know right away that it, is the source of water, yes, water is life. Without water, we all cannot live. The wetland (lutobazi) helps us who live in the villages. We cultivate it, do fish farming on it, feed our livestock on it and we obtain our daily livelihoods (in terms of food) from it (GI 2).

When one talks about wetlands (lutobazi) this is what comes to my mind: I see water flowing down a valley. The valley is surrounded by hills. As the water flows down the valley it is surrounded by shrubs. I also see sandy soil, clay soil, muddy soil as well as papyrus reeds since I have a passion for mats. That is what I see. May God bless you! (GI 1).

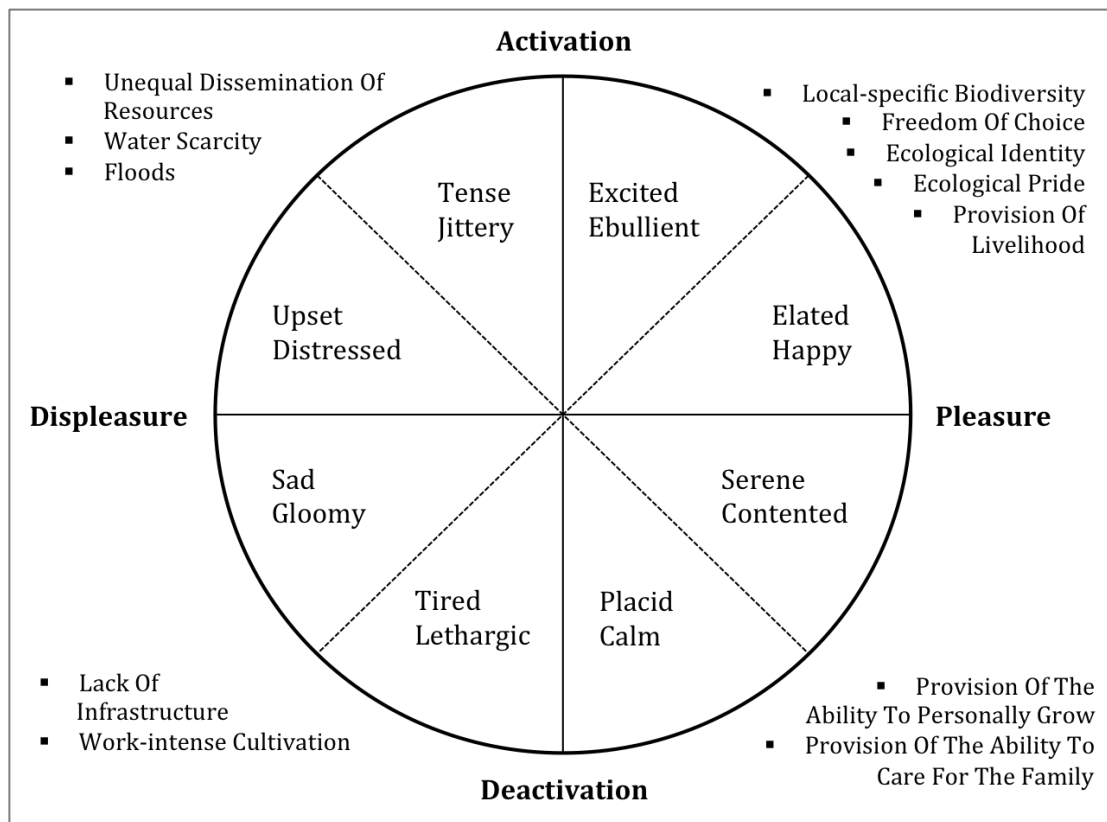


Figure 3.3-2: Core affects provoked by aspects related to wetland

Words like “*passion*” (GI 1) indicate a high appreciation of and deep commitment to the wetland (GI 4). Additionally, there is an association between spirituality and God. Others used the term “*pride*” (GI 2) when they talked about the large variety of products as well as the self-fulfillment they received from the wetland. *Happiness* is related to the freedom to farm and autonomy to produce the products of their choice (GI 2+4). The opportunity to grow crops in the wetland strongly supports people’s well-being. The wetland is seen as supporter and protection against droughts and food scarcity. It is the subsistence farmers’ hedge if the natural circumstance on the mainland change in a way of threatening their families. The wetland is associated with *help* (1+2+3+4+5) in terms of food security, financial well-being as well as a means by which to achieve goals and to obtain a better life. This makes people content.

In fact, I like farming very much. The piece I am holding is 5.77 acres. You can calculate that on 5.77 acres I would like to produce vegetables for commercial purposes. My wish is to have money founding for inputs, agricultural input, [like to] spray palm, fertiliser, herbicide, insecticide and so on so that I can raise money for some school fees for my children. I still have to sponsor two of my children. If I can educate my children up to university, I will die as a happy man [laugh] (GI 4).

At times when resources of the wetland become unavailable or inaccessible, people feel helpless: “*At the moment, most of our swamps dried up a long time ago. They no longer have water. We do need assistance*” (GI 1). Distress emerges when water is not available and food becomes scarce (GI 1+4). On the other hand, people become slightly upset if the water is too abundant during the rainy season (GI 6).

Many people, especially in community C2, experienced feelings of anger and injustice when they talked about the wetland in terms of the distribution of land properties and the social fabric (see Chapter 3.2.1).

[...] I need the wetlands in this area, according to what I do to cultivate some crops. These days we are heavy facing some problems...like as we farmers around here there is some kind of...because as a parent I have to guess on where I can have food...no life in Uganda...it’s now becoming expensive. To buy food is now becoming an expensive thing. So for my well-being, I need to work somewhere, where I can at least cultivate something instead of going for everything to the shops and... so that’s it (GI 4).

The scarcity of land for purchase is a source of tension as well as it poses a threat for the farmers to end up in hunger and poverty. The subsistence farmers have no reserves or savings. Without money, they are not able to make plans for the long-term except for dreaming of business ideas. People run a high risk to lose their whole existence in case of scarcity of water and food or eviction (GI 3). These

conditions cause feelings of fear and despair. In terms of community C2, this is a source of tense and jittery for people since land is “*monopolised by institutions and rich people*” (GI 4). These circumstances leave them despairing and fearful of the future.

Negative feelings have their origins mostly in social hierarchies and social pressures as well as the lack of the key resources of land and water, but also arise through the comparison of their own lives with those of others: “[...] *there are quarters they have the restriction but others they have not*” (GI 4). Land properties in the area of C2 are under the purview of the research institute thus the land is managed with a consequent top-down mentality, while subsistence farmers of other areas of jurisdictions have less restriction. This also generates feelings of injustice and anger. The missing of “*homeland*” (GI 4) and unfulfilled wishes and dreams makes people sad. Another issue is the exhausting long journey to water sources. General hard work in the wetland, as well as lack of infrastructure and improved farming techniques, make people tired and lethargic (see Box 3.1-1).

The wetland contains a specific composition of plants which are unique to this ecosystem. The provision of material, such as papyrus reed and tree leaves, plays an important role in the perception of the wetland as activity and social space. The residents of the rural areas get materials from the wetland on which they produce craftworks, such as mats. Many women sit together, chatting and creating products out of the material. This fosters social coherence (Antonovsky 1996) as well as a *sense of belonging* to the wetland (Relph 1976). By living in town, residents have fewer possibilities of joint production of handicrafts. In town C, the club played a role as an alternative for a social interaction. This influenced the perception of the wetlands as activity space and may explain the local differences in perception of the wetland as landscape. Activities which are closely related to the wetland, play a crucial role in the appreciation for the ecosystem. Especially, in site A many persons articulated *pride* when they talked about the wetland. Pride is a secondary emotion of love and happiness (Edelstein and Shaver 2007), which presupposes an internal evaluation about something (Russell 2003). In this study, pride was initiated when farmers talked about the wetland as their property and the support of the wetland for receiving financial well-being. Especially, farmers and business people relied on the wetland. Financial well-being provides freedom of choice and opportunity (Smith et al. 2013) and ensures the ability to personally grow (Ryff and Keyes 1995). Also, the local specific biodiversity was seen as something to be proud of. The feeling of taking pride in the ecosystem represents the conscious identification with the wetland, which influences the reflection on the wetland in a positive manner. Thus, *ecological pride* is a consciously felt appreciation for a landscape, which is expressed

to the outside world. Persons feeling proud of the wetland have a deep sense of place and are highly committed to the place (Shamai 1991).

3.3.2 Gender-related place attachment

The majority of men and women feel emotionally attached to the wetland (see Figure 3.3-3). However, the survey provided statistical evidence on gender as an influencing factor on place identity. Men identify slightly more with the wetland than women (see Table 3.3-2).

Table 3.3-2: Gender-related differences of place identity

PAI PI Gender	Mann-Whitney-U Test				
	n _i	Mean Rank	N	z	p-value
Male	109	132.6	235	-3078.00	0.00
Female	126	105.4			

Few participants have scores below the neutral cut-off score of 18; this group of slightly more women does not identify with the wetland. While the majority of men have scores of 24 to 27, women tend to have a higher variety in place identification (see Figure 3.3-3).

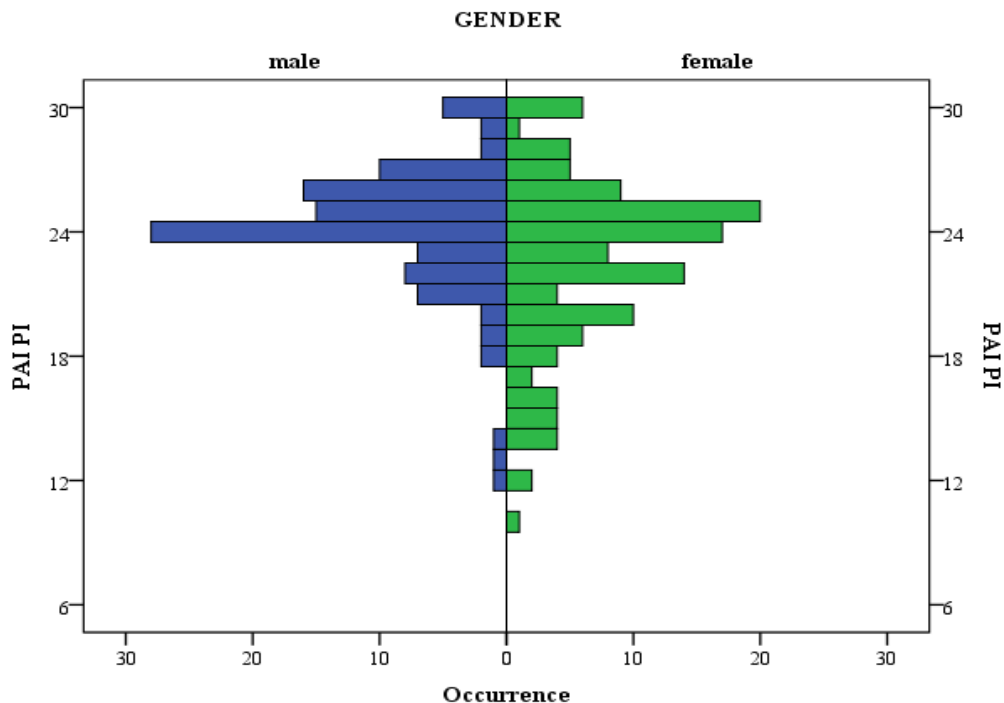


Figure 3.3-3: Gender-related place identity

In contrast, more women than men feel very dependent (>20) on the ecosystem (see Figure 3.3-4).

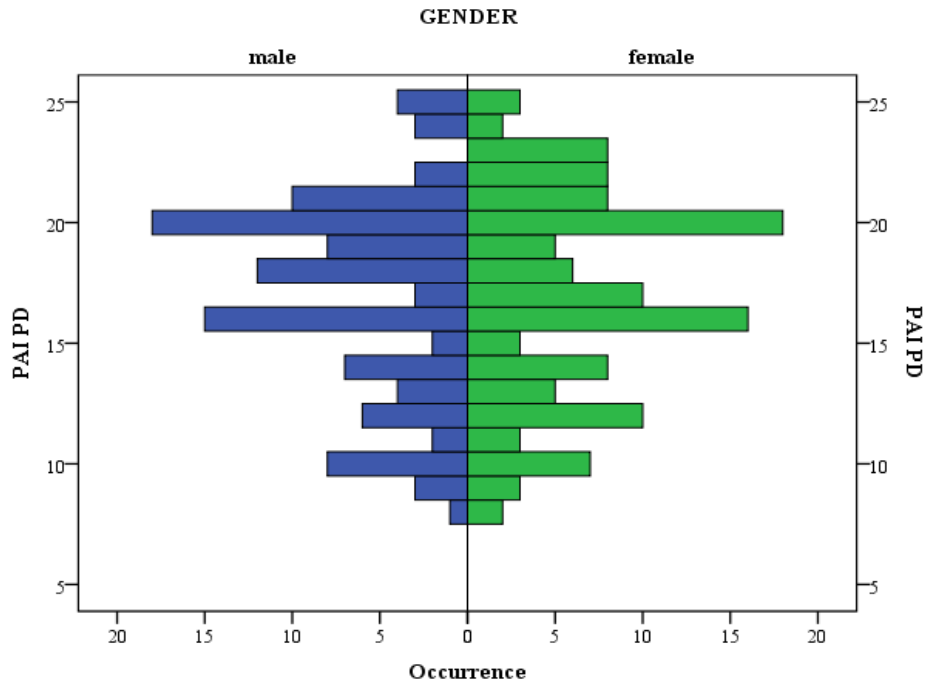


Figure 3.3-4: Gender-related place dependence

Nevertheless, there was no significant statistical evidence that men and women distinguish in place dependence (see Table 3.3-3). This result is also mirrored by the qualitative data. The wetland provokes mainly pleasure in men and displeasure in women (see Figure 3.3-5). The perception of the landscape differs between men and women and affects both genders differently. This contradicts the results of Anton and Lawrence (2014) who reported higher scores of place identity for women.

Table 3.3-3: Gender-related differences in place dependence

PAI PD Gender	Mann-Whitney-U Test				
	n _i	Mean Rank	N	z	p-value
male	109	117.1	234	-0.09	0.93
female	125	117.9			

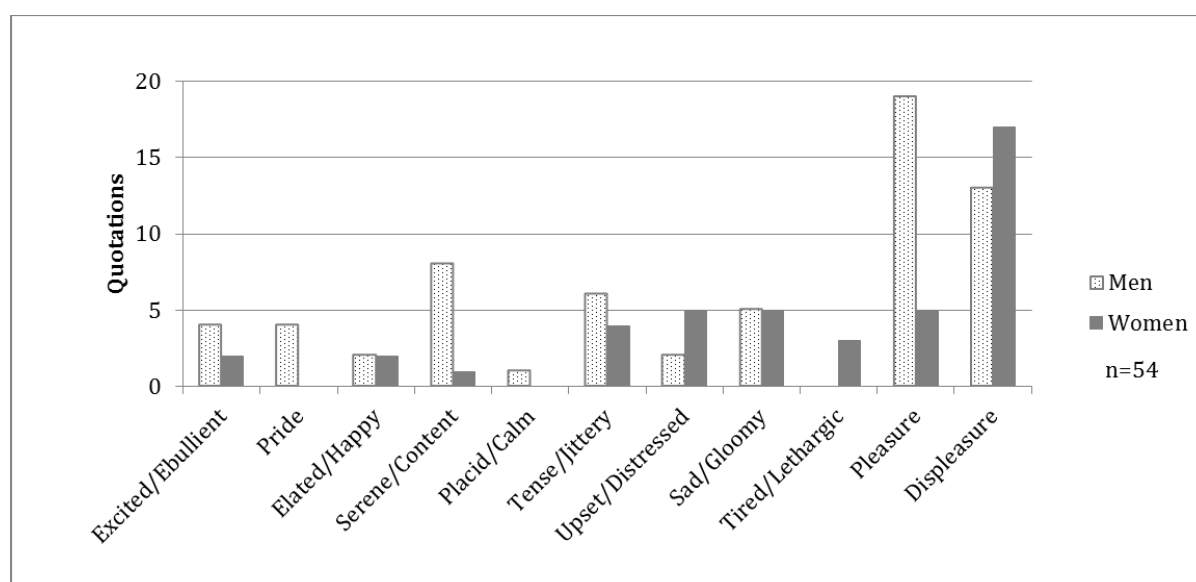


Figure 3.3-5: Wetland-attributed affects of men and women

Traditional gender roles play an important role in the impact of wetland on mental well-being.²³ The perception of wetlands is highly influenced by the activities in space. Gender in the research area is associated with a clearly defined set of activities, which are either the tasks of women or men. This also implies activities concerning the wetland. Men's activities in the wetland comprise food production for the family as well as brickmaking and the construction of houses and buildings. This explains the men's association of the wetland with the quality of soils as well as cash and food crops or husbandry (see Table 3.3-1). Especially, men perceive land ownership as very important. For men, it is important to sustain the family's livelihood. The expanse of land of the wetlands and the availability of resources cover all these needs and thus contribute strongly to the male residents' well-being. Additionally, having many children is seen as a symbol of masculinity and status. The more children persons had, the more attached they feel to the wetland, and also the higher their life satisfaction is.

Children are very present in the daily life in Uganda since they constitute half of the population (see Chapter 2.3.1). They are highly valued and perceived as very important for the Ugandan culture. This result is not in line with other studies conducted in a German cultural context, which investigated life satisfaction and emotional well-being in relation to socio-demographic variables (Jaeger et al. 2015, 236).

²³ Johanna Treidl carries out a PhD research project on gender and food security in the context of wetland transformation, which stays in relation to the Globe project

Uganda is a patriarchal society. In the research area, women move to their husbands' house after marriage. Men, in turn, are responsible to provide house and food to their families. Thus women might have a broader sense of place, due to their migration movement. They might be born and might have grown up in other places and, therefore, have experienced the wetland from different perspectives. At first, they immigrate as outsiders to the wetland. Only by certain life events, they become *biographically bonded* to the place, while the majority of men are born at the wetland and are already biographically bonded.

The children's birth is perceived as an important life event, especially for women, which contributes to the women's place attachment. There is a strong change in their lives after women gave birth to their first child. Besides finding themselves in a different role, they are perceived by their social surrounding as different persons, which is expressed in a shift of their surnames from the given name to "Mama" plus the name of the first child.

In the group interview, women in GI 1 did not know how to differentiate the areas of the wetland. Only through the thought of their childrens' playing areas, they saw a difference in the area. Some areas are perceived as a threat for the children to play, due to the danger of drowning, while the children are instead allowed to play in other areas of the wetland. Women tend to define landscapes as activity spaces of their children. The *kiseniy* is perceived as safe and healthy place for the children, while the *lutobazi* is considered dangerous. The spatial division into safe and unsafe areas for children was also considered by Stefanovic (2008). To a great extent, women perceive their environment through the activities of their children and as their caretakers.

Furthermore, women perceive the landscape by their traditional gender-related activities. Women do handicrafts like weaving mats and bowls as well as producing pottery. Thus women associate materials to the wetland, which they need in order to produce crafts such as clay and leaves of certain trees (see Table 3.3-1).

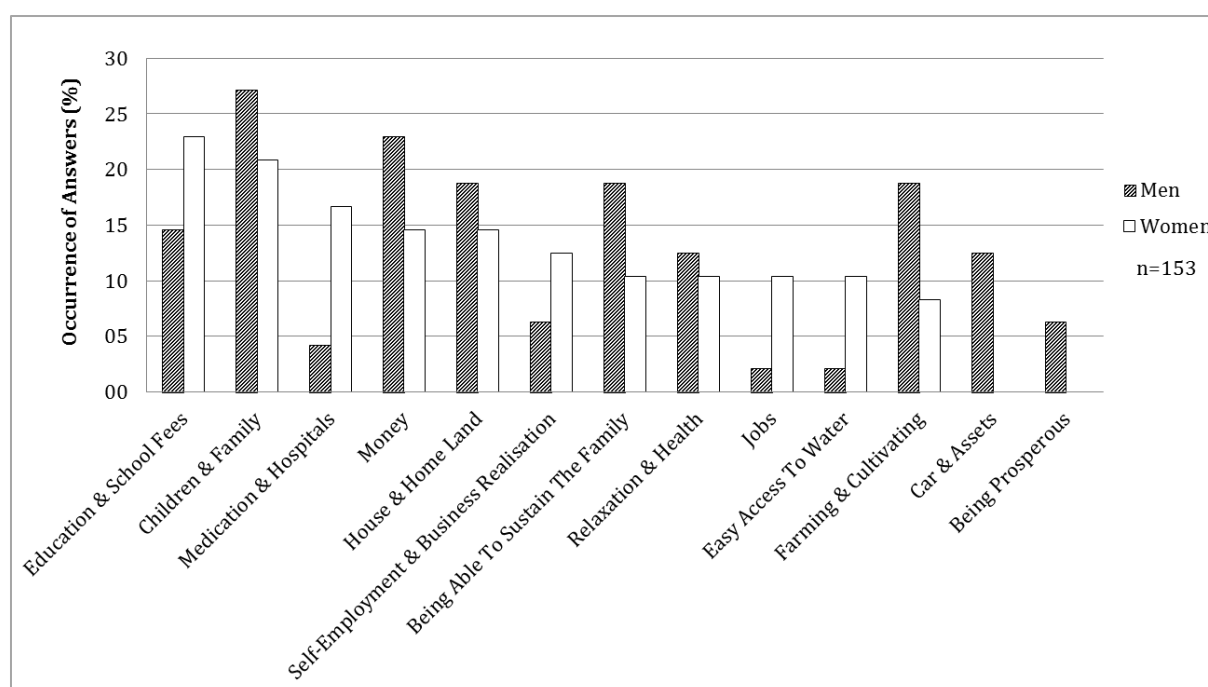


Figure 3.3-6: Items of well-being of men and women

Since women are also traditionally responsible for the health of their families, they demand better health and educational facilities (see Figure 3.3-6). The availability of jobs for their children was evaluated as very important. In this context, the conditions of life in the wetland may be perceived as a burden. Long routes to fetch water and water as a potential source of disease cause the feelings of stress and tiredness. This results in a significantly higher stress perception of women (see Table 3.3-4).

Table 3.3-4: Gender-related differences in the perception of stress

PSS-10 Gender	Mann-Whitney-U Test				
	n _i	Mean Rank	N	z	p-value
male	108	102.8	233	-2.99	0.00
female	125	129.3			

The majority of women has a stress level of ≥ 19 (see Figure 3.3-7). The group of men is more heterogeneous. One part also feels stressed at the same level as women do, while another part is more relaxed and has scores < 15 .

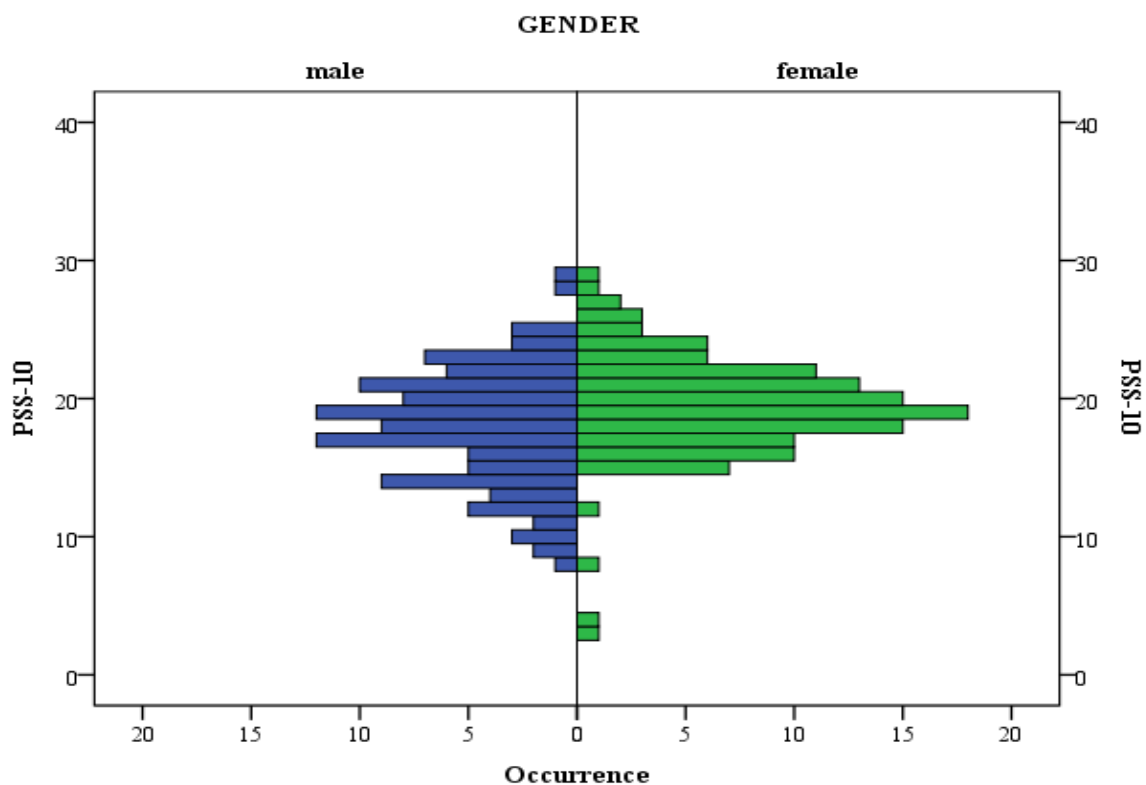


Figure 3.3-7: Gender-related perceived stress

The wetland hampers the construction of infrastructure by its natural borders. The strongly perceived lack of infrastructure and improved farming techniques disturbed especially women due to their duty of care for their children. In developing countries, women often are the caretakers of the family. Their exposure to risks for physical and mental well-being have been outlined by Kevany and Huisingh (2013).

In the outlined context subsistence farmers perceive the wetland through their activities in space, i.e. farming activities and hard physical work. The work is hard and time-intensive and may change people's behaviour since the year-round cultivation hampers people's ability to attend social events; they are at risk of becoming lonely and quiet (FM). Due to the high workload under the special conditions of the wetland (PF M), the landscape is associated with huge physical work and thus precludes the use of recreational ecosystem services. To a certain extent, the wetland hampers the improvement of infrastructure (GI 1, GI 3, GI 6) and the ability to expand businesses through its topological characteristics.

Most of the studies in the place-people relationship only focused on rivers and wetlands as places of relaxation and recreational activities and not in a development context (Raymond et al. 2010; D. Williams and Vaske 2003; Bricker and Kerstetter 2000; MacKerron and Mourato 2013; Alcock et al. 2015; Peña et al. 2015; Völker and Kistemann 2015).

A more feministic perspective on wetlands provides a new perspective on the research topic of place attachment and place identity in developing countries.

Nowadays, Uganda's population is facing tensions between the traditional ways of life, based on traditional values and gender roles, and the modern life, including higher mobility and job opportunities in urban areas. Being part of this transition, women seek their independence and emancipation. *"What I need in order to have a better life is a nice family, for me is a nice family which respects one another"* (GI 6). Women are also looking for jobs in the urban areas, where especially people with a higher level of education are searching for employment. This implies a migration movement, the second one for many women, from their place of residence to larger cities. In the course of women's emancipation from traditional gender roles towards more modern lifestyles, the emancipation from traditional senses of place can be expected, also. The study results suggest, that explicitly women in rural areas want to be self-ruled and independent. They feel comfortable with self-employment and aspire to realise new business ideas as well as the construction of houses, which are based on the wetland's materials.

Men and women have a highly different emotional access to the wetland. Predicated on traditional gender-roles, residents of the wetland have a gender-related place identity resulting in an essentially different evaluation of the landscape between men and women.

3.3.3 Activities – provision - dependencies

The place attachment inventory was a good tool to quantitatively assess the residents' dependence on and identification with the wetland. It detected more factors influencing the wetland-resident-relationship. In the previous data preparation and meta-analysis (see Chapter 2.4.5), the subscales of the place attachment inventory (PAI) showed acceptable and good internal consistency and reliability. This chapter presents the results of the place attachment.

Table 3.3-5: Location parameter of PAI PI and PD

Place Attachment Inventory	n	\tilde{x}	Min	Max	IQR
PAI PI	235	24	10	30	4
PAI PD	234	17	8	25	6

PAI PD = Place Identity; PAI PD = Place Dependence; n = Number of Cases; \tilde{x} =Median; Min = Minimum value; Max = Maximum value; IQR = Interquartile range

The survey sample has a general PAI PI median of 24 (IQR = 4) implying that people identify with the wetland (see Table 3.3-5). During the interview, especially in the dry season, people sometimes asked for specification of the wetland in either *kiseniy*

or *lutobazi* (see Chapter 3.3-1). They told that there is one area, which dries out during the dry season, and another one, which does not dry out. People tend to consider the *lutobazi* when thinking about place identification. The median of PAI PD is 17 (IQR = 6), which means that people of the study only slightly depending on the wetland.

Different age classes appear with variable scores of place dependence (see Figure 3.3-8). Younger people feel less dependent on the wetland, namely, people below the age of 20 feel less dependent on the ecosystem, same as people of 20-39 years. Both age classes differ in their interquartile range and minimum and maximum values. In the age class 20-39, a high amount of people have already settled due to having their own families and children.

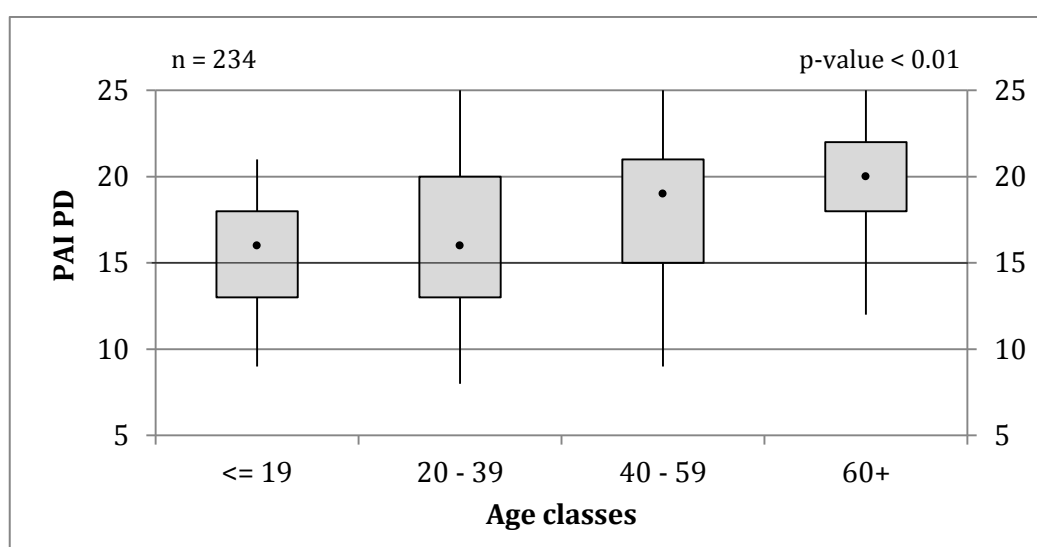


Figure 3.3-8: Place dependence in age classes

In line with this, the correlation analysis shows: the older the participants, the higher their level of functional attachment to the wetland (see Table 3.3-6). The more children people have, the more dependent they feel on the wetland. Place dependence correlates slightly more with the length of residence in the wetland instead of the length of residence in the same house.

Table 3.3-6: Correlations of place dependence with biographical and local factors

PAI PD	AGE	PPH	KIDS	MIN SCHOOL	MIN MC	LOR PLACE	LOR HOUSE
r	0.28	0.07	0.22	0.16	0.03	0.22	0.17
p	0.00	0.31	0.00	0.04	0.69	0.00	0.01
n	234	234	232	162	230	231	234

PAI PD = Place Dependence; r = Spearman's correlation coefficient; p = significance level; n = number of cases; AGE = Age; PPH = Persons per household; KIDS = Number of children; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes; LOR PLACE = Length of residence at the same place; LOR HOUSE = Length of residence in the same house;

As shown in Table 2.4-17, place dependence is strongly interconnected with place identity ($r=0.61$; $p < 0.01$). The correlation analysis also shows the more satisfied people are with lives, the more dependent they feel on the wetland ($r = 0.39$; $p < 0.01$). The functional attachment to the wetland is also dependent on the attitude to the place of residence. If people feel comfortable, safe, as well as if they enjoy their life at their place of residence, they show higher values of place dependence (see Table 3.3-7).

Table 3.3-7: Place dependence subject to personal attitudes to the wetland

PAI PD Attitudes to place of residence		Mann-Whitney-U Test				
		n_i	Mean Rank	N	z	p-value
Comfort at Sample Site	No	31	69.8	234	-4232.00	0.00
	Yes	203	124.8			
Safety at Sample Site	No	38	82.9	234	-3454.00	0.00
	Yes	196	124.2			
Enjoyment at Sample Site	No	28	57.2	227	-4910.00	0.00
	Yes	199	122.0			

The residents of the wetland are highly dependent on the provisioning ecosystem services. The subsistence farmers depend primarily on the key resources, water and land. Particularly during the dry season, the wetland especially provides a sense of security in terms of water supply. The security of material needs supports the feeling of comfort and enjoyment of living in the wetland, aspects which are important to the long-term evaluation of life and well-being. A higher life satisfaction also appears to be connected to the feeling of safety in the place of residence. The natural resources play an important role in the positive appraisal of the wetland.

Those who have chosen the place of residence autonomously feel more dependent on the wetland than those who were obliged by an external factor to live there (see Table 3.3-8). It does not matter for the place dependence whether the place of residence is the birthplace or considered as *home*.

Table 3.3-8: Place dependence subject to biographical aspects

PAI PD Biographical aspects		Mann-Whitney-U Test				
		n_i	Mean Rank	N	z	p-value
Sample Site is Birthplace	No	157	118.8	234	-0.41	0.68
	Yes	77	114.9			
Sample Site is Considered as Home	No	72	114.9	234	-0.40	0.69
	Yes	162	118.7			
Sample Site is Place of Choice	No	143	101	234	-4711.00	0.00
	Yes	91	144			

Place dependence is conditional on the location of the village or town (see Table 3.3-9). Furthermore, the educational background, as well as the profession, plays a role in the feeling of being dependent on the wetland. People with lower degrees have higher medians in place dependence than people with higher degrees. Business people and self-employed farmers show higher medians than employed or unemployed people.

Table 3.3-9: Place dependence subject to location, profession, education and health

	Kruskal-Wallis-H Test		PAI PD			Bonferroni Correction
	Sample Groups	n_i	\bar{x}	IQR	p	
Sample Site	Sample Site A	76	19.0	5	<0.01	<0.02
	Sample Site B	91	17.0	7		
	Sample Site C	65	16.0	8		
Community	Community A1	39	18.0	5	<0.01	0.01
	Community A2	37	20.0	6		
	Community B	91	17.0	7		
	Community C1	26	16.5	6		
	Community C2	39	14.0	8		
Education	No Education	8	20.0	1	<0.01	0.01
	Primary Education	100	19.0	5		
	Ordinary Education	99	16.0	8		
	Advanced Education	10	17.5	8		
	Tertiary Education	15	12.0	6		
Profession	Business	26	20.0	6	<0.01	<0.01
	Self-Employed Farmer	126	18.0	6		
	Employed Farmer	14	17.0	8		
	Educational sector	23	14.0	4		
	Unemployed. Housewife	20	14.0	9		
	Others	23	16.0	6		
General Health	Very Good	16	18.0	7	0.19	0.01
	Good	66	16.0	7		
	Fair	135	18.0	7		
	Poor	10	17.5	3		
	Very Poor	5	12.0	12		

The sample sites, as well as the local council areas, differ significantly in the dependence on the wetland (see Figure 3.3-9).

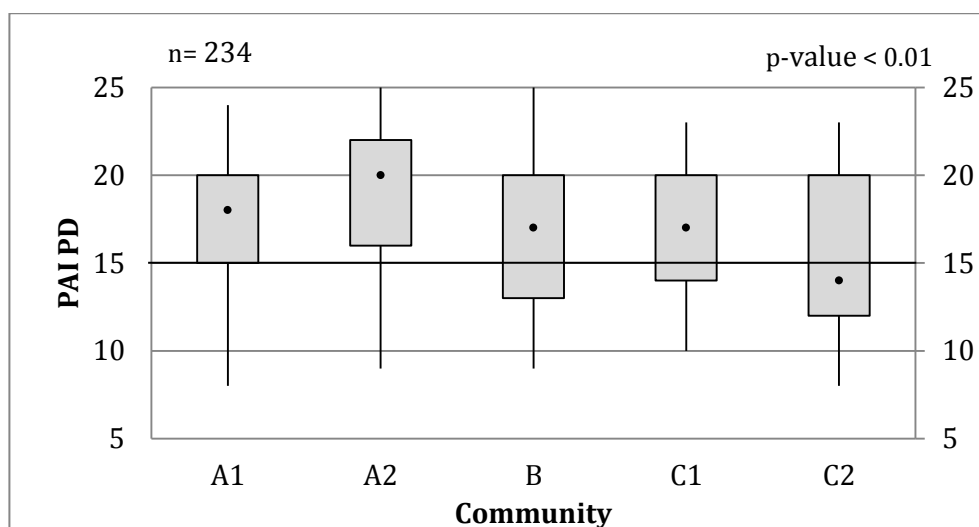


Figure 3.3-9: Boxplots of place dependence in the communities

A detailed dependence analysis shows that place dependence is higher in location A2 than in location B, C1 and C2 (see Table 3.3-10). The latter three have a better connection to the mobile infrastructure. Community B and C1 have comparable median scores and interquartile ranges, while participants of community C2 instead feel less dependent on the wetland.

Table 3.3-10: Place dependence in the communities A1, A2, B, C1, C2

PAI PD Community	Mann-Whitney-U Test				
	n _i	Mean Rank	N	z	p-value
A1	39	35.5	77	-1.40	0.16
A2	38	42.59			
A1	39	69.9	130	-0.88	0.38
B	91	63.62			
A1	39	35.6	66	-1.08	0.28
C1	27	30.46			
A1	39	44.68	78	-2.03	0.04
C2	39	34.32			
A2	38	78.3	129	-2.62	0.01
B	91	59.45			
A2	38	37.95	65	-2.51	0.01
C1	27	26.04			
A2	38	48	77	-3.50	0.00
C2	39	30.23			
B	91	59.99	118	-0.29	0.77
C1	27	57.85			
B	91	68.8	130	-1.53	0.13
C2	39	57.79			
C1	27	36.41	66	-1.03	0.30
C2	39	31.49			

Uneducated persons and persons with a primary level of education appeared as highly dependent on the wetland. Persons with advanced educational background

were more dependent on the wetland than persons with ordinary or tertiary education (see Table 3.3-11). The higher the degrees, the higher the spatial and social mobility. Persons with higher levels of education are less likely to depend on the wetland as a provisioning ecosystem. They probably more rely on urban infrastructure and employers and intangible values of the wetland instead. In relation to the location of their training organisation, these residents may have a large radius of action implying a broad understanding of the geographical space. More than the local farmers with a sense of place relatively focused on the investigated wetland, as discussed later in this in chapter, people with a higher educational background might be able to compare different wetlands. Nevertheless they might have a greater emotional distance to wetlands than farmers, as their income is not based on activities in the wetland as well as on the wetland's materials. These results reflect other studies, which also provide statistical evidence on level of education as a predictor for place dependence (Anton and Lawrence 2014; D. Williams et al. 1992).

Table 3.3-11: Place dependence subject to educational background

PAI PD Education Level	Mann-Whitney-U Test				
	n _i	mean rank	N	z	p-value
no primary	9 101	69.50 54.25	110	-1.38	0.17
no ordinary	9 99	81.33 52.06	108	-2.70	0.01
no advanced	9 10	11.61 8.55	19	-1.22	0.24*
no tertiary	9 15	19.28 8.43	24	-3.69	0.00*
primary ordinary	101 99	113.62 87.11	200	-3.25	0.00
primary advanced	101 10	56.65 49.40	111	-0.68	0.49
primary tertiary	101 15	63.55 24.50	116	-4.22	0.00
ordinary advanced	99 10	54.48 60.10	109	-0.54	0.59
ordinary tertiary	99 15	61.00 34.40	114	-2.92	0.00
advanced tertiary	10 15	16.80 10.47	25	-2.12	0.00*

The groups of occupation appeared significantly different in terms of their dependence on the wetland. Businesspersons, as well as self-employed farmers, felt significantly more dependent on the wetland than unemployed persons and

housewives as well as teachers or students (see Table 3.3-12). Farmers who generally have a lower degree of education, tend to feel strongly attached to the wetland. Business people reached highest medians of place dependence due to many businesses in the region depending on the materials and sales of products from the wetland. Farmers and business people perceive the wetland as activity space. The majority of people with higher educational backgrounds are employed outside the wetland and feel less attached to the landscape.

Table 3.3-12: Place dependence subject to occupation

PAI PD Profession	Mann-Whitney-U Test				
	n _i	Mean Rank	N	z	p-value
Business	26	86.75	153	-1.24	0.22
self-employed Farmer	127	75.00			
Business	26	22.50	40	-1.49	0.14
employed Farmer	14	16.79			
Business	26	30.50	49	-2.88	0.00
Education	23	18.78			
Business	26	28.71	46	-3.02	0.00
unemployed. Housewife	20	16.73			
Business	26	28.27	49	-1.71	0.09
others	23	21.30			
self-employed Farmer	127	72.02	141	-0.90	0.37
employed Farmer	14	61.71			
self-employed Farmer	127	80.09	150	-3.05	0.00
Education	23	50.15			
self-employed Farmer	127	78.22	147	-3.04	0.00
unemployed. Housewife	20	47.20			
self-employed Farmer	127	77.00	150	-1.00	0.32
others	23	67.24			
employed Farmer	14	22.46	37	-1.53	0.13
Education	23	16.89			
employed Farmer	14	20.86	34	-1.66	0.10
unemployed. Housewife	20	15.15			
employed Farmer	14	18.64	37	-0.16	0.88
others	23	19.22			
Education	23	22.39	43	-0.22	0.83
unemployed. Housewife	20	21.55			
Education	23	19.67	46	-1.95	0.05
others	23	27.33			
unemployed. Housewife	20	18.05	43	-1.94	0.05
others	23	25.43			

The residents use the wetland consumptively as a source of provisioning ecosystem services and source of income. Thus market use-values of the wetland play a great

role in the residents' well-being, equally as important as non-market use-values (Stoeckl et al. 2014). The participants of the study are deeply functionally committed to the wetland due to its provision of their livelihood, which reflects the results of other studies and reports (Finlayson et al. 2005; Horwitz et al. 2012).

Comparing the place dependence inventory with studies from high-income countries, there are only slight differences in the results. As shown in Table 3.3-13, Anton & Lawrence (2014) assessed the place attachment of locals to their surrounding environment after bushfires in Australia; Raymond et al. (2010) also assessed the place attachment of rural landholders to their land in Australia. These studies provide an adequate comparison to the presented study since the persons considered are biographically attached to the area. The three studies show similar ranges of place dependence. The studies of Bricker and Kerstetter (2000) and Williams and Roggenbruck (1989) showed slightly lower results of grand means of the place dependence as the presented study. Both studies assessed the place attachment to recreational places. People were only temporarily attached to the places, as visitors and tourists. This suggests that the place attachment inventory is sensitive to slight differences in the place dependence of residents or landowners on their surrounding environment, and the functional attachment of tourists to places where leisure activities are performed. Residents of the wetland are slightly higher attached to their environment than tourists to those places, which they visit for recreational reasons.

Interestingly, the items 4, 6 and 10 of place dependence in the investigated wetland were slightly underestimated. The item means around three suggest a neutral position towards the uniqueness of the investigated wetland. They have item means implying just a neutral attitude of participants towards the landscape.

Due to their low income, subsistence farmers in the research area have a very small radius of action. Several subsistence farmers of villages in the research area have never visited the capital, which is about 30 km away from the wetland. Villagers and people lack spatial mobility and are not able to compare their wetland with other wetlands. The subsistence farmers' understanding of place is very focused on the wetland implying that they are highly rooted in the areas. Their perception of the place and the comparison to other places and landscapes are "*relatively narrow*" (Relph 2008, 37). Thus also their sense of place is very focused on the wetland and their settlements.

Table 3.3-13: Comparison of place dependence in the research area with other studies

Item	Place Dependence	Own study 2018 (UGA)		Anton & Lawrence 2014 (AUS)		Raymond et al. 2010 (AUS)		Bricker & Kerstetter 2000 (USA)		Williams & Roggenbruck 1989 (USA)	
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
2	The wetland is the best place for what I like to do	3.52	1.17			3.77	0.82	3.2	0.8	2.70	1.03
4	No other wetland can compare to this wetland	3.26	1.13			3.21	1.08	2.56	0.92	3.00	1.20
6	I get more satisfaction out of being at this wetland than at any other	3.21	1.15					2.89	0.8	3.30	0.99
8	Doing what I do at this place is more important to me than doing it in any other place	3.60	1.08			3.80	0.93	2.84	0.83	2.90	1.10
10	I wouldn't substitute any other area for doing the types of things I do at this place	3.43	1.07			3.11	0.96	2.72	0.86	2.70	0.95
	Number of Items		5		5		4				11
	Grand Means	3.40				3.47		2.84		2.92	
	Score Mean	17.03	4.25	15.13-18.19	4.16-4.82						
	Cronbach's Alpha		0.82				0.81				0.82
	n		235		298		320		1219		123

3.3.4 Place identity – ecological identity

The indicator of a more emotional access to the wetland, place identity, correlates with age classes. The older the people, the more they identify with the wetland. Older participants feel more emotionally attached to the wetland than younger ones (see Figure 3.3-10). The group of 60+ highly identifies with the wetland, while in the group of people in the age of ≤ 19 , 25% had neutral or no emotions related to the wetland.

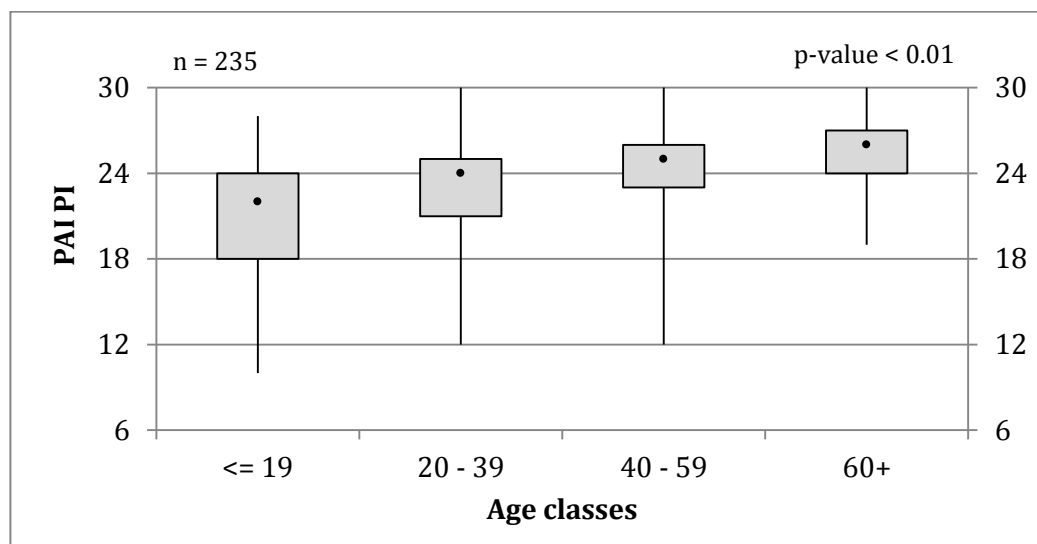


Figure 3.3-10: Place identity in age classes

A slight correlation between place identity and the participants' age underpins the descriptive analysis (see Table 3.3-14). The fact of having children supports the development of place identity, as also outlined in Chapter 3.3.2. The length of residence in the same house shows a slightly more intense identification with the wetland, same as the length of residence at the same place. The more time people spent in the wetland and the better they get to know it, the more they feel responsible to maintain it. People who spend their day-to-day life in the wetland or who had already spent a significant part of their lives in the area identify more with the wetland than, others, for example, labour migrants, or people who have never worked in the wetland.

The result shows a correlation between the length of residence in the same house and place identity (see Table 3.3-14). The longer people live in the same house, the more they identified also with the wetland and its ecology. Both places refer to different scales; while the wetland may be understood as a whole landscape, a house is a single clearly-defined point in a place. The meaning of the wetland and its representation in the residents' minds refers to more than just one single scale. This reflects what Jack (2010, 90) stated that "*place exists at different scales, ranging from*

a particular part of a house or garden to the streets, shops and other facilities and landmarks of the local neighbourhood or town, out to the wider countryside, region and nation”.

Those who state that their children have long journeys to school, identify more with the wetland than those ones whose children only have short journeys to school. As described in Chapter 2.4.6, the time required to go to school was taken as an indicator of the infrastructural quality of the area.

Table 3.3-14: Correlations of place identity with biographical and local factors

PAI PI	AGE	PPH	KIDS	MIN SCHOOL	MIN MC	LOR PLACE	LOR HOUSE
r	0.29	0.01	0.20	0.23	-0.04	0.19	0.20
p	0.00	0.89	0.00	0.00	0.56	0.00	0.00
n	235	235	233	162	231	232	235

PAI PI = Place Identity; r = Spearman's correlation coefficient; p = significance level; n = number of cases; AGE = Age; PPH = Persons per household; KIDS = Number of children; MIN SCHOOL = Journey to assess school in minutes; MIN MC = Journey to assess medical centre in minutes; LOR PLACE = Length of residence at the same place; LOR HOUSE = Length of residence in the same house;

The analysis revealed a slight correlation between the length of the children's route to school and the emotional attachment of their parents to the wetland. Many residents had spent their whole lives and had taken the same routes to school as nowadays their children. The route to school is learned by landmarks, such as trees, plants, water pumps, and houses as well as small pathways, crop fields and others. Young children in the cultural-specific context of Uganda spend most of their time outside. They play in groups with other children and very early come into contact with nature and the environment. Thus they are unshaped (Hay 1998) and take the wetland for granted (Jack 2010; Horwitz and Finlayson 2011a). Very early in their lives, the residents of the rural areas obtain a geospatial understanding of the wetland (Siegel and White 1975), which is based on the natural environment and contributes to a deep bond to the landscape. They are *biographical insiders* (Rowles 1983) of the wetland, which is an essential part of their identity since it has been represented in their minds from childhood on (Lengen and Kistemann 2012; Proshansky et al. 1983). In terms of future developments of Uganda, strategic positioning of new schools in terms of the children's ways to the schools need to be considered. There will be a difference in the children's place attachment and their mental well-being if they are allowed to go through green areas instead of running a risk by crossing dangerous roads.

As shown in Table 2.4-17, the more dependent people feel on the wetland, the more they identify with it ($r = 0.61$; $p < 0.01$). Moderate correlations between life satisfaction and PAI PI show: the more people identify with the wetland ($r = 0.33$; $p < 0.01$) the more satisfied they are with their lives and vice versa. People who

identify with the wetland show a slightly a better status of emotional well-being ($r = 0.16$; $p = 0.05$) as well as more self-esteem ($r = 0.13$; $p = 0.02$). Moreover, their perception of stress is slightly lower than of those ones who less identify with the wetland ($r = -0.15$; $p = 0.02$). The analysis provides statistical evidence on the interconnection between life satisfaction as well as emotional well-being with place identity.

Table 3.3-15: Place identity depending on personal attitudes to the wetland

PAI PI Attitudes to place of residence		Mann-Whitney-U Test				
		n_i	Mean Rank	N	z	p-value
Comfort at Sample Site	No	31	83.6	235	-3049.00	0.00
	Yes	204	123.2			
Safety at Sample Site	No	38	93.8	235	-2416.00	0.02
	Yes	197	122.7			
Enjoyment at Sample Site	No	28	65.5	228	-4229.00	0.00
	Yes	200	121.4			

Place identity is also dependent on the personal attitude to the place of residence (see Table 3.3-15). Persons who feel comfortable and safe living in their community, and who enjoy their lives there, identify more with the wetland and surrounding landscape than people whose attitude to their place of residence is negative.

Table 3.3-16: Place identity depending on biographical aspects

PAI PI Biographical aspects		Mann-Whitney-U Test				
		n_i	Mean Rank	N	z	p-value
Sample Site is Birthplace	No	157	113.8	235	-1366.00	0.17
	Yes	78	126.5			
Sample Site is Considered as Home	No	72	125.3	235	-1100.00	0.27
	Yes	163	114.8			
Sample Site is Place of Choice	No	144	108	235	-2886.00	0.00
	Yes	91	134			

Surprisingly the consideration of the place of residence in the wetland as their *home* has no significant influence on the development of place identity (see Table 3.3-16). Additionally, it is not relevant for place identity whether the place of residence in the wetland was the birthplace or not. In contrast, the autonomous choice of the place of residence is relevant for the identification with the wetland.

The development of place identity depends on the location as well as the community, and furthermore, on the educational background (see Table 3.3-17).

Table 3.3-17: Place identity depending on location, profession, education and health

	Kruskal-Wallis-H Test		PAI PI			Bonferroni Correction
	Sample Groups	n_i	\bar{x}	IQR	p	
Sample Site	Sample Site A	76	25.0	6	<0.01	<0.02
	Sample Site B	91	24.0	4		
	Sample Site C	65	23.0	5		
Community	Community A1	39	24.0	6	<0.01	0.01
	Community A2	37	25.0	4		
	Community B	91	24.0	4		
	Community C1	26	23.5	6		
	Community C2	39	23.0	5		
Education	No Education	8	25.0	2	0.03	0.01
	Primary Education	100	24.0	3		
	Ordinary Education	99	24.0	4		
	Advanced Education	10	22.5	7		
	Tertiary Education	15	23.0	2		
Profession	Business	26	24.0	4	0.07	<0.01
	Self-Employed Farmer	126	24.0	4		
	Employed Farmer	14	24.0	4		
	Educational sector	23	22.0	7		
	Unemployed. Housewife	20	24.0	9		
	Others	23	24.0	4		
General Health	Very Good	16	22.0	6	0.43	0.01
	Good	66	24.0	3		
	Fair	135	24.0	4		
	Poor	10	23.0	7		
	Very Poor	5	21.0	7		

Participants from the villages (A1; A2; B) identify with the wetland with a comparable intensity ($\bar{x} \geq 24$). Lower levels of identification below the sample median were measured in town (C1; C2) ($\bar{x} = 23$) (see Figure 3.3-11).

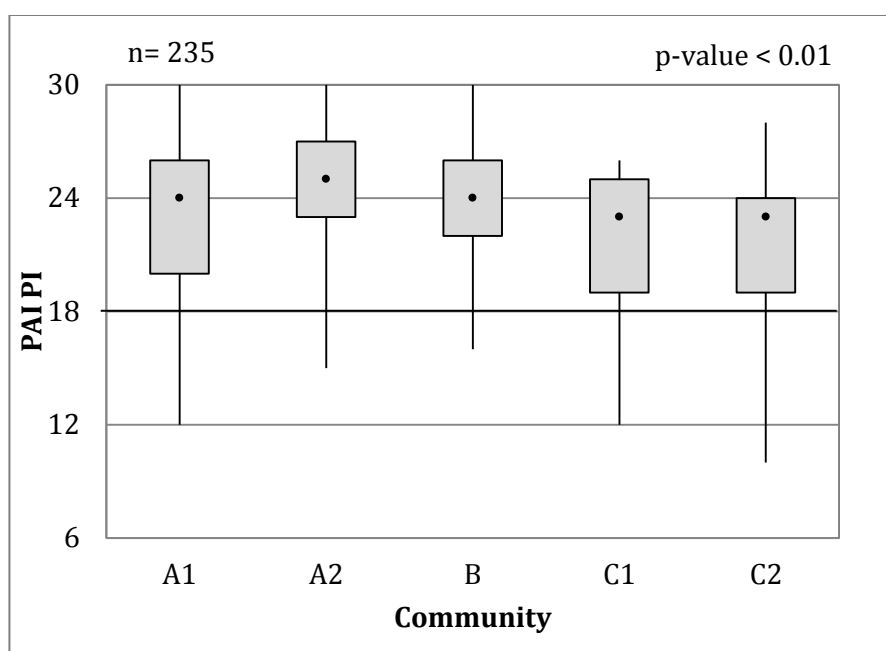


Figure 3.3-11: Boxplots of place identity in the communities

Against expectations, participants of village B, which is classified as a relatively urban area by its good mobile infrastructure, identify with the wetland similarly or slightly more as participants of village A1 and village A2. Furthermore, their place identity is distinctively higher as the identification with the wetland of participants from community C2 (see Table 3.3-18). As described in Chapter 2.4.6, villages and towns are characterised by different social fabrics, which might influence the development of place identity (A. Williams 1999).

Table 3.3-18: Differences of place identity in the communities A1, A2, B C1, and C2

PAI PI Community	Mann-Whitney-U Test					
	n_i	Mean	Mank	N	z	p-value
A1	39	34.69		78	-1.89	0.06
A2	39	44.31				
A1	39	61.87		130	-0.72	0.47
B	91	67.05				
A1	39	36.46		66	-1.52	0.13
C1	27	29.22				
A1	39	43.92		78	-1.73	0.08
C2	39	35.08				
A2	39	74.78		130	-1.85	0.06
B	91	61.52				
A2	39	40.04		66	-3.35	0.00
C1	27	24.06				
A2	39	48.82		78	-3.65	0.00
C2	39	30.18				
B	91	63.55		118	-2.39	0.02
C1	27	45.83				
B	91	71.9		130	-2.99	0.00
C2	39	50.58				
C1	27	33.76		66	-0.09	0.93
C2	39	33.32				

Besides significant differences in the identification with the wetland in the communities, the Kruskal-Wallis-H test detected significant differences of place identity between people with different educational backgrounds. The detailed analysis with Mann-Whitney-U test, however, shows no significant differences in the single educational groups.

The investigated wetland is perceived as a place for identification, which becomes manifest in the residents' close bond to the wetland. The participants clearly agreed with all items of wetland identity (grand \bar{x} = 3.88). The wetland plays a special role in the residents' lives and means a lot to the participants, who strongly identify with the landscape. The median place identity scores of the survey were similarly high as those in other studies (see Table 3.3-19). The place identity scores of studies with residents and landowners were slightly higher than the place identity of place visitors and tourists.

Regulating and provisioning ecosystem services, including, e.g., the provision of fresh air in the dry season, influences body and mind. One farmer said: *"When I hear about the swamp, happiness comes to my mind. First of all because of the opportunity to harvest water and to cultivate in it. I always feel fresh when I am working in a swamp"* (GI 2). The farmers appreciate the functions of the wetland, *"because it preserves the living plants and animals in a particular region. These animals are essential to humanity"* (GI 2). This conservative role for regional plants and animals makes the wetland unique for its inhabitants. They talk about passion and livelihood when they think about the landscape. The availability of the key resources, water and land, provide security and make people feeling at home. *"If one knows how to utilise the swamp well, one can sustain one's livelihood instead of looking for jobs elsewhere"* (GI 1). Living nearby the wetland is seen as an advantage. On basis of the deep commitment to the wetland, an *ecological identity* (Kumar and Kumar 2008; Thomashow 1996) evolves in the residents by living and perceiving the ecosystem as activity space and having various experiences onsite (Völker and Kistemann 2015; Gesler 1992; A. Williams 2002).

Table 3.3-19: Comparison of place identity in the research area with other studies

Item	Place Identity	Own study 2017 (UGA)		Anton & Lawrence 2014 (AUS)		Raymond et al. 2010 (AUS)		Bricker & Kerstetter 2000 (USA)		Williams & Roggenbruck 1989 (USA)	
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
1	I feel that the wetland is a part of me	3.95	0.99			3.67	0.92			3.40	1.11
3	This wetland is very special to me	4.18	0.74			3.97	0.73				
5	I identify strongly with this wetland	3.91	0.89			4.07	0.77	3.28	0.88	3.70	0.98
7	I am very attached to this wetland	3.59	1.07			4.19	0.74	3.47	0.9	3.60	0.92
9	Being at this wetland says a lot about who I am	3.65	0.99			3.70	0.88				
11	This wetland means a lot to me	3.99	0.78			4.10	0.65	4.08	0.83	4.30	0.64
	Number of items		6		6		6				11
	Grand means	3.88				3.95		3.61		3.75	
	Score mean	23.28	3.85	21.39- 25.11	3.69- 4.99						
	Cronbach's Alpha		0.79				0.87				0.86
	n		235		298		320		1219		123

Also, small-scaled varieties in the perception of the wetland need to be considered. Quantitative as well as qualitative results of the study show a notable difference between various locations in the perception of and the attachment to the wetland. In the research area, the sense of place underlies local dynamics such as social fabrics and ecological shifts. Attributed positive or negative emotions towards the wetland vary. The sense of place differs from individual, community, regional, national, and other levels (A. Williams et al. 2008).

People in the villages perceive the wetland as an essential part of their subsistence. The wetland contributes to their life satisfaction and a positive attitude arising from good feelings like happiness and fulfilment. The wetlands are perceived as attractive and colourful (LC1 C2). In the case of the remote areas, there is a high appreciation for the uniqueness of the wetland, as expressed by an emotional statement of a respondent committing to the wetland: „*Why can one not be happy and fulfilled in a village where one grew up from? You can never take me out of this place*”²⁴ (LC1 A). On the one hand, the *aesthetical appearance* of the landscape as such makes people happy and provides elements for identification (Sandifer et al. 2015). Water flows provoke intuitional pleasant emotions, like calmness and placidness (Ulrich 1983).

The study revealed that people of rural areas do not perceive environmental degradation, yet. The local council from the rural areas stated, that

[...] these fruits are still the same (in content). In some instances, manure is added to the greens, which are planted [...]. [Food crops are] still growing. Additionally, the land (soil) is still productive. [...] However, the cultivation of the wetlands has not yet realised an observable effect Health-promoting effects of a wetland in Wakiso District, Uganda at the moment. Perhaps this may occur in the future! (LC1 A)

To them, the wetland seems to be fully functioning. Positive feelings about the wetland outweigh the negative ones, as results of the qualitative analysis show. Locals from rural areas view the wetland as highly fertile and arable land. They perceive the wetland as *best land* for cultivation, which has not reached the peak of productivity and demand (see Figure 3.1-1). Positive emotions of a high activation level were provoked by the thought of intact natural environments and the functional ecosystems services of the wetland (see Figure 3.3-2). The availability of water and materials and thoughts about the wetland as a source of life were positively associated. People are serene and content if they obtain their daily needs

²⁴ The interviewee added the following: “*I may only leave to visit Germany, perhaps.*” This perfectly shows the influence of the researcher on the study, which has been addressed in Chapter 2.4.7.

from the wetland and as long as they are able to sustain the livelihood of their families. This underlines the results of Cottet et al. (2013) stating that pristine and functioning wetlands provoke positive feelings in human beings. The wetland still has its continuity, which plays a crucial role in the people identification with the place (Breakwell 1986).

Persons in urban areas have a different sense of the wetland than residents of the rural areas. In this study, the residents of the urban areas were aware of the useful functions of the wetland and their supportive character for health and well-being. They realize that the exploitation of wetlands results in a massive loss of the environment, and thus causes concerns about the farmers' subsistence and the existence of the environment. The urban population is aware of the vast and rapid reduction of biodiversity, as well as the degradation of land. *"There are some animals which naturally have to live within or near the wetlands. When you destroy the wetlands you have destroyed them. Unless the government reserves some wetland for these aquatic creatures, I doubt whether they would survive!"* (LC1 B). The wetland reduces its function as a provider of livelihood. So far, the wetland as an ecosystem has satisfied the needs of the residents and provided well-being. This positive sense of place, however, is highly dependent on the resources the place offers (DeMiglio and Williams 2008). The residents had received their livelihood from the wetlands since after the wars, but now the water seems to be no longer clean and the soil, which has sustained many families for generations, loses its fertility. In urban areas, people are concerned about the wetlands productivity and the overuse of resources. The degradation and finally loss of the wetlands cause insecurity and distress concerning the peoples' basic provision. As a consequence, this continuity of the place, which provides the feeling of security and belongingness (Breakwell 1986) is highly questioned.

The composition of flora and fauna changes rapidly, as does the ecological identity of the residents.

Because we used to have monkeys here but now you can take some time because the swamps have been cleared. Okay, they were troublesome somehow [laugh] but they used to be there. Now you can ask a child also in Buganda or in this area: "Have you ever seen a monkey?" And they would say: "No." And this can be a shaming for every person (LC1 C2).

Elder residents feel ashamed of the huge losses of the wetland and the poor relicts of a place, which originally had been characterised by a high biodiversity and unique composition of wetland-specific animals and plants. The wetlands are now "man-made" landscapes, which look alike, each the same as the other. The wetland is not as unique as it used to be. Locals do no longer feel represented in the landscape and

realize that the wetland will not be existent for their children. The wetland they got to know has lost its *continuity* (Breakwell 1986). This causes sadness about the development in the area and fear about their future and about the partial loss of their place identity, which may result in solastalgia (Albrecht et al. 2007). Thus the elder residents feel a sentiment of *placelessness* (Relph 1976).

The sense of the wetlands of rural areas is overlapping with the sense of the wetland in urban areas. The sense of the wetland is highly influenced by the resources and ecosystem services the wetland has to offer (DeMiglio and Williams 2008). The different states of ecological health result in different senses of places.

3.3.5 *Seasons of well-being in the wetland*

Subsistence farmers' well-being depends strongly on environmental circumstance since the availability of water and food changes due to weather and climate (see Table 3.3-20). The farmers have their own predictors of food scarcity: *"Food is usually scarce during the beginning of the second season when the rains begin. However, since the period between the first rains and the second rains is shorter, food is not scarce during this period"* (GI 3).

The unpredictability of rains, which had occurred during the last few years (GI 3+4), however, poses a risk for the farmers and put strong pressure on them. Cultivation in the wetland is perceived as an advantage due to the provision of year-round yields. Nevertheless, *"those who cultivate in the swamps (Kiseniy) have no rest because the weeds they dig outgrow very fast"* (GI 3). Off-seasonal digging and cultivation in the wetland also means a workload, which farmers can hardly fulfil. Many persons want to see a change in their life situation and thus also critical voices of farming activities come up: *"If I had a less stressful job I would be happy. I would be happy if I were no longer digging because I am fed up with it. If I could get any person willing to buy my portion of wetland (Lutobazi), I would sell it and use the money to venture into other self-employment opportunities which are less stressful"* (GI 1).

The exhausting long journeys to water sources as well as the general hard work in the wetland make people tired and lethargic (see Box 3.1-1). The long distances to overcome in order to access water sources (GI 3, GI 6) make women, in particular, tired and lethargic during the dry season (see Chapter 3.3.2). If they could afford the increasing prices, they need to buy water from water tankers.

Table 3.3-20: Seasonal calendar of community C2

	January	February	March	April	May	June	July	August	September	October	November	December
Rainy season			XXX	XXX				XX	XXX	XXX	X	
Planting			XXX	XXX			X	X	XXX	XXX		
Pesticides / Fertilizer	X	X	XXX	XX	X	X	X	X	X	X	X	X
Harvest	XX	X	X	X	X	XX	XXX	XXX	X	X	XX	XXX
Income	XX	X	X	XX	X	X	X	XX	X	X	X	XXX
Food Supply	XX	X	X	X	X	XX	XX	XX	X	X	XX	XXX
Health						XX					XXX	XXX
Employ Of Workers	XX	XX	XXX	XX	X	XX	XX	XX	XX	XX	XXX	XX
Dry Season	XX	XXX					XXX	XX				XX
Water Scarcity	XX	XXX					XXX	XX				X
Sickness		XX	XX	XX		XX	XXX	XX			XXX	
Employment	X	X	X	X	X	X	X	X	X	X	X	X
Expenditure	X	XXX			XX		X	X	XXX			XXX
Education		X	X	X		X	X	X	X	X	X	
Recreation (Sports)	X				X							X
Death											XXX	
X marks the intensity of the seasonal occurrences; X lowers intensive; XX medium intensive; XXX very intensive												

Mental well-being is influenced by seasonal variations and depends on weather events and climate conditions. In the rainy seasons, a large amount of water, especially, in the wetland provoke distress and are perceived as a burden to the residents. During the dry seasons, water scarcity poses a concern for the residents. The seasonal rhythm of rainy and dry seasons is a challenge for human well-being, due to physical circumstance. People, however, might be adapted to the seasonal fluctuations, since they are physically and mentally used to the change of the humidity and environmental conditions. Mentally healthy people have coping strategies to overcome these challenges (WHO 2001; Dodge et al. 2012).

Shifts of basic ecological conditions, however, harm the ability of mentally overcome with these challenges. A fundamental change in the ecology of the wetland is the shift in water quality. In some parts of the research area, the wetland no longer provides clean drinking water (site C2). According to the respondents, the drinking water is contaminated with chemicals due to the overuse of pesticides (see Box 3.1-2). The loss of clean drinking water, which is fetched from the wetlands, harms the residents' well-being and causes insecurity and anxiety. These results are in line with results published by Kevany and Huisinigh (2013). Another shift of basic environmental conditions regards

the rainy and dry seasons due to climate change. The variability of rains is perceived as being higher today than it used to be. The unpredictability of the start of the rainy seasons poses a problem for the farmers since they are at high risk to lose their harvest. *“At the moment, most of our swamps dried up a long time ago. They no longer have water. We do need assistance”* (GI 1). These large changes of the environment are perceived as uncontrollable. The wetlands’ residents get the feeling of being surrendered to nature without protection. The shifts of ecological conditions are likely to result in distress (Relph 2008) and trigger the feeling of being helpless. Learned helplessness according to Maier and Seligman (1976) is caused by the repeated exposition to harm without the ability to refuse. Acceptance of loss of control over their own life exposes the people to the risk of mental disorder (Maier and Seligman 1976).

3.3.6 *The transformation of the wetland from a push to a pull factor*

For the residents of the wetland, five pull factors played a dominant role in the choice of the place of residence (see Figure 3.3-12). The choice of residence depends mostly on the personal attachment to the place. Many participants would like to live at their birthplaces or return to the place of residence as they were born there. Also, the feeling of being at home as well as the familiarity with the place of residence is important (Twigger-Ross and Uzzell 1996; Relph 2008). In this case, however, the qualitative data differed from quantitative data in the study.

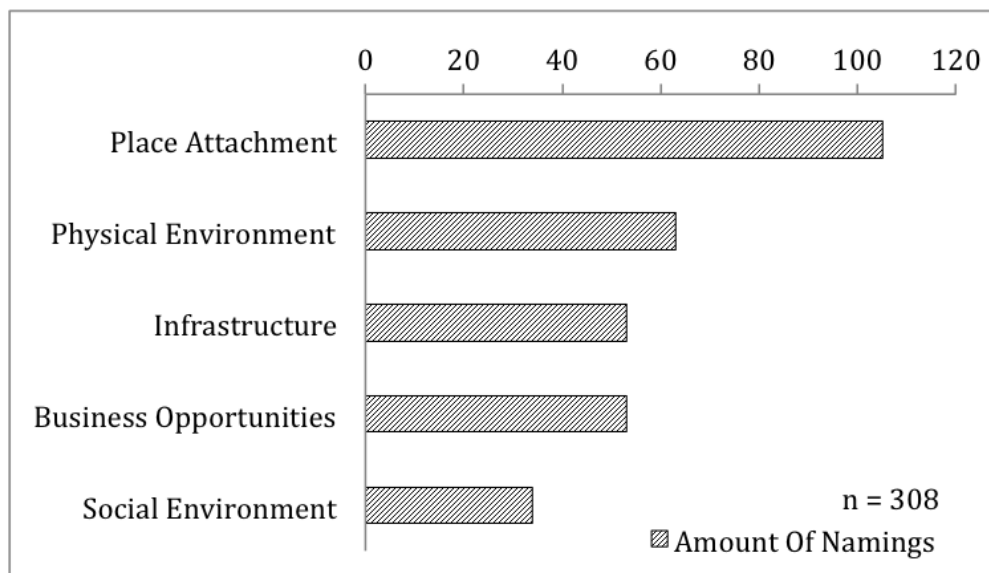


Figure 3.3-12: Main pull factors for the choice of residence

Personal experiences and autobiographical events, which individuals assign to special places increase their place attachment (Chawla 1992) and this personal bonding is seen as an important pull factor among respondents of the research area.

Societies depending on the natural environment, as those considered in this study, pay much attention to their environmental surrounding. The physical environment is perceived as a substantial pull factor. Specifically, the availability of resources and the expanse of land, the affordability of land and key resources of the environment are important issues for the people (see Figure 3.3-13). These requirements are provided by wetlands as long as these ecosystems are well-functioning and intact. In large parts of the research area, a constant degradation of wetlands takes place. Due to the high demand of land and valuable resources, the prices of a plot in the wetland increase, which may result in sort of a gentrification of the areas, thus change the social fabric and social hierarchy. As a consequence, the key resources, water and land, in certain areas already have become a matter of conflict (GI 3 + 4; PF M; LC1 C1, LC C2). This transforms the currently sense of wetlands as a positive attributed area into an area as source of displeasure. Locals have only a weak voice in this context since the government acts independently from the residents (see Figure 3.2-1). Thus pull elements of the wetlands, such as the provision of the key resources of land, and water, the provision of food, and the opportunity of cultivation, as well as the beauty of the landscape are accessible only for a selected group of actors, mainly rich people from outside, while poorer people tend to look for other income sources. Pull factors turn into push factors for the local population.

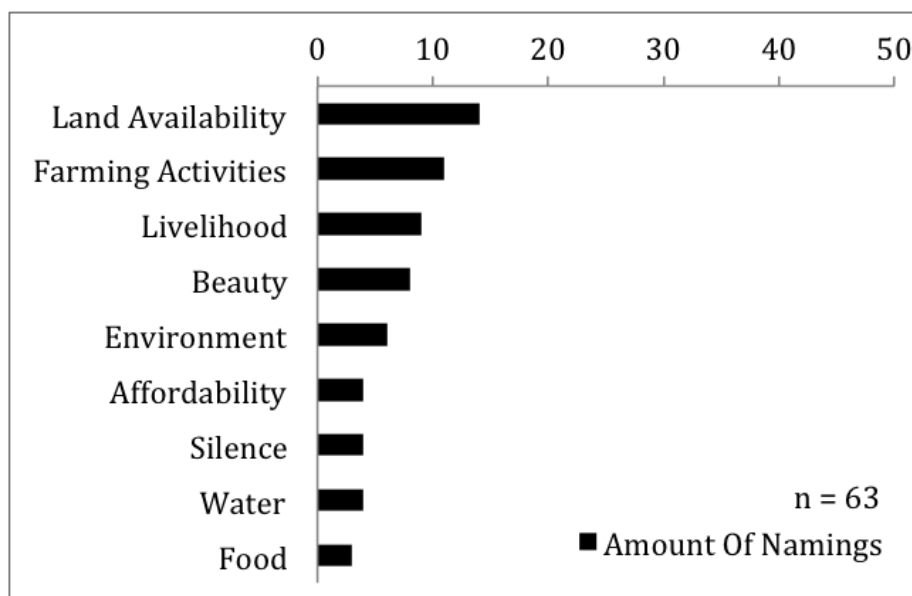


Figure 3.3-13: Pull factor physical environment in detail

The permanent change of the social and activity space of the landscape, as well as the reduction of the availability of resources, impacts the people's identity and mental well-being. The subsistence farmers need to reevaluate every season, if their yields from the wetland supply their sustenance. This *discontinuity* of the place might result in irritation and disorientation among users (Silver and Grek-Martin 2015) and changes the sense of place (Stedman 2003). People are forced to

permanently “*re-evaluate*” the wetland in the social and environmental context (Dixon and Durrheim 2000) as well as under hedonistic and eudaimonic aspects (see Chapter 1.2).

Factors such as the opportunities to earn money as well as the infrastructure on-site also are perceived as very important for the choice of residence, while social indicators such as pull factors are relevant also but play a secondary role in the choice of preferred places to live. In this context, towns and cities (see Figure 3.3-14) for jobs and business opportunities to earn money are receiving more attention. The wetland’s resources are becoming scarce and the farmers cannot fall back on the wetlands as a single source of income. Instead, many self-employed farmers are likely to migrate to urban areas, where they expect better living conditions. Surprisingly, individual aspects like the feeling of being at home, enjoying the place of residence as well as to be born at place play a very important role for the choice of the place of residence (Figure 3.3-14).

Due to movements in and out of the wetland, the populations have intermingled. Biographical insiders, according to Rowles (1983), will live next to outsiders who invested in the wetland. Locals, who are born at the wetland and have a cultural sense of place (Hay 1998) may differ from outsiders, who may immigrate from another region, speak another language, and rely on different cultural and traditional values. The population on-site thus has to overcome the gap between different cultures and the barrier of the language. Locals and outsiders have a different understanding of the wetland as well as personal relation to the landscape. Locals are differently attached to the wetland compared to persons from outside. Attributes such as the provision of livelihood, which are very important for the subsistence farmers, might be less important to private investors or people from outside. These difference between natives and non-natives were also shown by the study of Hernández et al. (2007).

Different understandings of the wetland as landscape and activity space may result in a different social cohesion (Eyles and Williams 2008). The overwriting of the sense of place by other tangible and intangible values alter the sense of the wetlands. Already in the past, the wetlands had been tagged with negative emotions, such as fear and disgust since the wetlands were perceived as inconvenient for cultivation and the guerrillas used the wetland as cover against the military (see Chapter 3.1). During the first years of the current government, the feelings towards the wetlands had turned from displeasure into pleasure. The sense of place as a positive bond between the population is small-scaled and spatially overlapping between people from different areas (A. Williams et al. 2008; Jack 2010).

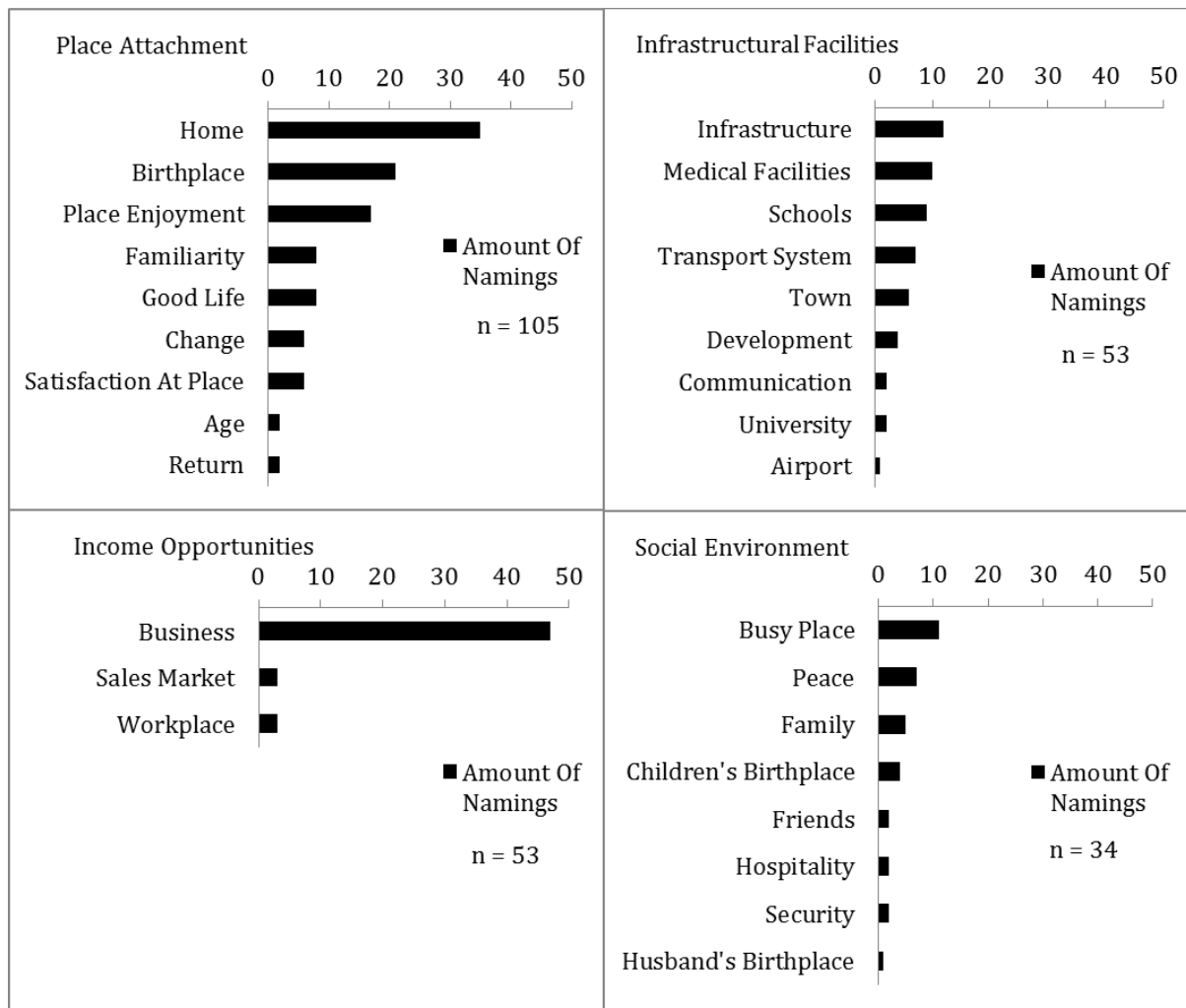


Figure 3.3-14: Pull factors place attachment, infrastructure, business opportunities, and social environment in detail

The central tendency of positive or negative attitudes towards the wetland, however, arises from this *contemporary sense of place*. Place attachment to the wetland and related emotional well-being depends on the social fabric onsite as well as individual experiences and activities in the wetland. It is, however, embedded into a common trend of the sense of place. Positive or negative attitudes of individuals towards the wetland are impacted by the general government’s attitude towards the wetlands. Thus in a hierarchical system, like the political system of Uganda, the authorities’ appraisal towards wetlands highly influences the Ugandans’ sense of place and thus the relationship between human beings and the environment (DeMiglio and Williams 2008; A. Williams et al. 2008). The example of the wetlands in Uganda underlines, what Relph (2008, 37) stated that sense of place varies and “*is not constant over time*”.

3.3.7 Chapter summary: *Experiencing wetlands through actions of tradition and habits*

Actions in the landscape result in a deep identification with a wetland. The landscape is represented in the residents' minds, and certain aspects of the landscape are connected with specific feelings and emotions. Place identity is related to social and environmental aspects.

The landscape is perceived by an individual's task in the landscape. Men and women have a different activity space in wetlands. According to traditional gender roles, men are responsible for building a house and ownership of land. They take care for the harvest and the earnings by market sales. Men feel proud of their wetland due to they perceive it as their property. Men experience wetlands as a landscape, which provides land, fresh air, food, and water.

In contrast, women traditionally take care of the children and the household. Both groups perceive the wetland as source of water, food and other products, but connect these aspects with very different emotions and feelings. Women for example feel stressed and exhausted by the wetland due to their task of carrying water. Furthermore, they perceive the wetland as divided into two areas: there are areas that are dangerous for their children while others are suitable as playground.

People with lower school degrees, mainly farmers and business people, are more dependent on wetlands as people with higher educational backgrounds, like students and teachers. Farmers rely on the resources the wetland provides. These residents only know their wetland and have rarely seen other areas of the country due to a low income and accordingly a low mobility. Their sense of place is narrowed down to one wetland. People with higher educational backgrounds identify less with a single wetland, which might be related with a higher geographical and social mobility.

Residents identify with the specific flora and fauna in a wetland. Especially in rural areas, there is a distinctive ecological identification, which in the outlined case study turns in to an ecological pride about the wetlands functions and resources. This extremely positive feeling towards the wetland is related with the currently positive sense of place. In more urban areas, where the wetland's degradation is obviously visible, the ecological pride turns into a sadness. Through the rapid loss of the wetland's resources, the place does no longer provide continuity, which is important for people's identification with a place.

Mental well-being is influenced by seasonal variations in the environment. Residents are adapted to these annual changes and can usually cope with it. The

unpredictability of dates and intensity of rainfalls due to climate change, however, is severely impacting the people's mental well-being. They feel helplessly exposed to the environment.

Wetlands play an essential role in the people's choice of residence. Besides business opportunities, the personal biographical attachment is one of the main pull factors of the wetland. Furthermore, the environment with its resources is important for the choice of residence. The changing environmental and social baselines in the wetland, however, result in an emigration of residents and an immigration of outsiders. While outsiders feel attracted by the wetland's resources and services, it becomes a push factor for biographical insiders.

4. USE OF THE KNOWLEDGE ABOUT WETLANDS' EFFECT ON MENTAL WELL-BEING IN UGANDA

4.1 WETLAND PROTECTION IN UGANDA - ADDRESSING GAPS BETWEEN LOCAL AND NATIONAL WETLAND PERCEPTIONS

Residents emotionally evaluate the physical environment of a wetland as well as the social fabrics in and around such an ecosystem. They are highly dependent on the current state of the wetland as activity and experienced space. The residents as wetland users are primarily concerned with preserving the wetland's *functions* in order to sustain their livelihood. They might be only secondarily concerned about threatened species or biodiversity. Nevertheless, they are highly affected by changes in the wetland and the wetland management. Politicians as well as decision-makers, however, might not even have a sense of place to wetlands or specific places in wetlands. They rather focus on a subordinate role of wetlands in general. The diverse interests on the wetlands at different administrative levels and in the private sector reveal that a wetland's management needs to address diverse stakeholders. Other researchers also state that human beings and wetlands are highly intertwined by social, economic as well as political aspects (Smith et al. 2013, 86). The sense of place of residents is overlapping with the sense of place of decision-makers (Davenport and Anderson 2005).

The effects of the exploitative use in the wetlands are known, as written already in the Uganda Wetlands Policy 1995 (see Chapter 2.3.3). Nevertheless, the aim of the government was to change the sense of the wetlands from negative *wastelands* to the appreciation of the economic potential of the ecosystems. This aim was successfully pushed through the recommendation on the wetlands' use. Farmers were "*advised to always use the water from the wetlands to irrigate their plants*" (LC1 A).

According to locals, the government assigns land to private investors from outside (see Chapter 3.2.1). In this case, the role of the government needs to be scrutinised in the context of the current, rapidly degrading wetlands. Investors build factories and houses in the wetlands and use the resources from the wetland. In the research area, this happened without any consultation and without the integration of locals. The wetland's use, in this case, contradicts the approach of a *wise use* concept of the wetlands, which Uganda accepted as a guideline for the wetland management. "*Wise use of the wetlands equates to the maintenance of ecosystem benefits/services to ensure long-term maintenance of biodiversity as well as human well-being and poverty alleviation*" (Ramsar Convention Secretariat 2010). Instead, the allocation of wetland

plots to private investors may boost pressure on the land through increase of population. This feeds the conflict on land and resources even more through the increased need for the resources water and land as well as the social segregation between locals and *outsiders*. Locals claim that private investors are obliged to employ locals, and should take responsibility for the environment *"If the factory is giving employment, [...] the long-term effect should be considered before!"* (LC1 C2). Furthermore, the relationship between locals and private investors should be balanced.

The main sources of conflicts in Uganda's wetlands are currently the availability of land, political restrictions of land use and evictions. As the ministry of water and environment published: *"[...] some illegal wetland users are openly resisting eviction"* (The Republic of Uganda 2017, 111). A sustainable management needs to have a trans-disciplinary and multi-stakeholder approach (Parkes and Horwitz 2009) and aims to reduce the over-use of water sources and conflicts as well as contribute to the human health and well-being as written in the *Changwon Declaration on human well being and wetlands* (2008 Annex to Resolution X.3). The integration of locals into decision-making processes might reduce conflicts, since the more attached to the wetland residents are, the more likely they are to act pro-environmentally if environmental knowledge is provided and the infrastructure for pro-environmental behaviour is provided (Kollmuss and Agyeman 2002). These aspects refer to different political and non-political institutions, which need to strengthen their collaboration (Horwitz and Finlayson 2011a).

The study shows that laws on environmental protection lack enforcement. Governmental adoption of laws concerning the uses of the wetland or the protection of the tenant's rights does not automatically imply their implementation on site. *"For instance, you may hear the law that states that a freehold landowner cannot dismiss a tenant but this is not the case. Some landowners rudely chase away tenants"* (LC1 A). According to the interviewed local councillors, it is their task to implement top-down rules (LC1 A, LC1 C1, LC1 C2). All respondents admit that this is impossible or very hard to convince the population of the necessity to protect the wetland, and the local councillors felt a lack of support from higher authorities. In contrast, local councillors often are landlords or tenant themselves. Regarding the law enforcement, responsibilities seem not to be clear at higher levels and the feasibility of implementation difficult at the local level. Local councillors in their function represent the population and only can apply *bottom-up* rules. Nevertheless, one of the strengths of this administrative unit is the small physical and social distance of local chairpersons to the residents. Local leaders can make pleas to the citizens of their communities, they can set good examples, and encourage others to do the

same. At a grassroots level, they are the first instances to guarantee a participation of the population. Peaceful interventions of NEMA require the participation of people in form of the collaboration of the local councillors.

The participants of the study often talked about *us* and *them*: “*They are in no way associated with us!*” (GI 6) or “[...] *the biggest chunk of wetlands belongs to the government*” (GI 6). This suggests that the responsibility of the environment refers to *the others* or higher institutions. The belief in higher institutions might be culturally determined in Uganda. Exhaustive uses of the wetlands need to be stopped at all levels and changed into a careful treatment of the environment and the appreciation of ecosystem services and all kinds of life. Personal engagement of every wetland user is required, as well as the assumption of personal responsibility and adaption of good practice. Local perceptions need to be included in governmental protection measures and individuals recruited for the implementation of protection activities. Nevertheless, the responsibility for the environmental status falls to the wetlands users and place-based communities (Relph 2008). In the study locals suggest individual actions as the following:

It is the prevailing circumstances, which force me to cultivate the wetlands. But here is my personal view: I think we should all desist from cultivating the wetlands (LC1 A).

We should think about evacuating the wetlands as fast as possible before the law enforcement officers do evacuate us. Now is the time to think about a new residence and place of work (LC1 C1).

We should plant trees! I cannot emphasize this enough we all ought to plant trees! When one cuts down a tree one does not replace the cut-down tree with another (PF F).

For the environment, when we consider the dry land the policy is, if one is going to cut down a tree, one should first plant five new ones. This, however, is not being put in practice. Secondly, just as you see the solar lights over there, they too have helped people (LC1 B).

Awareness raising about local responsibilities would have a positive effect on the wetland's protection since human beings prioritise their own responsibilities (Kollmuss and Agyeman 2002).

Due to highly differing interests and various stakeholders concerning the resources of the wetlands, the management of the remaining wetlands need to be reformed and laws enforced (LC1 A+B+C1+C2, FM). Sustainable solutions on the use of the wetlands can only be generated by linking and harmonising *top-down* and *bottom-up* decisions. The communities need support from higher authorities, however, they do not want to be patronised by them.

The overlapping and partly contrary senses of places in the research area pose a challenge between the locals and governmental institutions as well as outsiders. The farmers in the research area, whose existence is based on the wetland, have an emotional access to the landscape. Only when their basic needs are covered subsistence farmers can think about environmental protection strategies. In this context, the equal distribution of resources plays a great role for the farmers as well as the wetlands' future (Parkes and Horwitz 2009). Basic needs in the study context also imply the participation in the social life and entertainments as well as financial well-being. Their decision-making on the environment underlies emotional aspects, as also described in the study of Douglas et al. (2016). These decisions, such as the expanse of businesses relying on the wetland's resources, are in opposition to the governmental strategies on the wetland's protection. Locals of the research area have a narrow but detailed sense of their wetland, while members of governmental institutions might have a subordinate perspective on the wetlands in general and therefore a broader sense of the environment. Laypersons have a more emotional access to the wetlands, while experts have a scientific, cognitive approach to access the landscape (Cottet, Piégay, and Bornette 2013). Better knowledge of local motivation and the emotional decision-making process of locals may help in finding trade-offs and sustainable solutions for environmental conflicts (McInnes et al. 2016).

The visualisation of wetland-directed emotions, as carried out in Chapter 3.3., provides a situation-based local understanding of the wetland. Core affects provide the first intuitive step of highly complex decision-making processes. The general humanistic aim is to reduce displeasure and enhance feelings of pleasure (Russell 2003). In the presented case studies the reduction of displeasure implies the high interest of the residents in solving the social conflicts of land pressure. Communities and individuals need to be involved in decisions concerning the development of the landscape. The involvement of marginalised stakeholders prevents conflicts at the local level and might ensure the wetlands' protection (Horwitz and Finlayson 2011b; Görg 2007).

Campaigns of capacity building in terms of the healthy and sustainable use of pesticides are required (LC1 B, FM) as well as the dissemination of specific types of seeds, which are convenient for the commercialisation of crops in the wetlands' circumstance (FM). Initiatives from authorities might sensitize users to the fragility of the environment, and solutions to avoid further environmental degradation can be found jointly by dialogue between stakeholders and decision-makers. Locals might be encouraged to protection activities, and provide ideas of environmental joint protection activities such as:

[...] The government should encourage people to plant trees. This activity should be enforced at all levels of local government administration. (County, Sub-county, Parish levels) - when one tree is cut down, at least one more should replace it. We need to restore the environment because it is being destroyed (PF F).

If we were given some wetland friendly plants/food crops to accommodate the wetlands it would be great (LC1 B).

Through proactive measures, people become aware of cultural heritage and traditional values basing on the wetland and their ecological identity. This could raise the compliance of the population for sustainable uses of the wetland. The provision of information about the ecological uniqueness of the wetlands fosters the emotional and cognitive attachment of those who feel attached to the wetlands (Davenport and Anderson 2005). In a dialogue of stakeholders and political institutions of the wetlands' protection, awareness raising of the uniqueness but the critical status of the wetlands need to be addressed. In that context, the local individual's place identity can be used as a driver for pro-environmental action (Dixon and Durrheim 2000). Observing the successes of the own pro-environmental actions supports mental well-being and bonds people to places. Furthermore, locals would become aware of their *self-efficacy* and their internal *locus of action* (Kollmuss and Agyeman 2002). The pro-environmental behaviour might thus be a trigger for mental well-being and vice versa.

Changing the sense of the wetlands in Uganda from the best land to cultivate to a fragile ecosystem might motivate individuals to pro-environmental behaviour. Horwitz et al. (2001) outlined the high potential of a sense of place to raise awareness on places, which need protective measures. Paying attention to threatened environments implies the change of a sense of place to these environments (D. Williams and Stewart 1998), which may raise their tangible and intangible values and endow the wetlands with meaning (Relph 2008; Tuan 1977). Place-making activities strengthen the relationship between humans and environment. They may contribute to an authentic sense of place (Relph 1976), and may shape a collective sense of coherence (Atkinson, Fuller, and Painter 2012, 3, 231f.). Furthermore, alternative income strategies and the sectors of labour and finances need to be linked with environmental protection activities. Environmental protection and sustainability need to be taken as common guideline of other political sectors and accepted as cross-sectoral topic, in the same way as human well-being (Horwitz and Finlayson 2011a).

One important link between bottom-up and top-down approaches in protective activities might be the tribal system of the Baganda. As shown in Figure 3.2-1, there is a parallel, traditional tenure system with the Buganda Land Board on top of

institutions with responsibilities on the wetland. Locals might refer to accustomed practices in the management of land properties. The hierarchical tribal system is “headed by traditional kings or chiefs who are not politically elected but have an indirect role in community governance and moral build up” (UBOS 2016, 3). A close collaboration between the systems of traditional authorities and political institutions might have a positive effect on law enforcement on the protection of the wetlands as cultural heritage. Additionally, it shows respect from the Ugandan government towards the Kingdom of Buganda. The Baganda people believe and follow their monarchy. Involving the Kingdoms institutions into wetlands protection activities might facilitate a dialogue between Baganda stakeholders at the grass-roots level and the government since a third party is involved, upon which the residents might feel morally and emotionally committed. Traditional leaders could promote the need for pro-environmental behaviours and “*normatively*” influence the Baganda (Kollmuss and Agyeman 2002).

Furthermore, the tribe of Baganda keep the tradition to bury their relatives in their *homeland*. Thus they are connected with a special place during their lifetime and even after their death. The ownership of land which is suitable for digging and cultivating and provides the space to build a house and bury relatives, receives, therefore, a special traditional value. Without the inclusion of local people, governmental interventions are perceived as restrictions on daily life. In the study area, restrictions upon the purchasing of land and the allocation of land by institutions hamper locals of practising traditional customs. This ambiguity of governmental interventions reflects the study of Kušová et al. (2008), who revealed that residents of biosphere reserves felt restricted in their personal development and course of lives.

In the study area, people differentiate between two different types of the wetland, *kiseniy* and *lutobazi*. These words provide culture-sensitive information about the spatial participation and local perception of the landscape. Linguistic aspects may help outsiders to understand place concepts. The words are results of a local culture and expressed in the local language (Low 1992) and it is recommended to use local wording for the landscape, showing respect to the locals as well, so as to avoid misunderstandings (D. Williams and Stewart 1998). In Uganda, the use of local wording, however, might pose a burden for scaling up environmental protection activities to a supra-regional level, since Uganda is a multilingual and multi-ethnic state. Thus an important aspect is the clarification of the wording in a language, which is understood by all stakeholders.

Nature conservation and food security are trade-offs, which require the knowledge and implementation of sustainable agriculture techniques. A split of the wetlands

into different zones has been suggested: “For some, they should be naturally. I think they should be preserved as they are now. [...] we could have animals because there are some spaces within wetland so that would be saved. Otherwise, we could extinct them” (LC1 C2). Focusing on the reciprocity between human beings and wetlands highlights the health-promoting character of these landscapes (Parkes and Horwitz 2009). Linking the protection of wetlands to the health sector provides synergies in terms of health promotion and prevention as well as pro-environmental action and behaviour. Wetland managers and environmentalists need to respect that human well-being is subjected to culture-specific conceptions (Panelli and Tipa 2007). Ecosystem management needs to be small-scaled and culture-sensitive. The state of human health is a mirror of the state of the productivity of the ecosystem (Horwitz and Finlayson 2011b). The overall aim of wetland management strategies needs to be the reconciliation of people’s health and well-being and the wetlands’ protection.

4.2 PREREQUISITES OF A WETLAND’S THERAPEUTIC EFFECT

This study investigated the place-people relationship of residents and their surrounding wetland in Wakiso District, Uganda. The wetland serves as a provider of water and food and, moreover, it has semantic meanings, which evolved from the historical, collective, and individual consideration of the landscape.

Farming and generating income are closely related to the wetland. The provision of livelihood results in a high appreciation of the ecosystem. Especially people having spent much time of their lives in the wetland and using its materials to sustain their livelihood, perceive a deep commitment to the landscape. The wetland plays a crucial role as *activity space* (Völker and Kistemann 2015) in the residents’ day-by-day life. They have an *ecological identity* (Kumar and Kumar 2008; Thomashow 1996) implying that the wetland is part of their self and influences thoughts and actions, as well as their courses of life (Lengen and Kistemann 2012). Many residents feel proud of the wetland’s high biodiversity and uniqueness. They feel supported by the ecosystem in terms of their ability to personally develop. *Ecological pride* expresses the inner representation of the wetland to the outside world. This includes the deep conscious commitment to the ecosystem (Shamai 1991) as well as a state of high mobilization to act pro-environmentally as long as income and livelihood are ensured. As Kollmuss and Agyeman (2002) stated, the stronger the emotional feelings provoked by an ecosystem, the higher the probability of the people’s action for the environmental protection.

The outlined case study of a wetland in Wakiso District in Uganda showed the complex reciprocity of residents and their surrounding landscape, as also issued by

Parkes and Horwitz (2009). Like in other regions (Finlayson et al. 2005; Corvalan et al. 2005; Horwitz et al. 2012), the residents in this region strongly depend on the ecosystem services. Particularly the *off-seasonal* cultivation of crop provides a special advantage of the wetland under the pressure of a rapidly increasing demand for food. Wetlands support individual's livelihood as well as provide a source of financial well-being. The availability of ecosystems services and ecosystem functions allow people to plan their short-term and long-term future. Additionally, the wetland-based financial well-being provides autonomy in terms of social interactions with others and thus links the wetland to substantial aspects for ensuring mental well-being (WHO 2001; Ryff 1989).

Besides positive associations, the wetland is perceived as a work intense area. Residents experience the massive workload of cultivation in the swamps, the digging of trenches included, as a very exhaustive work. Water fetching and carrying uphill, which makes people tired, may provoke back pains and exhaustiveness. In this context, the perception of wetlands differs elementary between low-income and high-income countries (Stoeckl et al. 2014). Studies on the supportive character of wetlands on well-being in high-income countries focused on the aesthetical appearance and effects of the landscape on recovery and relaxation (Raymond et al. 2010; D. Williams and Vaske 2003; Bricker and Kerstetter 2000; MacKerron and Mourato 2013; Alcock et al. 2015; Peña et al. 2015). The use of wetlands in low- and high-income countries distinguishes by the activities and experiences in the landscape (Völker and Kistemann 2015). Their perception is embedded into a broader socio-cultural and socio-economic context.

The wetlands in Uganda contain semantic meanings that create a sense of place. This sense of place changes over time and is impacted by contemporary developments and socio-cultural contexts (Relph 2008; A. Williams 1999). Due to the shift of socio-ecological baselines in Uganda during the last twenty years, the sense of wetlands converted continuously and resulted in the society's gradual attribution of values to the wetlands. The poor reputation of these ecosystems as *wastelands* changed into a euphoric semantic meaning as *lands of fortune*. Although the perception of a landscape might be different at the individual level, the *sense of wetlands* followed a general and trans-regional trend in the country.

In the study area, the government assigns plots to "*outsiders*", which in the perception of residents belongs to private landowners of a traditionally grown land tenure system. Both overlapping senses of place of people *in place* and governmental institutions hold a high potential for land conflicts. Long-term tenants now live in permanent fear of eviction, which strongly impacts their mental well-being. The exhaustive use of the wetlands and the resulting irreversible loss of the ecosystem

currently shifts again the general trend of the sense of wetlands from feelings of pleasure to feelings of despair and *solastalgia* (Albrecht et al. 2007). Different case studies could substantiate the importance of the continuity and uniqueness of a place for the individuals' well-being (Belton 2016; Douglas et al. 2016).

The change of the sense of place of wetlands results in a change of social fabric and values attributed to the wetland (Silver and Grek-Martin 2015). The complex social fabric consisting of various stakeholders at different administrative levels forms the wetland's environmental condition and their availability of resources for stakeholders. The *social space* (Gesler 1992; A. Williams 1998; Völker and Kistemann 2015) of a wetland sets rules on which stakeholders are empowered to fulfil their aspirations in terms of the wetland and to personally develop. The social fabric, furthermore, decides on who is prohibited to put down roots and to identify with the wetland and which stakeholder is allowed to feel attached to the wetland. A shift of the sense of place impacts the existing social fabric and may result in a loss of familiarity to the wetland as well as a loss of social and material security as also show by Belton (2016).

The study provides evidence on the significant influence of place attachment on the people's life satisfaction and mental well-being. The raising tangible and intangible values of wetlands and their incremental exploitation as arable land ended up in a restricted access to these ecosystems. Furthermore, the distribution of resources between different stakeholders becomes a political issue. According to Parkes and Horwitz (2009), the equal distribution of resources is a central issue to be addressed in both sectors, the management of ecosystems as well as in healthcare. Specifying and reducing the use of pesticides, for example, supports the sustainable agriculture as well as is a great benefit for human health. This aim requires a close intersectoral collaboration of both sectors as well as the addition of other political actors. This is an important aspect in terms of Uganda's aspiration to become a middle-income country by 2040 (The Republic of Uganda 2015). Linking the health and environmental sector provides useful synergies and closes institutional gaps (Parkes and Horwitz 2009).

Wetlands are fragile ecosystems and therefore need to be taken under special consideration in terms of environmental protection since these ecosystems are at threat worldwide and change rapidly (Horwitz and Finlayson 2011b; Finlayson et al. 2005). Consequences of the wetlands' degradation impact human well-being in different ways. One impact is the decrease in income due to lower yields. Especially subsistence farmers suffer from the reduction of the wetland's fertility and thus the decline of financial and nutritional well-being. The consequences of the wetland's degradation on mental well-being are perceived as abstract (Mononen et al. 2016)

since mental well-being is influenced by various factors. Wetlands or specific *places* as determining factors of mental well-being are in the scope of the scientific discourse but have not been entirely investigated, yet.

Protection activities, however, are only successful and sustainable if stakeholders and their social interrelations are integrated into decision-making processes. The segmentation of the wetlands in different *layers* (Kearns and Gesler 1998) as proposed in the concept of therapeutic landscape according to Völker and Kistemann (2011; 2015) helps the differentiated perspectives on wetlands, which stay in close relation to mental aspects of human beings. The *social space* is a transparent layer of the natural landscape of the wetland, which plays an important role in successful management strategies. However, the information of this *layer* is not obvious and hardly accessible for external environmental managers. The assessment of information of the social space requires cultural-sensitive and anthropologic methods. Moreover, the content of this *layer* is politically sensitive and its successful assessment is based to a great extent on the confidence of locals to the environmental managers.

The study shows that emotional reactions on the wetland by locals are highly variable and dynamic. In many cases, the wetland or at least elements of the landscape provoke a state of arousal. Basing on cultural and individual experiences, emotional arousal may result in an adaptive reaction on the wetland (Ulrich 1983). In the case study, provoked wetland-attributed affects resulted in the evaluation of the relationship between individuals and the wetland. Adaptive reactions ranged from expressed *feelings of belonging to the wetland* to the *perception of the wetland as a push factor*. Since there is a rising awareness about the complexity of individual's behaviour and environmental decision-making (Parkes and Horwitz 2009), there is a demand on the integration of psychosocial perspectives into the evaluation of ecosystems (Kumar and Kumar 2008). Mental benefits received from wetlands are not actively perceived and the existence of the landscape itself is taken for granted by locals (Relph 2008). Unnoticed ecosystem services of wetlands are thus the provision of elements of identification, which shape peoples' identity and promote mental health. The more intense the relationship between human beings and environment the more important is the wetland's role in the human psyche. Moreover, the more intense the residents' emotional attachment to a wetland, the higher the impact of environmental changes on their mental well-being.

Influences of wetlands on mental well-being mainly become visible in case of a change or loss of these ecosystems. The case study shows that parts of the investigated wetland are already degraded and resources are not available anymore. The provisioning ecosystem services, however, are important for especially

consumptive wetland users. Their livelihood and survival, and therefore their physical and mental well-being are predicated on these ecosystem services. Subsistence farmers living in degraded parts of the study area felt helpless and discouraged to think about their future. They feared for their survival and felt unable to manage their lives and to cope with challenges in their surroundings. According to Ryff and Keyes (1995), they are missing essential aspects of their psychological well-being (see Chapter 1.2). Moreover, the farmers lack resilience against normal stresses of life, which strongly impacts their mental health (WHO 2001). The type of wetland use, as either passive, consumptive or active (Martinez-Juarez et al. 2015) determines, how losses of certain ecosystem services impact mental well-being.

The assessment of the psychometric scales is informative on the status of the residents' well-being, however, they only partly reflect these aspects of well-being, which are related to the wetland. The WHO-5, as well as the PSS-10, provided information on the short-term emotional well-being. This was mainly explicable by the perceived general health status. The evaluation of an individual's relationship to a place, however, may refer to a retrospective evaluation of long-term aspects of life. The results suggest that the SWLS as a retrospective tool provides good statistical evidence on *place-related* mental well-being. Explaining environmental influences on mental well-being, however, requires the culture-sensitive consideration of well-being (Panelli and Tipa 2007). Determinants of well-being are closely related to the physical environment and the general living standard of a region and therefore may vary at different geographical scales. In the study, the availability of resources played a crucial role in the mental well-being of farmers. In fact, this distinguishes residents of this area from Ugandans living in the capital, where small-scale water supply belongs to the common living standard and people rely on subsistence farming only to a certain extent.

The qualitative assessment revealed that a poor ecological status of wetlands causes sadness. Degraded physical environments also provoke tensions concerning the availability of resources and set people under pressure to maintain their subsistence. In contrast, places of an *intact* physical environment caused feelings of pleasure and happiness (see Figure 4.2-1). The relationship between individuals' and the wetland needs to be assessed more detailed to evaluate the intensity and quality of shifts of emotional well-being triggered by the wetland. In order to get a better understanding of the human-environment relationship, there is a need for further research on the emotional access to nature and affective reaction on elements in nature. This knowledge might be useful in terms of the compliance for environmental protection measurements. Moreover, it provides important

knowledge about the emotional support received by wetlands and, more generally, health-promoting aspects of landscapes.

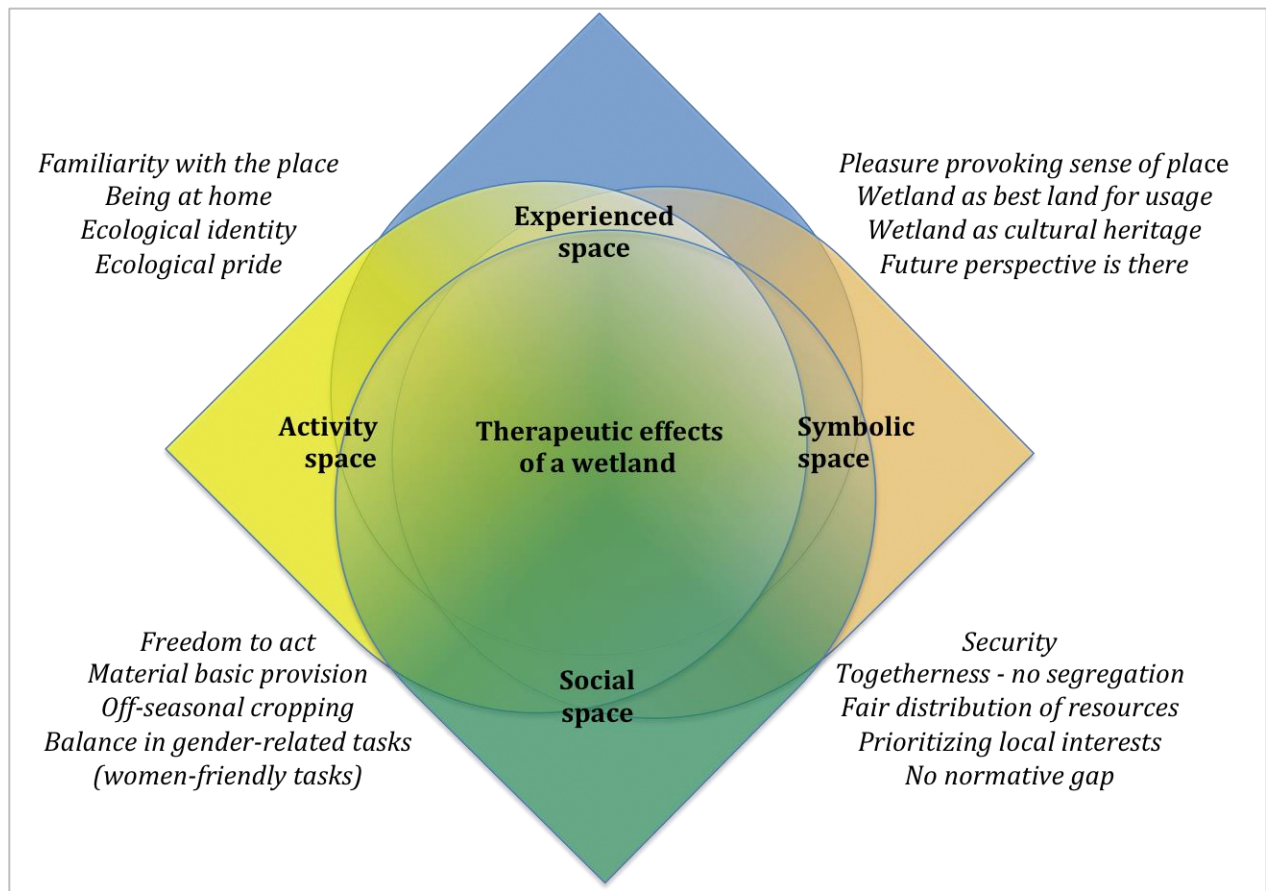


Figure 4.2-1: Basic prerequisites for the therapeutic effect of wetlands

The study showed a high gender-related variance of the emotional access to the wetland, which is founded on local traditions and gender-roles. While men in the study area are appreciating the ecosystem services and the landscape in the role as landowners or tenants, women perceive the landscape through their own gender-related activities, but also to a great extent through the activities of their children. As caretakers of the families, they rely on the availability of medical and educational facilities on-site. A gender-related evaluation of the wetlands and related factors supporting well-being may result in a diametric perspective between men and women. While men associated the wetland mainly with positive feelings, the majority of women attributed negative feelings to the wetland. People strive to reduce displeasure and support pleasure (Russell 2003). Men and women may, therefore, differ in behaviour patterns regarding the wetland. Their pursuit of mental well-being as an intrinsic motivator for human actions may help to better understand decisions and actions of locals concerning the wetland. This, however, needs further research.

This study has shown that the laws on the wetlands' protection are lacking implementation on site. Although, external support is needed a patronization of residents by outsiders should be prevented. Furthermore, local-cultural perspectives need to be taken up in order to close *normative gaps* and feelings of responsibility for the wetland should be strengthened at the grass-roots level to ensure pro-environmental behaviour (Kollmuss and Agyeman 2002). Locals require environmental knowledge and community-based activities, which should be elaborated in education campaigns. "*The best thing would be to mobilize people, educate civil education to elect leaders who are able to express our views there because they are supposed to, like the local councillors and MPs. So we need more civic education but we are lacking that*" (LC1 C2). According to the Wetland Management Division (WMD), awareness raising campaigns are ongoing (The Republic of Uganda 2017, 107). These initiatives need to be enforced and the success of the initiatives further investigated.

In the context of Wakiso District, the complex social fabric of traditional organisation and modern democracy provides opportunities to close the gap between top-down and bottom-up approaches. The social-ecological network, however, reflects only the local-specific context of the research area and needs to be assessed in other Ugandan regions. An adequate management of the ecosystems implies a culture-sensitive dialogue between the government and locals (Panelli and Tipa 2007).

Uganda currently is in a state of transition breaking down traditional ways of life, and seeking modernity and progress. Education is a key element for development and results in a higher spatial and social mobility of people. The relationship between wetlands and their residents may be lost due to reduced place dependence. Therefore, the integration of an educational concept on the fragility and global importance of ecosystems becomes even more important. Since other studies have outlined the importance to see other places in order to appreciate the own place (Davenport and Anderson 2005), small-scale and large-scale migrations and influences on the personal ecological identity based on wetlands need to be further investigated. The evaluation of the wetland by locals with a culture-specific sense of place (Hay 1998) and their *re-evaluation* of the same ecosystem after migration (Dixon and Durrheim 2000) may shed light on movement patterns as well as on dynamics in the development of place identity and place attachment. The equal distribution of the wetlands' resources prevents poverty induced migration and thus the expansion of the wetlands' degradation. Nevertheless, the *social and physical infrastructure* needs to be put in place before people at grass-root level can come into pro-environmental action (Kollmuss and Agyeman 2002).

5. CONCLUSIONS: INTACT WETLANDS – PLACES OF PLEASURE

Mental health aspects need to be considered when assessing health impacts of wetlands. Here, it is not enough to simply deconstruct landscape into physical items and reduce it to a naturalistic construct containing *non-human* masses. The holistic view of nature as a passive and active contributor to mental well-being is important. The assessment of the environmental impact on mental well-being and mental health requires a humanistic perspective on landscapes. It is highly complex to assess since mental well-being is taken for granted and at the same time related to many other aspects of the environment. Therapeutic effects of wetlands help to keep residents mentally healthy and their assessment clarifies the importance of wetlands for human health and well-being. In Uganda, wetlands are exhaustively in use and under pressure, which poses a high risk for the residents' mental health. This situation is in a country where mentally ill persons in rural areas are highly stigmatised, and it may exacerbate the problematic mental health care situation.

In low-income countries as Uganda, the majority of people rely on wetlands as provider of water and food, thus on the natural functions of the landscape. A functional understanding and definition of landscape in terms of productivity is common. This understanding contradicts the understanding of nature in Western countries, where natural landscapes are closely related to relaxation and leisure time.

Irreversible changes in the natural environment highly impact mental well-being. It is mainly the changing resources' availability that largely alters meanings and values of the wetland. This finally impacts action patterns and experiences of people onsite. The wetland as landscape exemplar reflects the cultural-ecological development of the country. Symbolic meanings change in dependence on the societal discourse. The society itself impacts the individual mental well-being as well as the ecological change of the country. Basic conditions for the therapeutic effect of wetlands are (1) a positive symbolic meaning of the landscape; (2) equally divided resources of (3) an intact nature.

If these conditions are not fulfilled, the individual's functional and emotional attachment to the landscape suffers and may contribute to feelings of anxiety, fear and anger as well as provoke depressive moods. Conservation of nature and promotion of mental health are highly interrelated.

Psychometric scales and quantitative data on place attachment and mental well-being show the situation on site and shed light on the complex interaction of human beings with their surroundings. They can uncover to what extent people are bonded to their environment in comparison to others. However, these data can neither

entirely explain why people are emotionally bonded to their environment, nor can they clarify how the surrounding impacts mental well-being. For these assessments qualitative data are valuable and the triangulation of data is an applicable way to generate answers to those questions.

Applying the concept of therapeutic landscapes may empower health workers and environmentalists to regard wetlands and other landscapes through very different perspectives and from a macro, meso and micro scale. In this study, the wetland was considered as naturalistic, structuralistic and humanistic landscape. The wetland was looked upon as activity, social, symbolic and experienced spaces, which are highly intertwined. The concept helps to understand wetlands as cultural heritage and humankind. The concept of therapeutic landscapes assesses the individual's feelings and approach to a landscape. It is applicable in order to detect emotional bonding and accesses to nature. It shows many aspects of human-environmental reciprocity as well as overlapping aspects in the landscape. However, it lacks a process orientation since the effect of emotional bonding to a landscape is a process. It bases on cultural and individual behaviours, which are learned since early childhood and are shaped by experiences and interaction on site.

Many aspects of therapeutic effects of the wetland have more origins than only the wetland itself. The positive effect on emotional well-being is a secondary effect based on many things in the course of an individual's life. The different spaces of the concept address different scales. The experienced space is highly depending on an individual's activity space. The radius of action may be very small and so is the experienced landscape. Both spaces focus on an individual's experience with a landscape. Social and symbolic spaces are results of a long history of the landscape requiring more research on the cultural-historic background of a country. Those social networks and symbolic meanings are organically grown or constructed parts of the landscape, which happens at macro and mesoscale. More transdisciplinary research is needed to assess those meanings and sense of places in order to determine aspects of a landscape provoking pleasure and displeasure.

The important impact of wetlands on the global CO₂ household and thus global climate regulation makes the conservation of these ecosystems to a global health issue. Residents of wetlands have to be considered as part of this ecosystem and therefore, rapid changes of the landscapes also impact their well-being. Linkages of human well-being and wetlands have been addressed in X.3 Resolution of the Ramsar convention. The broad field of mental well-being and wetlands needs to be stretched at international, national and local levels, since mental well-being of people who are committed to a wetland is as fragile as the ecosystem itself.

6. REFERENCES

- Albrecht, G., Sartore, G.-M., Connor, L., Higginbotham, N., Freeman, S., Kelly, B., Stain, H., Tonna, A., and Pollard, G. (2007) "Solastalgia: The Distress Caused by Environmental Change." *Australasian Psychiatry: Bulletin of Royal Australian and New Zealand College of Psychiatrists* 15 Suppl 1 (January): S95-8.
- Alcock, I., White, M.P., Lovell, R., Higgins, S.L., Osborne, N.J., Husk, K., and Wheeler, B.W. (2015) "What Accounts for 'England's Green and Pleasant Land'? A Panel Data Analysis of Mental Health and Land Cover Types in Rural England." *Landscape and Urban Planning* 142: 38–46.
- Altman, I., and Low, S. (2012) *Place Attachment: A Conceptual Inquiry. Place Attachment*. Vol. 12. Boston.
- Anderson, J., Learch, C. E, Gardner, S. T., Bishop C., Fitzgerald, M. A., Mukemi, L., Musiime D., and O 'reilly, D. (2016) "National Survey and Segmentation of Smallholder Households in Uganda Understanding Their Demand for Financial, Agricultural, and Digital Solutions."
<http://microdata.worldbank.org/index.php/catalog/2574>.
- Anton, C. E., and Lawrence, C. (2014) "Home Is Where the Heart Is: The Effect of Place of Residence on Place Attachment and Community Participation." *Journal of Environmental Psychology* 40 (December): 451–61.
- Antonovsky, A. (1996) "The Salutogenic Model as a Theory to Guide Health Promotion." *Health Promotion International* 11 (1): 11–18.
- Aryamanya-Mugisha, H. (2011) *20 Years of Wetlands Conservation in Uganda - Have Uganda ' S Wetlands Become Wastelands Again ?* Kampala.
- Atkinson, S., Fuller, S., and Painter, J. (2012) *Wellbeing and Place*. Durham.
- AWE Air Water Earth Ltd. (2015) *Environmental and Social Management Framework for the Proposed Regional Communications Infrastructure Project*. Kampala.
- Barton, J., and Pretty, J. (2010) "What Is the Best Dose of Nature and Green Exercise for Improving Mental Health? A Multi-Study Analysis." *Environ. Sci. Technol.* 44 (10): 3947–55.
- Bech, P. (2004) "Measuring the Dimension of Psychological General Well-Being by the WHO-5." *Quality of Life Newsletter* 32: 15–16.
- Belton, B. (2016) "Shrimp, Prawn and the Political Economy of Social Wellbeing in Rural Bangladesh." *Journal of Rural Studies* 45: 230–42.
- Bowlby, J. (1979) "On Knowing What You Are Not Supposed to Know and Feeling What You Are Not Supposed to Feel." *Canadian Journal of Psychiatry* 24 (5): 403–8.
- Bowling, A. (2014) *Research Methods in Health: Investigating Health and Health Services*. 4th ed. Maidenhead.

- Bradley, E. H., Curry, L. A., and Devers, K. J. (2007) "Qualitative Data Analysis for Health Services Research: Developing Taxonomy, Themes, and Theory." *JOUR. Health Services Research* 42 (4): 1758-1772.
- Brandenburg, A. M., and Carroll, M. S. (1995) "Your Place or Mine?: The Effect of Place Creation on Environmental Values and Landscape Meanings." *Society & Natural Resources* 8 (5): 381-98.
- Breakwell, G. M. (1986) *Coping with Threatened Identities*. London; New York: Methuen.
- Bricker, K. S., and Kerstetter, D. L. (2000) "Level of Specialization and Place Attachment: An Exploratory Study of Whitewater Recreationists." *Leisure Sciences* 22 (4):233-57.
- Butler, C. D., and Hanna, L. (2013) "1.05 - Ecosystems, Biodiversity, Climate, and Health." *Climate Vulnerability*, 69-78.
- Carson, T. L., Desmond R., Hardy S., Townsend S., Ard, J. D., Meneses, K., Partridge, E. E., and Baskin, M. L. (2015) "A Study of the Relationship between Food Group Recommendations and Perceived Stress: Findings from Black Women in the Deep South." *Journal of Obesity* 2015 (January): 1-7.
- Chambers, R. (1984) *Rural Development : Putting the Last First*. London; New York: Longman.
- Chambers, R. (1994) "Participatory Rural Appraisal (PRA): Challenges , Potentials and Paradigm *." *World Development* 22 (10): 1437-54.
- Chawla, L. (1992) "Childhood Place Attachments." In Altman. I. and Low, S. M. (eds.) *Place Attachment*, 63-86. Boston.
- Claßen, T. (2016) "Landschaft." In Gebhard, U. and Kistemann, T. (eds.) *Landschaft, Identität Und Gesundheit*, 31-43. Wiesbaden.
- Cohen, J. (1988) *Statistical Power Analysis for the Behavioral Sciences*. Vol. 2nd. New York.
- Cohen, S., Kamarck, T., and Mermelstein R. (1983). "A Global Measure of Perceived Stress." *Journal of Health and Social Behavior* 24 (4): 385-96.
- Cohen, S., and Janicki-Deverts. D. (2012). "Who's Stressed? Distributions of Psychological Stress in the United States in Probability Samples from 1983, 2006, and 2009." *Journal of Applied Social Psychology* 42 (6): 1320-34.
- Conradson, D. (2005) "Landscape, Care and the Relational Self: Therapeutic Encounters in Rural England." *Health & Place* 11 (4): 337-48.
- Corvalan, C., Hales, S., and McMichael, A. (2005) "Ecosystem and Human Well-Being." *Millenium Ecosystem Assessment*. Geneva.
- Cottam, H. (1994) "The Death of the Clinic? Participatory Urban Appraisal (PUA) in a Dominican Barrio." In Mitlin, D., and Thompson, J. (eds.) *RRA Notes 21: Participatory Tools and Methods in Urban Areas*, 21:28-32. London: IIED.

- Cottet, M., Piégay, H., and Bornette, G. (2013) "Does Human Perception of Wetland Aesthetics and Healthiness Relate to Ecological Functioning?" *Journal of Environmental Management* 128 (October): 1012–22.
- Cresswell, T. (2004) "Defining Place." In *Place: A Short Introduction*, 1–14. West-Sussex.
- Cronbach, L. J. (1951) "Coefficient Alpha and the Internal Structure of Tests." *Psychometrika* 16 (3): 297–334.
- Davenport, M. A., and Anderson, D. H. (2005) "Getting From Sense of Place to Place-Based Management: An Interpretive Investigation of Place Meanings and Perceptions of Landscape Change." *Society & Natural Resources* 18 (7): 625–41.
- Delle Fave, A., Brdar, I., Freire, T., Vella-Brodrick, D., and Wissing, M. P. (2011) "The Eudaimonic and Hedonic Components of Happiness: Qualitative and Quantitative Findings." *Social Indicators Research* 100 (2). Springer Netherlands: 185–207.
- DeMiglio, L., and Williams, A. (2008) "A Sense of Place, A Sense of Well-Being." In Eyles, J. and Williams, A. (eds.) *Sense of Place, Health and Quality of Life*, 15–30. Hampshire, Burlington.
- Dewsbury, J.D. (2015) "Non-Representational Landscapes and the Performative Affective Forces of Habit: From 'Live' to 'Blank.'" *Cultural Geographies* 22 (1): 29–47.
- Diener, E., Emmons, R. A., Larsen, R. J., Griffin, S., and Pavot, W. (1993) "Review of the Satisfaction With Life Scale." *Psychological Assessment* 5 (2): 164–72.
- Dixon, J., and Durrheim, K. (2000) "Displacing Place-Identity : A Discursive Approach to Locating Self and Other." *British Journal of Social Psychology* 39: 27–44.
- Dodge, R., Daly, A. P., Huyton, J. and Sanders, L. D. (2012) "The Challenge of Defining Wellbeing." *International Journal of Wellbeing* 2 (3): 222–35.
- Douglas, E. M., Wheeler, S. A., Smith, D., Overton, I. C., Gray S. A., Doody, T. M., and Crossman, N. D. (2016) "Using Mental-Modelling to Explore How Irrigators in the Murray-Darling Basin Make Water-Use Decisions." *Journal of Hydrology: Regional Studies* 6: 1–12.
- Douglas, I. (2012) "Urban Ecology and Urban Ecosystems: Understanding the Links to Human Health and Well-Being." *Current Opinion in Environmental Sustainability* 4 (4): 385–92.
- Edelstein, R. S., and Shaver, P. R. (2007) "A Cross-Cultural Examination of Lexical Studies of Self-Conscious Emotions." In Tracy, J. L., Robins, R. W., and Tangney, J. P. (eds.) *The Self-Conscious Emotions: Theory and Research*. New York: 194–208.
- Eyles, J., and Williams A. (2008) *Sense of Place, Health and Quality of Life*. Hampshire, Burlington.
- Finlayson, M., D'Cruz, R., and Davidson, N. (2005). "Ecosystems and Human Well-Being: Wetlands and Water Synthesis: A Report of the Millenium Ecosystem Assessment." *Millenium Ecosystem Assessment*. Washington, DC.

- Francis, S. (1994) "6 PALM in Slum Improvement Projects: A Training Experience from India." In Mitlin, D., and Thompson, J. (eds.) *RRA Notes 21: Participatory Tools and Methods in Urban Areas*, 21:36–40. London: IIED.
- Fuller, R. A., Irvine, K. N., Devine-Wright, P., Warren, P. H., and Gaston, K. J. (2007) "Psychological Benefits of Greenspace Increase with Biodiversity." *JOUR. Biology Letters* 3 (4): 390 LP-394.
- Gatrell, A. C. (2002) *Geographies of Health : An Introduction*. Blackwell.
- Gesler, W. M. (1992) "Therapeutic Landscapes: Medical Issues in Light of the New Cultural Geography." *Social Science & Medicine* 34 (7): 735–46.
- Görg, C. (2007) "Landscape Governance: The 'politics of Scale' and the 'natural' Conditions of Places." *Geoforum* 38 (5): 954–66.
- Hartig, T., Johansson, G., and Kylin, C. (2003) "Residence in the Social Ecology of Stress and Restoration." *Journal of Social Issues* 59 (3): 611–36.
- Hay, R. (1998) "Sense of Place in Developmental Context." *Journal of Environmental Psychology* 18 (1): 5–29.
- Hayles, K.. (1995) "Searching for Common Ground." *Reinventing Nature? : Responses to Postmoderns Deconstruction*, 47–63. San Francisco.
- Heatherton, T. F., and Wyland, C. L.. (2003) "Assessing Self-Esteem." In Lopez, S. J. and Snyder, C. R. (eds.) *Positive Psychological Assessment: A Handbook of Models and Measures*: 219–33. Washington, DC.
- Heinkel, S.-B. (2014) "Wetlands in Uganda – Ecosystems under Pressure A Newspaper Review from Uganda." *WHOCC Newsletter Water & Risk* 23: 7-9.
- Henninger, N., and Landsberg, F. (2009) *Mapping a Better Future How Spatial Analysis Can Benefit Wetlands and Reduce Poverty in Uganda*. Washington DC; Kampala.
- Hernández, B., Hidalgo, C., Salazar-Laplace, E., and Hess, S. (2007) "Place Attachment and Place Identity in Natives and Non-Natives." *Journal of Environmental Psychology* 27: 310–19.
- Hinchliffe, S. (2002) "Inhabiting - Landscapes and Natures." In Anderson, K., Domosh, M., Pile, S., and Thrift, N. (eds.) *Handbook of Cultural Geography*, , 207–26. London: SAGE Publications Ltd.
- Hornberg, C. (2016) "Gesundheit Und Wohlbefinden." In Gebhard, U. and Kistemann T. (eds.) *Landschaft, Identität Und Gesundheit*. 63–69. Wiesbaden.
- Horwitz, P., and Finlayson, M. (2011a) "Water and Health: On the Notion of a Healthy Wetland." *Global Bioethics* 24 (1–4): 71–75.
- Horwitz, P., and Finlayson, M. (2011b) "Wetlands as Settings for Human Health: Incorporating Ecosystem Services and Health Impact Assessment into Water Resource Management." *BioScience* 61 (9): 678–88.

- Horwitz, P., Finlayson, M. and Weinstein, P. (2012) *Healthy Wetlands, Healthy People: A Review of Wetlands and Human Health Interactions*. Ramsar Technical Reports. Geneva.
- Horwitz, P., Lindsay, M., and O'Connor, M. (2001) "Biodiversity, Endemism, Sense of Place, and Public Health: Inter-Relationships for Australian Inland Aquatic Systems." *Ecosystem Health* 7 (4): 253–65.
- Huising, E J. (2012). "Wetland Monitoring in Uganda." *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Science XXXIV* (Part 6/W6): 127–35.
- Hunter, J. M. (1974) *The Geography of Health and Disease: Papers of the First Carolina Geographical Symposium (1974)*. Chapel Hill.
- Hur, Y., Cho, A R., and Kim, S. (2014) "Operation of a School Adaptation Program Considering the Interpersonal Needs of Medical Freshmen." *Korean Journal of Medical Education* 26 (4): 283–89.
- IPCC SAR WG2. 1996. *Climate Change 1995: Impacts, Adaptations, and Mitigation of Climate Change: Scientific - Technical Analyses. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge.
- Ipsen, D. (2006) *Ort und Landschaft*. Wiesbaden.
- Jack, G. (2010) "Place Matters: The Significance of Place Attachments for Children's Well-Being." *British Journal of Social Work* 40 (3): 755–71.
- Jaeger, P., Kolb, S., Palm, E., Heiden, B., Herbig, B., Luke, G., Nowak, D., Glaser, J., and Herr, C. (2015) "Work-Related Connectivity and ICT Use outside of Regular Working Hours: Associations with Life Satisfaction, Well-Being and Quality of Life." *Umweltmedizin - Hygiene - Arbeitsmedizin* 20 (5): 231–204.
- Jorgensen, B. S., and Stedman, R. C. (2001) "Sense of Place as an Attitude: Lakeshore Owners Attitudes toward Their Properties." *Journal of Environmental Psychology* 21 (3): 233–48.
- Kahneman, D., and Deaton, A. (2010) "High Income Improves Evaluation of Life but Not Emotional Well-Being." *Proceedings of the National Academy of Sciences of the United States of America* 107 (38): 16489–93.
- Kaplan, R., and Kaplan S. (1989) *The Experience of Nature: A Psychological Perspective*. Cambridge University Press. Cambridge; New York; Port Chester; Melbourne; Sidney.
- Kazig, R. (2013) "Landschaft Mit Allen Sinnen-Zum Wert Des Atmosphärenbegriffs Für Die Landschaftsforschung." In Kühne, O. and Bruns, D. (eds.) *Landschaften: Theorie, Praxis Und Internationale Bezüge*, 221–32. Oceano.
- Kearns, R. A, and Gesler, W. M. (1998) *Putting Health into Place: Landscape, Identity, and Well-Being. Space, Place, and Society*. Vol. 1. Syracuse, New York.

- Kevany, K., and Huisingh, D. (2013) "A Review of Progress in Empowerment of Women in Rural Water Management Decision-Making Processes." *Journal of Cleaner Production* 60 (December): 53–64.
- Kirsopp-Reed, K. (1994) "A Review of PRA Methods for Livestock Research and Development." In Watson, C., and Cullis, A. (eds.) *RRA Notes 20: Livestock*, 20: 11–36. London.
- Kistemann, T., and Schweikart, J. (2010) "Von Der Krankheitsökologie Zur Geographie Der Gesundheit." *Geographische Rundschau* 7–8: 4–10.
- Kollmuss, A., and Agyeman, J. (2002) "Mind the Gap: Why Do People Act Environmentally and What Are the Barriers to pro-Environmental Behavior?" *Environmental Education Research* 8 (3): 239–60.
- Kopmann, A., and Rehdanz, K. (2013) "A Human Well-Being Approach for Assessing the Value of Natural Land Areas." *Ecological Economics* 93: 20–33.
- Kubovy, M. (1999) "On the Pleasures of the Mind." *Homo*, 1–18.
- Kumar, M., and Kumar, P. (2008) "Valuation of the Ecosystem Services: A Psycho-Cultural Perspective." *Ecological Economics* 64 (4): 808–19.
- Kušová, D., Těšitel, J., Matějka, K., and Bartoš, M. (2008) "Biosphere reserves—An Attempt to Form Sustainable Landscapes: A Case Study of Three Biosphere Reserves in the Czech Republic." *Landscape and Urban Planning* 84 (1): 38–51.
- Latour, B. (2001) "Good and Bad Science: The Stengers– Desprest Falsification Principle." In Akrich, M., and Ber, M. (eds.) *Bodies on Trial*. Durham.
- Lea, J. (2008) "Retreating to Nature: Rethinking 'therapeutic Landscapes.'" *Area* 40 (1). Blackwell Publishing Ltd: 90–98.
- Leemhuis, C., Amler, E., Diekkrüger, B., Gabiri, G. and Näschen, C. (2016) "East African wetland-catchment data base for sustainable wetland management." *Proc. IAHS* 374: 123-28.
- Lelea, M. A., Roba, G. M., Christinck, A., and Kaufmann, B. (2014) *Methodologies for stakeholder analysis for application in transdisciplinary research projects focusing on actors in food supply chains*. Witzgenhausen.
- Lengen, C. (2015) "The Effects of Colours, Shapes and Boundaries of Landscapes on Perception, Emotion and Mentalising Processes Promoting Health and Well-Being." *Health & Place* 35 (September): 166–77.
- Lengen, C., and Gebhard, U. (2016). "Zum Identitätsbegriff." In Gebhard, U. and Kistemann T. (eds.) *Landschaft, Identität Und Gesundheit*. 45–61. Wiesbaden.
- Lengen, C., and Kistemann, T. (2012). "Sense of Place and Place Identity: Review of Neuroscientific Evidence." *Health & Place* 18 (5): 1162–71.
- Longhurst, R. (1997) "(Dis)embodied Geographies." *Progress in Human Geography* 21 (4): 486–501.
- Low, S. (1992) "Symbolic Ties That Bind." In Low, S. and Altman, I. (eds.) *Place Attachment*, 12: 165–85. MA: Springer US.

- Luhmann, M., Hawkey, L. C., Eid, M., and Cacioppo, J. T. (2012) "Time Frames and the Distinction between Affective and Cognitive Well-Being." *Journal of Research in Personality* 46 (4): 431–41.
- MacKerron, G, and Mourato, S. (2013) "Happiness Is Greater in Natural Environments." *Global Environmental Change* 23 (5): 992–1000.
- Maier, S. F, and Seligman, M. E. (1976) "Learned Helplessness: Theory and Evidence." *Journal of Experimental Psychology: General* 105 (1). US: American Psychological Association: 3–46.
- Martín-López, B., Montes, C., and Benayas, J., (2007) "The Non-Economic Motives behind the Willingness to Pay for Biodiversity Conservation." *Biological Conservation* 139 (1–2): 67–82.
- Martinez-Juarez, P., Chiabai, A., Taylor, T., and Gómez. S. Q. (2015) "The Impact of Ecosystems on Human Health and Well-Being: A Critical Review." *Journal of Outdoor Recreation and Tourism* 10: 63–69.
- McInnes, R., Smith, G., Greaves, J., Watson, D., Wood, N., and Everard. M. (2016) "Multicriteria Decision Analysis for the Evaluation of Water Quality Improvement and Ecosystem Service Provision." *JOUR. Water and Environment Journal* 30 (3–4): 298–309.
- Merleau-Ponty, M. (1962) *Phenomenology of Perception*. London.
- Merleau-Ponty, M. (1968) *The Visible and The Invisible*. Edited by Lerfort, C. Evanston.
- Milner-Gulland, E. J., McGregor, J. A., Agarwala, M., Atkinson, G., Bevan, P., Clements, T., Daw, T., et al. (2014). "Accounting for the Impact of Conservation on Human Well-Being." *Conservation Biology: The Journal of the Society for Conservation Biology* 27(5): 1160-1166.
- Ministry of Natural Resources (1995) *National Policy for the Conservation and Management. Uganda National Wetland Policy*. Kampala.
- Mononen, L., Auvinen, A. P., Ahokumpu, A. L., Rönkä, M., Aarras, N., Tolvanen, H., Kamppinen, M., Viirret, E., Kumpula, T., and Vihervaara, P. (2016) "National Ecosystem Service Indicators: Measures of Social-Ecological Sustainability." *Ecological Indicators* 61: 27–37.
- Najafi, M., and Kamal, M. (2012) "The Concept of Place Attachment in Environmental Psychology." *Elixir Sustainable Architecture* 45: 7637–41.
- Ndyanabangi, S., Basangwa, D., Lutakome, J., and Mubiru, C. (2004) "Uganda Mental Health Country Profile." *International Review of Psychiatry* 16 (1–2): 54–62.
- Nile Basin Initiative. (2013) *Wetland Management Strategy*. Entebbe.
- Panelli, R., and Tipa, G. (2007) "Placing Well-Being: A Maori Case Study of Cultural and Environmental Specificity." *EcoHealth* 4 (4): 445–60.

- Parkes, M., and Horwitz, P. (2009) "Water, Ecology and Health: Ecosystems as Settings for Promoting Health and Sustainability." *Health Promotion International* 24 (1): 94–102.
- Parkes, M., and Panelli, R. (2001) "Integrating Catchment Ecosystems and Community Health: The Value of Participatory Action Research." *Ecosystem Health* 7 (2): 85–106.
- Pavot, W., and Diener E. (1993) "Review of the Satisfaction With Life Scale." *Psychological Assessment* 5 (2): 164–72.
- Peña, L., Casado-Arzuaga, I., and Onaindia M. (2015) "Mapping Recreation Supply and Demand Using an Ecological and a Social Evaluation Approach." *Ecosystem Services* 13: 108–18.
- Proshansky, H. M., Fabian, A. K, and Kaminoff, R., (1983) "Place-Identity: Physical World Socialization of the Self." *Journal of Environmental Psychology* 3 (1): 57–83.
- Ramsar Convention Secretariat (1971) *Convention on Wetlands of International Importance Especially as Waterfowl Habitat*. Gland.
- Ramsar Convention Secretariat (2010) *Wise Use of Wetlands: Concepts and Approaches for the Wise Use of Wetlands. Ramsar Handbook for the Wise Use of Wetlands*. Edited by David Pritchard. 4th ed. Gland.
- Raymond, C. M., Brown, G. and Weber, D. (2010) "The Measurement of Place Attachment: Personal, Community, and Environmental Connections." *Journal of Environmental Psychology* 30 (4): 422–34.
- Relph, E. (1976) *Place and Placelessness*. London.
- Relph, E. (2008) "Senses of Place and Emerging Social and Environmental Challenges." In Eyles, J. and Williams, A. (ed) *Sense of Place, Health and Quality of Life*, 31–44. Hampshire, Burlington.
- Remor, E. (2014) "Psychometric Properties of a European Spanish Version of the Perceived Stress Scale (PSS)." *The Spanish Journal of Psychology* 9 (1): 86–93.
- Ritchie, J., and Spencer, L. (2002) "Qualitative Data Analysis for Applied Policy Research." *The Qualitative Researcher's Companion*, 305–329. London, Thousand Oaks.
- Rose, M. (2002) "Landscape and Labyrinths." *Geoforum* 33 (4): 455–67.
- Rosenberg, D. M., Bodaly, R. a., and Usher, P. J. (1995) "Environmental and Social Impacts of Large Scale Hydroelectric Development: Who Is Listening?" *Global Environmental Change* 5 (2): 127–48.
- Rowles, G. D. (1983) "Place and Personal Identity in Old Age: Observations from Appalachia." *Journal of Environmental Psychology* 3 (4): 299–313.
- Russel Bernard, H. (2006) *Research Methods in Anthropology: Qualitative and Quantitative*. Oxford.

- Russell, J. (1980) "A Circumplex Model of Affect." *Journal of Personality and Social Psychology* 39 (6): 1161–78.
- Russell, J. (2003) "Core Affect and the Psychological Construction of Emotion." *Psychological Review* 110 (1): 145–72.
- Russell, J., and Pratt, G. (1980) "A Description of the Affective Quality Attributed to Environments." *Journal of Personality and Social Psychology* 38 (2): 311–22.
- Ryan, R M, and Deci, E L. (2001) "On Happiness and Human Potentials: A Review of Research on Hedonic and Eudaimonic Well-Being." *Annual Review of Psychology* 52 (January): 141–66.
- Ryff, C. D. (1989) "Happiness Is Everything, or Is It? Explorations on the Meaning of Psychological Well-Being." *Journal of Personality & Social Psychology* 57 (6): 1069–81.
- Ryff, C. D., and Keyes, C. L. M. (1995) "The Structure of Psychological Well-Being Revisited." *Journal of Personality and Social Psychology* 69(4): 719-727.
- Ryff, C. D., and Singer B. H. (2008) "Know Thyself and Become What You Are: An Eudaimonic Approach to Psychological Well-Being." *Journal of Happiness Studies* 9 (1): 13–39.
- Sachs, L., and Hedderich, J. (2009) *Angewandte Statistik - Methodensammlung Mit R*. 13th ed. Berlin.
- Sandifer, P. A., Sutton-Grier, A. E., and Ward, B. P. (2015) "Exploring Connections among Nature, Biodiversity, Ecosystem Services, and Human Health and Well-Being: Opportunities to Enhance Health and Biodiversity Conservation." *Ecosystem Services* 12: 1-15.
- Semken, S. (2005) "Sense of Place and Place-Based Introductory Geoscience Teaching for American Indian and Alaska Native Undergraduates." *Journal of Geoscience Education* 53 (2): 149–57.
- Settele, J., Scholes, R., Betts, R. A., Bunn, S., Leadley, P., Nepstad D., Overpeck, J. T., and Taboada, M. A. (2014) "Terrestrial and Inland Water Systems." In Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., et al. (eds.) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*: 271–359. Cambridge.
- Shamai, S. (1991) "Sense of Place: An Empirical Measurement." *Geoforum* 22 (3): 347–58.
- Shaver, P., Schwartz, J., Kirson, D., and O'Connor, C. (1987) "Emotion Knowledge: Further Exploration of a Prototype Approach." *Journal of Personality and Social Psychology* 52 (6): 1061–86.
- Shin, D. C., and Johnson D. M. (1978) "Avowed Happiness as an Overall Assessment of the Quality of Life." *Social Indicators Research* 5 (1–4): 475–92.

- Shumaker, S. A., and Stokols. D. (1982) "Residential Mobility as a Social Issue and Research Topic." *Journal of Social Issues* 38 (3): 149–71.
- Siegel, A. W., and White, S. H. (1975) "The Development of Spatial Representations of Large-Scale Environments." *Advances in Child Development and Behavior* 10: 9–55.
- Silver, A., and Grek-Martin J. (2015) "'Now We Understand What Community Really Means': Reconceptualizing the Role of Sense of Place in the Disaster Recovery Process." *Journal of Environmental Psychology* 42 (June): 32–41.
- Smith, L. M., Case, J. L., Smith, H. M, Harwell, L. C., and Summers, J. K. (2013) "Relating Ecosystem Services to Domains of Human Well-Being: Foundation for a U.S. Index." *Ecological Indicators* 28 (0): 79–90.
- Stedman, R. (2003) "Is It Really Just a Social Construction?: The Contribution of the Physical Environment to Sense of Place." *Society & Natural Resources* 16 (8): 671–85.
- Stefanovic, I. L. (2008) "Holistic Paradigms of Health and Place: How Beneficial Are They to Environmental Policy and Practice?" In Eyles, J. and Williams, A. (eds.) *Sense of Place, Health and Quality of Life*, 45–58. Hampshire, Burlington.
- Stoeckl, N., Farr, M., Larson, S., Adams, V. M., Kubiszewski, I., Esparon, M., and Costanza, R. (2014) "A New Approach to the Problem of Overlapping Values: A Case Study in Australia's Great Barrier Reef." *Ecosystem Services* 10: 61–78.
- Sultana, F. (2011) "Suffering for Water, Suffering from Water: Emotional Geographies of Resource Access, Control and Conflict." *Geoforum* 42 (2): 163–72.
- Tavakol, M., and Dennick. R. (2011) "Making Sense of Cronbach's Alpha." *International Journal of Medical Education* 2: 53–55.
- The Republic of Uganda (2010) *National Development Plan (2010/11 - 2014/15). Uganda Vision 2040*. Kampala.
- The Republic of Uganda (2012) *Uganda Vision 2040*. Kampala.
- The Republic of Uganda (2015) *Second National Development Plan (NDPII) 2015/16-2019/20*. Kampala.
- The Republic of Uganda (2017) "Water and Environment Sector Performance Report 2016." Kampala.
- Thomashow, M. (1996) *Ecological Identity: Becoming a Reflective Environmentalist*. Cambridge, Massachusetts, London.
- Thrift, N. (1999) "Steps to an Ecology of Place." In Massey, D., Allen, J. and Sarre, P. (eds.) *Human Geography Today*, 295–322. Cambridge.
- Topp, C. W., Dinesen Østergaard S., Søndergaard, S., and Bech, P. (2015) "The WHO-5 Well-Being Index: A Systematic Review of the Literature." *Psychotherapy and Psychosomatics* 84 (3): 167–76.
- Tuan, Y.-F. (1977) *Space and Place: The Perspective of Experience*. 8th ed. Minneapolis; London.

- Twigger-Ross, C. L., and Uzzell, D. L. (1996). "Place and Identity Processes." *Journal of Environmental Psychology* 16 (3): 205–20.
- UBOS (2012) *2012 Statistical Abstract*. Kampala.
- UBOS (2014) *National Population and Housing Census. Provisional Results Report*. Kampala.
- UBOS (2016) *National Population and Housing Census 2014 - Sub-County Report - Central Region*. Kampala.
- Ulrich, R. S. (1983) "Aesthetic and Affective Response to Natural Environment." In Altman I. and Wohlwill J.F. (eds.) *Behavior and the Natural Environment. Human Behavior and Environment (Advances in Theory and Research)*, vol 6. Boston: 85–125.
- Ulrich, R. S, Simons R. F, Losito, B. D., Fiorito, E., Miles, M. A., and Zelson, M. (1991) "Stress Recovery during Exposure to Natural and Urban Environments." *Journal of Environmental Psychology* 11 (3): 201–30.
- United Nations, Department of Economical and Social Affairs (2015) "World Population Prospects: The 2015 Revision, Key Findings and Advance Tables." *Working Paper*. New York.
- United Nations, Department of Economical and Social Affairs (2014) "World Urbanization Prospects: The 2014 Revision, Highlights." *Working Paper*. New York.
- Vaske, J., and Kobrin K. C. (2001) "Place Attachment and Environmentally Responsible Behavior." *The Journal of Environmental Education* 32 (4): 16–21.
- Voigtländer, S., and Deiters. T. (2015) "Mindeststandards für die räumliche Erreichbarkeit hausärztlicher Versorgung: Ein systematischer Review." *Das Gesundheitswesen* 77 (12): 949–57.
- Völker, S. (2016) "Natur, Landschaft Und Mentale Gesundheit." In Gebhard, U. and Kistemann, T. (eds.) *Landschaft, Identität Und Gesundheit*. 93–108. Wiesbaden.
- Völker, S., and Kistemann, T. (2011) "The Impact of Blue Space on Human Health and Well-Being - Salutogenetic Health Effects of Inland Surface Waters: A Review." *International Journal of Hygiene and Environmental Health* 214 (6): 449–60.
- Völker, S., and Kistemann, T. (2013) "'I'm Always Entirely Happy When I'm Here!' Urban Blue Enhancing Human Health and Well-Being in Cologne and Düsseldorf, Germany." *Social Science & Medicine* 78 (February): 113–24.
- Völker, S., and Kistemann, T. (2015) "Developing the Urban Blue: Comparative Health Responses to Blue and Green Urban Open Spaces in Germany." *Health & Place* 35 (September): 196–205.
- Warr, P. (1990) "The Measurement of Well-Being and Other Aspects of Mental Health." *Journal of Occupational Psychology* 63 (3): 193–210.

- White, M. P., Pahl, S., Ashbullby, K., Herbert, S., and Depledge, M. H. (2013) "Feelings of Restoration from Recent Nature Visits." *Journal of Environmental Psychology* 35 (September): 40–51.
- WHO (1948) "WHO Definition of Health." In *Official Records of the World Health Organization*, 2:100.
- WHO (2001) "Strengthening Mental Health Promotion." *Fact Sheet No 220*. <http://www.who.int/mediacentre/factsheets/fs220/en/>.
- WHO (2006) "WHO-AIMS Report on Mental Health System in Uganda: A Report of the Assessment of the Mental Health System in Uganda Using the World Health Organization - Assessment Instrument for Mental Health Systems (WHO-AIMS)." Edited by WHO and Ministry of Health. Kampala.
- WHO (2014) "Factsheets on Alcohol Consumption." http://www.who.int/substance_abuse/publications/global_alcohol_report/msb_gsr_2014_2.pdf?ua=1.
- Williams, A. (1998) "Therapeutic Landscapes in Holistic Medicine." *Social Science and Medicine* 46(9): 1193-1203.
- Williams, A. (1999) *Therapeutic Landscapes: The Dynamic between Place and Wellness*. Lanham; New York; Oxford.
- Williams, A. (2002) "Changing Geographies of Care: Employing the Concept of Therapeutic Landscapes as a Framework in Examining Home Space." *Social Science and Medicine*, 55:141–54.
- Williams, A., Heidebrecht, C., DeMiglio, L., Eyles, J., Streiner, D., and Newbold, B. (2008) "Developing a Psychometric Scale for Measuring Sense of Place and Health: An Application of Facet Design." In Eyles, J. and Williams, A. (eds.) *Sense of Place, Health and Quality of Life*, 73-85. Hampshire, Burlington.
- Williams, D., Patterson, M., Roggenbuck, J., and Watson, A. (1992) "Beyond the Commodity Metaphor: Examining Emotional and Symbolic Attachment to Place." *Leisure Sciences* 14 (1): 29–46.
- Williams, D., and Roggenbuck, J. (1989) "Measuring Place Attachment: Some Preliminary Results." *Outdoor Planning and Management NRPA Symposium on Leisure Research*, 1–7.
- Williams, D., and Stewart, S. (1998) "Sense of Place: An Elusive Concept That Is Finding a Home in Ecosystem Management." *Journal of Forestry* 96 (5): 18–23.
- Williams, D., and Vaske, J. (2003) "The Measurement of Place Attachment: Validity And Generalizability of a Psychometric Approach." *Forest Science* 49 (6): 830–40.
- Wilson, E. O. (1984) *Biophilia*. Harvard University Press.
- Wylie, J. (2006) "Depths and Folds: On Landscape and the Gazing Subject." *Environment and Planning D: Society and Space* 24 (4): 519–35.

7. ANNEX

7.1 ETHICAL APPROVAL

7.1.1 University of Bonn



Rheinische Friedrich-Wilhelms-Universität
Medizinische Fakultät
Ethik – Kommission

Ethik-Kommission - Medizinische Fakultät Bonn
Biomedizinisches Zentrum, Sigmund-Freud-Str. 25, 53105 Bonn

Herrn
Prof. Dr. med. Thomas Kistemann
Institut für Hygiene und Öffentliche Gesundheit
Sigmund-Freud-Straße 25
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53105 Bonn, 02.09.14

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KRa/BR

N / S. Heinkel

Lfd. Nr. 248/14

Bitte stets angeben!

Betr.: Ihr Antrag an die Ethik-Kommission
Promotionsarbeit Sophie-Bo Heinkel
Antragsteller: Prof. Dr. Med. Thomas Kistemann
Studientitel: Applying place-related well-being as a local driver for the sustainability of environmental protection activities – A case study of wetlands in Uganda
Ortsbasierendes Wohlbefinden als lokaler Motor für die Nachhaltigkeit von Aktivitäten zum Umweltschutz: eine Fallstudie von Feuchtgebieten in Uganda
Sponsor: Promotionsstipendium

Auflistung der eingereichten Unterlagen – Eingang 11.08.2014

- Checkliste/Antrag vom 11.08.2014
- Study Protocol vom 11.08.2014
- Patienteninformation und Einverständniserklärung
- Fragebögen
- Interview Guide

Sehr geehrter Herr Kollege Kistemann,
sehr geehrte Frau Heinkel,

die Ethik-Kommission für klinische Versuche am Menschen und epidemiologische Forschung mit personenbezogenen Daten der Medizinischen Fakultät der Rheinischen Friedrich-Wilhelms-Universität Bonn ist nach Beratung des o.g. Antrags auf ihrer Sitzung am 01.09.2014 zu dem Beschluss gekommen, gegen das o.g. Forschungsvorhaben keine ethischen oder rechtlichen Bedenken zu erheben.

Die Ethik-Kommission geht davon aus, dass die Angemessenheit der Informationsschriften durch die lokal verantwortliche Ethik-Kommission bewertet wird.

Die Ethik-Kommission weist ferner noch darauf hin, dass im Prüfplan adressiert werden sollte, wie eine Einwilligung nach Aufklärung von Analphabeten eingeholt werden soll.

Änderungen im Prüfplan müssen der Ethik-Kommission mitgeteilt werden und bedürfen der erneuten Beratung.

Des Weiteren müssen Änderungen bei den beteiligten Prüffärzten der Ethik-Kommission unverzüglich mitgeteilt werden.

Die ärztliche und juristische Verantwortung des Leiters der klinischen Prüfung und der an der Prüfung teilnehmenden Ärzte bleibt entsprechend der Beratungsfunktion der Ethik-Kommission durch unsere Stellungnahme unberührt.

Die Ethik-Kommission der Medizinischen Fakultät der Rheinischen Friedrich-Wilhelms-Universität Bonn arbeitet gemäß den nationalen gesetzlichen Bestimmungen und den ICH-GCP Richtlinien. Den Beratungen der Ethik-Kommission der Medizinischen Fakultät der Rheinischen Friedrich-Wilhelms-Universität Bonn liegt gemäß der gültigen Berufsordnung die maßgebende Deklaration des Weltärztebundes von Helsinki in der letzten revidierten Fassung zugrunde.

Mit freundlichen Grüßen



Prof. Dr. K. Racké
Vorsitzender der Ethik-Kommission

Nachfolgend sind die Mitglieder der Ethik-Kommission aufgeführt, die den o. g. Antrag auf ihrer Sitzung am 01.09.2014 beraten haben:

Herr Prof. Dr. W. Entzian, Arzt für Neurologie
Prof. Dr. I. Schmidt-Wolf, Arzt für Innere Medizin
Frau Dr. A. Pralong, Medizinethikerin
Herr Prof. Dr. M. Böse, Jurist
Herr Dr. S. Garbe, Arzt für Radiologie
Frau Dr. K. Hoffmann, Apothekerin
Frau N. Storm, Patientenvertreterin
Prof. Dr. K. Racké, Arzt f. Pharmakologie und Toxikologie, Vors. der Ethik-Kommission

7.1.2 *Makerere University*



May 30th, 2016

Dr. Sophie-Bo Noel Heinkel
Department of Psychiatry

Category of review

- Initial review
- Continuing review
- Amendment
- Termination of study
- SAEs

Dear Dr. Heinkel,

Re: Approval of proposal #REC REF 2016-053

“Applying place- related well-being as a local driver for the sustainability of environmental protection activities”

Thank you for submitting an application for approval of the above – referenced **proposal**. The committee reviewed it and granted approval for one year, effective May 30th, 2016. Approval will expire on May 29th, 2017.

Continuing Review

In order to continue work on this study (including data analysis) beyond the expiration date, the School of Medicine Research and Ethics Committee must reapprove the protocol after conducting a substantive, meaningful, continuing review. This means that you must submit a continuing report form as a request for continuing review. To best avoid a lapse, you should submit the request six (6) to eight (8) weeks before the lapse date. Please use the forms supplied by our office.

Amendments

During the approval period, if you propose any change to the protocol such as its funding source, recruiting materials, or consent documents, you must seek School of Medicine Research and Ethics Committee approval before implementing it.

Please summarize the proposed change and the rationale for it in a letter to the School of Medicine Research and Ethics Committee. In addition, submit three (3) copies of an updated version of your

original protocol application- one showing all proposed changes in bold or 'track changes,' and the other without bold or track changes.

Reporting

Other events which must be reported promptly in writing to the School of Medicine Research and Ethics Committee include:

Suspension or termination of the protocol by you or the grantor
Unexpected problems involving risk to participants or others

Adverse events, including unanticipated or anticipated but severe physical harm to participants.

Do not hesitate to contact us if you have any questions. Thank you for your cooperation and commitment to the protection of human subjects in research.

Final approval is to be granted by Uganda National Council for Science and Technology.

Documents approved for use along with protocol:

- English and translated Informed consent document
- Data collection tool

Yours sincerely,



Assoc. Prof. Ponsiano Ocama
Chairperson School of Medicine Research and Ethics Committee

7.2 INFORMED CONSENT

7.2.1 *English*

Applying place-related well-being as a local driver for the sustainability of environmental protection activities – a case study of a wetland in Uganda

Sophie-Bo Heinkel as a PhD student of the GeoHealth Center of the Institute for Hygiene and Public Health of the University of Bonn, Germany is conducting a study whose title is shown above. I am requesting you to be part of this study. It is aimed at establishing the intangible values of the wetland and the influence of this ecosystem on human well-being.

This form explains to you the nature, risks and benefits of this study. When you decide to allow them to participate, please sign or put a thumbprint at the bottom of this form. You will not be forced to participate in the study.

Procedures:

If you agree, the following will happen:

- You will answer some questions about your well-being and the wetland inform of an interview.
- The information you provide will be recorded in form of a questionnaire or an audio record as well as pictures will be taken.
- The interview will take 60-90 Minutes
- One researcher and one interpreter will interview you.

Benefits:

There may no direct benefit to you or your community from the study. You may reflect on the value of the wetland. The information may help nature resource planning and the management of environment and nature resources of the wetland.

Risks:

This study does not pose any risk to the participant's well-being.

Confidentiality:

All information obtained in this study will be confidential and used only for research purposes.

Questions:

You are allowed to ask questions concerning the study, during the interview. If you get questions after the interview, you can contact the Principal Investigator, Sophie-Bo Heinkel, Sigmund-Freud-Str. 25, 53105 Bonn, Germany, Phone +49 228 287 19872, www.ihph.de, www.wetlands-africa.de.

If you have any questions or concerns regarding your rights as a study participant or are dissatisfied at any time with any aspect of this study, you may contact – Professor James Tumwine, Chairman of the Makerere University School of Medicine Research and Ethics Committee, by phone: 041530020.

Right to refuse:

The participation in this study is entirely voluntary and you are free to refuse at any time without fear of consequences.

Statement of consent

I have been informed that this is a study to establish the intangible values of the wetland and the influence of this ecosystem on human well-being.

I have also been informed that when I agree to participate in this study, I will have to sign or put my thumbprint at the bottom of this form. I have been informed that there may be no direct benefit to me or the members of my community, but the information may be useful for planning and management of environment and nature resources of the wetland. I have been informed that there is no risk to me in participating in the study and that all information obtained in this study will be confidential. I have the right to refuse or withdraw at any time without fear of consequences.

The nature and purpose of the study, the procedure, risks and benefits have been explained to me and I understand them. I agree to participate in this study.

Name	Witness name:.....
Date:.....	Date:.....
Signature/Thumbprint:.....	Signature/Thumbprint:.....

I have clearly explained the nature and purpose of the study to the participant in a language they understand. I have explained that there are no monetary benefits and that there are no dangers/risks associated with the participation in the study.

Principle Investigator: Sophie-Bo Heinkel

Date.....Signature.....

7.2.2 *Luganda - Okukkiriza mu buwandiike*

Okussawo embeera ennungi ey'omutuuze - nga engeri omuntu owa bulijjo gye yettanira okuleetawo enkulakulana y'ebyobutonde etalina kkomo - Eky'okulabirako ky'entobazzi mu Uganda

Nze Sophie-Bo Heinkel, omusomi w'o ku ddaala ery'essomo ery'okunoonyereza erya PhD mu kitongole kya GeoHealth Center ekya Institute for Hygiene and Public Health mu Ssettendekero wa Bonn mu Bugilimani. Nze netaba mu musomo ogwanjuddwa waggulu. Ku lw'ensonga eyo nkusaba nawe okkirize okwetaba mu ssomo lino. Mu musomo guno, nduubirira okumanya ebirungi (oba ebyomugaso) ebitakwatibwako naye ngate byeyoleka mu ntobazzi awamu n'engeri embeera y'abantu awamu n'ebyobutonde gye bikyuusiddwa. Foomu eno ekunnyonnyola enkola n'obukkwakkulizo, ebiyinja okukosa awamu n'ebyo ebiyinja okugasa okunnoonyereza kuno. Singa onoba okkiriza okwetaba mu kunnoonyereza kuno nkusaba kino okikakase nga ottaddeko omukono gwo oba ekinkumu mu bbanga eliteereddwawo wansi wa foomu eno. Kisanye kitegeerekeke nti okwetaba mu kunnoonyereza kuno si kukake.

Enkola eneeba bweti:

Singa okkiriza okwetaba mu kunnoonyereza bino bye binabawo:

- Ojja kuddamu ebibuuzo ebikwata ku mbeera y'obulamu bwo mu ntobazi. Ebibuuzo bino byakudibwamu mu buwandiike oba mu kunyumya (okumanyiddwa nga interview).
- Ebibuuzo byonna byonoddamu binakwatibwa ku katambi oba okuwandiikibwa. Kuno nno kwe kunagattibwako n'okukuba ebifananyi
- Ebbanga elinamalibwa mu kubuuzza okw'okunyumya(interview) linabanga wakati w'eddakiika 60(nkaaga) ku 90(kyenda) era telisukkengawo awo.
- Omunoonyereza omu anayambibwangako omuvvunuzi we.

Ebyokuganyulwamu:

Wayinza obutabawo byamugaso ebyembagirawo gyoli ggwe abuuzibwa awamu n'oyo abuuziddwa. Wabula kuno okunoonyereza kuyinza okukuwaliriza okufumiitiriza ku mugaso gw'entobazzi. Obubaka bwonna obunakunganyizibwa okuva gyoli bunayamba okusaawo enteekateeka ey'okulabiriramu entobazi n'ebyobutonde ebirala ebizetoolodde.

Obuzibu obusuubirwa:

Okunoonereza kuno tekulina buzibu bwonna eli obulamu bw'abo abanabwetabamu.

Obukuumi:

Obubaka bwonna obunawebwayo mu kunnoonyereza kuno bunakozesebwa ku/lwa nsonga za kuyiga na kunnoonyereza era bunakuumibwa butiribiri.

Ebibuuzo:

Okkirizibwa okubuuzza ebibuuzo ebikwata ku kunnoonyereza kuno. Kino kiyina okubawo mu mbeera yonna. Oyinja okutuukirira omunnoonyereza omukulu nga ye Mukyala Sophie-Bo Heinkel, Sigmund-Freud-Str. 25, 53105 Bonn, Germany, Phone +49 228 287 19872, www.ihph.de, www.wetlands-africa.de.

Eddembe lyo elyokugaana:

Okwetaba mu kunnoonyereza kuno si kwa buwazze. Teri muntu yenna alina kukakibwa era buli omu wa ddemba okugaana singa asangibwa nga tayagala.

Ekiwandiiko ekikakasa okukkiriza

Nze ntegeezeddwa nti okunnoonyereza kuno kuluubirira okuteekawo n'okwolesa ebyomugaso ebitalabibwako n'ebyo ebitakwatibwako ebiva mu ntobazzi awammu n'engeri gyebikosamu embeera y'omuntu wa bulijjo n'ebyobutonde ebimwetooolodde.

Era nze ntegeezeddwa nti singa nzikkiriza okwetaba mu kunnoonyereza kuno, kingwanira okukkiriza okuteeka ekinkumu (oba okussa omukono) mu banga eliteereddwa wamanga ku foomu eno. Ntegeezeddwa nti tewabeewo byakuganyulwa eby'embagirawo gyendi newankubadde eri abo bembeera nabo naye obubaka bwenawayo mu kunnoonyereza kuno bunayamba ku kussawo enteekateeka awamu n'endabirira y'entobazzi awamu n'ebyobutonde obugyetooolodde. Ntegeezeddwa nti teri buvune bwonna obunneyolekedde singa netaba mu kunnoonyereza kuno era ne byonna ebinafunibwa mu ssomo lino byakuumibwa bulungi era nga bikozezebwa lwa nsonga za kuyiga kwokka. N'ekisembayo nkakasiddwa nti nnina eddembe okugaana okwetaba mu kunnoonyereza kuno. Ate sirina kukakibwa kukwetabamu .

Omugaso gw'okunnoonyereza kuno enkola n'obukwakkulizo, ebyokusuubira, obuvuna obusuubirwa byonna bintegeezeddwa era mbitegedde. Ku lw'ensonga ezo, nzikkiriza okwwetaba mu kunnoonyereza kuno.

Elinnya	Elinnya (ly'omujulizi):.....
Olunaku lw'omwezi:.....	Olunaku lw'omwezi:.....
Omukono/ Ekinkumu:.....	Omukono/ Ekinkumu:.....

Nze nninnyonyodde ona agenda okwetaba (mu kunnoonyereza) ku mugaso, n'ebigendererwa eby'essomo lino mu lulimi lw'ategeera obulungi. Mutegeezezza nti teri kyakuganyulwa kyambagirawo ekisuubirwa era nti teri buvune bwonna bwanafuna mu kwetaba mu kunnoonyereza kuno.

Omunoonyereza omukulu: Sophie-Bo Heinkel

Olunaku lw'omwezi.....Omukono.....

7.3 POSTERS

- Heinkel, S.-B., Rechenburg, A. and Kistemann, T. (2017) The impact of wetlands on mental well-being – a case study from Uganda. Published at the European Conference on Biodiversity and Climate Change. Bonn, Germany. 27-29 June 2017.

7.4 ORAL PRESENTATIONS

- Heinkel, S.-B., Rechenburg, A., Kistemann, T.: Ortsbezogenes Wohlbefinden als lokaler Motor für die Nachhaltigkeit von Aktivitäten zum Umweltschutz – eine Fallstudie zu Feuchtgebieten in Uganda. Oral presentation: Jahrestagung des AK Medizinische Geographie 8. Humboldtsteiner Tage in Remagen, Germany, 9-11 October 2014.
- Heinkel, S.-B., Rechenburg, A., Kistemann, T.: Place-related well-being of people being attached to wetlands in Wakiso District, Uganda. Oral presentation: 16th International Medical Geography Symposium in Vancouver, Canada, 5-10 July 2015.
- Heinkel, S.-B., Rechenburg, A., Kistemann, T.: Ortsbezogenes Wohlbefinden und Raumwahrnehmung im Ökosystem “Wetland” in Uganda. Oral presentation: Deutscher Kongress für Geographie 2015 Stadt Land Schaf(f)t – Land Schaf(f)t Stadt in Berlin, Germany, 1-6 October 2015.
- Heinkel, S.-B. & Anthonj, C. , Andrea Rechenburg, Thomas Kistemann: Feuchtgebiete in Ostafrika – Gesundheitsrisiko und Beitrag zum Wohlbefinden. Oral presentation: Deutscher Kongress für Geographie 2015 Stadt Land Schaf(f)t – Land Schaf(f)t Stadt in Berlin, Germany, 1-6 October 2015.
- Heinkel, S.-B., Rechenburg, A., Kistemann, T.: Emotion matters - The meanings of a wetland in Uganda. Oral presentation: 11th Europe Chapter Meeting of the Society of Wetlands Scientists in Potsdam, Germany. 17 – 20 May 2016.
- Heinkel, S.-B., Rechenburg, A., Kistemann, T.: Place attachment as basic condition for wellbeing and life satisfaction in Africa. Oral presentation: 18. International Conference on Positive Psychology and Wellbeing. London, UK. 23. – 24. Juni 2016.
- Heinkel, S.-B.: Von Wasser und Emotionen – Wie ein Feuchtgebiet das emotionale Wohlbefinden seiner Anwohner beeinflusst. Oral presentation:

Annual meeting of the AK Medizinische Geographie 8. Humboldtsteiner Tage in Remagen, Germany. 6 – 8 October 2016.

- Heinkel, S.-B., Rechenburg, A., Kistemann, T.: From Wastelands to the Land of fortune: Perceptions and Consistencies about Wetlands in Uganda. Oral presentation: 12th Europe Chapter Meeting of the Society of Wetlands Scientists in Faro, Portugal. 5 - 7 May 2017.

7.5 EIDESSTATTLICHE ERKLÄRUNG

Hiermit erkläre ich, Sophie-Bo Heinkel (geboren am 21.12.1984) an Eides statt, dass ich die vorliegende Doktorarbeit mit dem Titel „Therapeutic effects of wetlands on mental well-being – The concept of therapeutic landscapes applied to an ecosystem in Uganda“ persönlich, selbständig und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Für die Erstellung der vorgelegten Arbeit und die Gelegenheit zur Promotion habe ich keine fremde Hilfe, insbesondere keine entgeltliche Hilfe von Vermittlungs- bzw. Beratungsdiensten in Anspruch genommen. Die aus anderen Quellen direkt oder indirekt übernommenen Daten und Konzepte habe ich unter Angabe der Quelle kenntlich gemacht. Ich habe bisher noch keinen Promotionsversuch unternommen und die vorliegende Dissertation wurde nicht in gleicher oder ähnlicher Form bei einer anderen Stelle zur Erlangung eines akademischen Grades eingereicht

Bonn, den 06.03.2018