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UNIVERSITY OF NATURAL RESOURCES AND LIFE SCIENCES VIENNA

ASSESSMENT OF AQUAHUB – EDUCATION AND RESEARCH HUB FOR THE SUSTAINABLE MANAGEMENT OF AQUATIC ECOSYSTEMS IN EASTERN AFRICA

Final Report

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List of abbreviations

AAU	Addis Ababa University
ADA	Austrian Development Agency
ADC	Austrian Development Cooperation
AEEM	Aquatic Ecosystems & Environmental Management
AQUAHUB	Education and research hub for the sustainable management of aquatic ecosystems in Eastern Africa
BDU	Bahir Dar University
BOKU	University of Natural Resources and Life Sciences Vienna
CAPAQUA	Educational and Research CAPacity in Eastern Africa for the Sustainable Management of AQUAtic Ecosystems
CAS	Complex adaptive systems
EAAWA	East Africa – Austria Water Association
EAWA	Eastern African Water Association
EGU	Egerton University
EIAR-NFALRC	Ethiopian Institute for Agricultural Research, National Fish and Aquatic Lives Research Center
ES-LWE	Master's Programme: Environmental Sciences, specialisation in Limnology & Wetland Ecosystems

HEST	Higher Education Science and Technology
IHE-Delft	IHE Delft Institute for Water Education
IPEA	Integrated Policy Effectiveness Assessment
IPGL	International Training Programmes in Limnology
LWM	Master's Programme in Limnology & Wetland Management
NGO	Non-governmental organisation
SDGs	Sustainable Development Goals
ToC	Theory of Change
ToR	Terms of Reference

1 Executive Summary

The AQUAHUB project aims to foster the sustainable management of freshwater ecosystems and strenghten the educational and research capacities of Higher Education Science and Technology institutions in Eastern Africa. Standing in a long tradition of related projects, starting with the "International Post-Graduate Education & Research Hub in Limnology" project which began in 1975, AQUAHUB can build on decades of experiences and established relationships for its cooperation, knowledge creation, and educational programmes in Ethiopia, Kenya, and Uganda. In its long history it has evolved from trainings in European countries to a broader capacity development and a direct integration of institutions in Eastern Africa as well as a strengthening of South-South cooperation and larger networks. Currently, the two joint-degree master programmes Limnology & Wetland Management (LWM) and Aquatic Ecosystems & Environmental Management comprise the core of the project's activities, with the latter one being purely a collaboration between Eastern African institutions. With these activities, AQUAHUB aims to educate and train highly-qualified professionals, carry out relevant research and extension activities and contribute to evidence-based policy making. A differentiating factor is the focus on hands-on training in practical and soft skills that enriches the otherwise mostly knowledge-focussed programmes in the Eastern African region[1].

Syspons was commissioned by the University of Natural Resources and Life Sciences Vienne (BOKU) to conduct the present assignment with the purpose to promote organisational learning within the project and to inform decision-making for future change processes and an upcoming impact assessment. The assignment combines three distinct but interrelated objectives:

- Inform the design of a follow-on phase of AQUAHUB, in particular by assessing the project's relevance and coherence in the local context
- Reflect, assess and – if necessary – revise the current Theory of Change
- Assess and revise the draft Terms of Reference (ToR) of a planned impact assessment.

Based on these three objectives, Syspons carried out three separate analyses that are tied together into a holistic research strategy as they all inform each other.

Firstly, to assess the AQUAHUB's coherence to the policy context and relevance to local needs, an Integrated Policy Effectiveness Assessment (IPEA) and Needs Assessment were conducted. The IPEA is an approach to assessing a policy's or intervention's alignment with other policies and interventions in a given area. A sample of the most important policies in the three countries and the region were systematically analysed regarding their point of intervention, and assumed causal mechanism, and subsequently scored regarding their practical relevance for and alignment with the AQUAHUB project. Interviews and focus group discussions with students, academic staff, and alumni of the educational programmes and key institutions and organisations (incl. potential and actual employer's of graduates) allowed the assessment of these stakeholders' needs. The results of these assessment are particularly useful for the design of the follow-on phase of AQUAHUB.

Secondly, the Theory of Change was analysed, tested for plausability, and ultimately visualised. To this end, in the inception phase a thorough understanding of the project and the different perspectives on it was developed through interviews with the project coordinators. Based on this initial data, state-of-the-art capacity development theories, and an expert assessment by the evaluation team, outcomes were reformulated, underlying assumptions identified, and impact hypotheses developed. In the data collection phase, these were then validated in further interviews with project stakeholders, faculty management and relevant organisations and institutions, and focus group discussions with alumni and academic staff. This analysis represent a prepatory step to the planned impact assessment,

[1] Furthermore, interview partners pointed out that there are no comparable joint-degree programmes between European and Eastern African universities. However, the current assignment did not perform a systematic analysis of similar academic programmes.

therefore, its approach and results do not speak to the project's effectiveness or impact. Instead, it focusses on the internal consistency and theoretical plausability of the project's Theory of Change. The practical validation of its impact hypotheses will be conducted in the impact assessment. Hence, the results from this assessment are particularly useful in informing the design of the follow-on phase of AQUAHUB and the revision of the Terms of Reference for the planned impact assessment

Finally, an Evaluability Assessment was conducted. Based on the analytical dimensions of the underlying analysis of the intervention, its Theory of Change, the proposed (or actual) M&E system, the data availability and quality, as well as the evaluation context, a complex set of indicators were applied to the AQUAHUB project. The assessment used the data from the interviews, the revised theory of change, and project documents to develop detailed scores for each of the indicators. The results from the evaluablity assesment provide insights not only into the general evaluability of the project (*whether* it can be evaluated) but also into the specifics of a possible evaluation (*how* it could be evaluated). They were thus central in the subsequent revision of the ToR for the planned impact assessment as they informed the appropriate evaluation strategy, approaches, and designs as well as scope, emphasis, and limitations.

The relevance and coherence analysis showed a strong relevance of the AQUAHUB intervention to the needs of the local context, the participating institutions, and its students and stakeholders. The activities and the underlying Theory of Change respond to key challenges in the region on an individual, organisational, and national/regional level. By aiming to provide fully-funded high-quality education to master students, to offer highly-qualified graduates to the job market, to produce and disseminate high-quality research, and to build a network of research institutions, the project is aligned with needs in the regional sector of the sustainable management of aquatic ecosystems. For many students, the financial and non-monetary support is key, enabling them to take up a master's study and receive high-quality supervision. The knowledge and skills acquired during the master's programmes are seen as being relevant to the local job market, both by the graduates and by potential employers. Employers value in particular the international and regional exposure and the broad set of academic and soft skills. However, with the on-going staff upgrading in East African research institutions, in many cases, a master's degree is becoming an insufficient entry ticket to the job market as more and more positions are requiring a PhD.

The IPEA analysis also showed that all analysed countries are putting a strong emphasis on sustainable development, the sustainable use of its natural resources, and the strengthening and/or reform of Higher Education and research. These policies offer many opportunities to the AQUAHUB project for funding, cooperation, and impact. At the same time, there is often a trade-off between environmental sustainability goals and economic development strategies that needs to be managed. Furthermore, while policies may be generally favourable, their implementation and enforcement are often still lacking, putting aquatic ecosystems at serious risk. Through its expertise in the sustainable management of aquatic resources and its well-qualified graduates, the project could attempt to make valuable contributions to the better management of competing priorities. Similarly, the area of community engagement and the dissemination of research findings to local communities is gaining increasing attention from policy makers, which could be further strengthened in the AQUAHUB approach. Additionally, a stronger strategic focus on reaching the policymaking community and influencing future policies through publications, networking, and the project's graduates would allow the project to shape a beneficial policy environment and thus increase both coherence as well as effectiveness.

Following a first analysis, the Theory of Change underlying the current project proposal was adjusted. A clearer differentiation between the projects inputs, activities, outputs, outcomes, and impact was established and impact hypotheses (if-then relationships) developed. Additionally, some aspects were found to be missing in the ToC which were captured by adding an additional outcome and the respective outputs and impact hypotheses concerning awareness and knowledge on sustainable management of aquatic ecosystem. The detailed analysis of the ToC, based on the interviews and focus group discussions, concluded that the current ToC generally represents an established and plausible intervention logic. However, it also revealed a number of weaknesses in definitions and

operationalisation such as the terms "regional flagship programmes" or "international standards". Additionally, the plausability of some causal links could be further strengthened by adding additional or explicating existing activities to the ToC and project approach. These include, among others, the role of the web-based platform, the effects of the network of participating institutions, the impacts of graduates, the link between individual skills development and organisational capacity development, and the gap between the dissemination of knowledge to a target group and achieving behavioural change in this target group.

For the impact assessment, these weaknesses offer interesting entry points and directions to explore further. For example, the dimensions of communication, cooperation, and interlinkages to other stakeholders could be analysed for the established network or the practical value of the produced research could be assessed. Another potential avenue would be to trace the alumni's entry to and trajectory within the job market and their impacts in and on their work environment to test whether the education of master students has the intended effects on the sustainable management of aquatic ecosystems.

The findings of the **evaluability assessment** suggest that, generally, an impact evaluation is possible and offers the opportunity of generating relevant findings to the further development of the project. The favourable evaluation context and the newly revised ToC form a good basis for such an assessment. However, due to the long period of project implementation and challenges in data availability and quality, especially with regards to the earlier project phases, the impact evaluation will have to face a number of limitations, such as a missing no treatment group or the option to conduct of a counterfactual analysis.

Recommandations

In a follow-up phase, **research uptake strategies** could be developed. A further gap exists regarding the question on the extent that research results are readily available and applicable to those who can benefit from it (e.g. farmers, fishermen, etc.). While AQUAHUB ensures that research is needs-oriented, the plausibility of that research having a direct impact on the beneficiaries and AQUAHUB's coherence with policies emphasizing community engagement needs to be strengthened. Accordingly, the project strategy should also include activities and mechanisms through which such uptake is facilitated and fostered. Possible options for activities/outputs addressing this issue could be: Identify which research results have the most potential for dissemination and uptake; involve extension officers, local authorities, smallholder farmer groups, etc. to a follow up; set-up knowledge transfer activities to encourage result uptake; involve stakeholders from the start of research activities to create sufficient ownership. A future impact assessment could also focus on finding examples and good practices, as well as analyse existing literature and insight on this matter.

To foster **impact at the level of employer organisations, mechanisms** could be included in the ToC. Such mechanisms could be developed at the level of master research projects, as graduates working in HEST institutions, governmental agencies or other type of employer organisation remain the key drivers of change. The project does implement activities that to a certain extent support graduates impacting their working environment (e.g., through modules within LWM on respearch proposal), however those activities are not yet included in the ToC. Therefore, the future ToC could explicitly define how during or after graduation, alumni are supported in their efforts to transfer knowledge, increase awareness and enhance capabilities of their employer organisations. Further, possible options for activities/outputs in the project design addressing this issue could be: Include a "Personal Action Plan" in the curriculum to create the opportunity to transfer knowledge to a practical setting and help push change processes and specific research topics. Such a Personal Action Plan could be a project/course within the master programmes or a follow-up through which alumni and their employer apply to receive support from AQUAHUB (e.g. access to equipment, co-supervision on research projects, etc.).

Concerning the sustainability of the AQUHUB project, **sustainability targets** could be developed in the long-term, to promote the longevity of the project. While the analysis revealed that both master programmes are being implemented successfully, the question of how to increase sustainability in the long-term remains. The ToC of future

project phases could explicitly define a sustainability target at outcome level. This would force all involved parties to design activities and outputs that contribute to the sustainability of programmes. Possible activities/outputs could be:

- Design a (hypothetical) exit that addresses the question on how sustainability should be addressed at the financial and institutional levels. This exit could use the five capabilities model as a blueprint.
- Strategize about how to further increase third-party-funding for scholarships and research
- Strategize about how to increase the number of self-funding students
- Strategize about options to increase resource mobilisation of participating institutions

Furthermore, current experiences on e-learning could be used to **digitize** certain programme components in a follow-up phase. During the COVID-19 Pandemic **e-learning components** were introduced, which – in a first assessment – were mostly assessed positively, even though the networking aspects and the exposur to different contexts was limited. The current experiences on e-learning could serve as a learning ground to expand digitization efforts within the master programmes.

Similarly, **knowledge creation, transfer and awareness raising** could be further strengthened in a follow-up phase. Networking, outreach and research activities are key components of AQUAHUB and are already used to create and disseminate knowledge, and to raise awareness on issues relevant to the sustainable management of aquatic ecosystems. Key outputs concerning networking and awareness raising exist, such as the web-based platform. Accordingly the future ToC should also include a specific outcome, such as outcome 6 of the revised ToC, and include a target on knowledge transfer, awareness building and – possibly - multiplication measures. Conducting a project-internal mapping exercise to centralise the existing knowledge on other interventions – both supporting and undermining AQUAHUB – potential partners and other stakeholders could be used to strengthen AQUAHUB's network more strategically.

Finally, the planned **impact evaluation** based on the revised Terms of Reference should be used to test the revised Theory of Change and its underlying assumptions. It should focus in particular on those aspects of the ToC that have been identified as having limited plausability and should try to uncover good practices and possible ways of improving plausability. Given the results of the evaluability assessment and the review of the ToC, the impact evaluation should, in particular, employ a contribution analysis to attempt to validate the underlying causal mechanisms and a tracer study or case studies to assess the impact of graduates and of the link between skills development and organisational capacity.

2 Introduction

The Syspons GmbH was commissioned by the University of Natural Resources and Life Sciences Vienna (BOKU) to assess the "Education and research hub for the sustainable management of aquatic ecosystems in Eastern Africa" (AQUAHUB) project. AQUAHUB aims to foster the sustainable management of freshwater ecosystems and strengthen the educational and research capacities of Higher Education Science and Technology (HEST) institutions in Eastern Africa.

The purpose of this assignment is to promote organisational learning within the project and to inform decision-making both at the strategic and operational level for future change processes and impact assessments. To achieve these purposes, the assignment targeted three objectives. The first objective was to inform the design of a follow-on phase of AQUAHUB, based on a coherence assessment of policies and interventions in the three main project countries (Kenya, Ethiopia, and Uganda). This objective was carried out using the OECD-DAC criteria relevance and coherence. The second objective was to reflect, assess and – if necessary - revise the current project ToC. Finally, the assignment was geared towards assessing and revising the draft Terms of Reference (ToR) for a planned impact assessment of the project.

The main subject of the assignment was the ADC funded project AQUAHUB. Previous projects funded by ADC, specifically the "International Post-Graduate Education & Research Hub in Limnology" project (IPGL, implemented from 1975 to 2009) and the "Development of Educational and Research Capacity in Eastern Africa for the Sustainable Management of Aquatic Ecosystems" project (CAPAQUA, implemented from 2009 to 2018) were also taken into account. These previous projects were specifically relevant in the revision of AQUAHUB's ToC and the Impact Assessment ToR. Geographically, the assignment focused on the Eastern African region, with special emphasis on Uganda, Kenya, and Ethiopia. Accordingly, the assignment focused on institutions and individuals from and in these three countries.

This report is structured as follows:

- **Chapter 3** presents the background and the context to this assignment
- **Chapter 4** provides information about the design and methodological approach used in this assignment
- **Chapter 5** outlines the findings of the assignment along the three objectives.
- **Chapter 6** presents the conclusions and lessons leaned
- **Chapter 7** delineates the recommendations.

The Annex contains the revised Theory of Change, the revised Terms of References for the impact assessment as well as a list of reviewed data, a list of persons interviewed during the assignment, the assessment grid, the evaluability assessment, the IPEA analysis, and the bibliography.

3 Background and Context

3.1 About AQUAHUB

In 2018, the AQUAHUB project was launched to foster the sustainable management of aquatic ecosystems in Eastern Africa by supporting individual and institutional capacity development in this area, with a focus on Kenya, Ethiopia and Uganda. The project's mission is to address the need for a better understanding and management of aquatic ecosystems, which are not only the basis to support the livelihoods of many people but serve as hot spots of biodiversity and play a crucial role for the climate. AQUAHUB approaches this challenge by supporting HEST

institutions, primarily universities, in their education, research, and outreach mission to provide highly qualified professionals that can develop innovative solutions tailored to the Eastern African context.

The project is implemented by the University for Natural Resources and Life Sciences Vienna, together with the IHE Delft Institute for Water Education (IHE-Delft), Egerton University (EGU), Addis Ababa University (AAU), Bahir Dar University (BDU) and the Ethiopian Institute for Agricultural Research, National Fish and Aquatic Lives Research Centre (EIAR-NFALRC) as well as with participation of Makerere University. AQUAHUB is funded by the Austrian Development Agency and embedded in a long-term history of collaboration between Austria and East African countries on this issue. Preceding the AQUAHUB project, the Austrian Development Agency funded two other development cooperation projects regarding sustainable management of aquatic ecosystems in East Africa: International Training Programmes in Limnology (IPGL) and Educational and Research Capacity in Eastern Africa for the Sustainable Management of Aquatic Ecosystems (CAPAQUA).

The IPGL project started in 1975 with an **8-months training programme in limnology** for scientists from developing countries in Austria. In 1986, a fact-finding mission recommended to shift to institutional cooperation and further supported the gradually increasing emphasis on the Eastern African region. Thereof, the process of establishing an international network of institutional collaborations on sustainable management of aquatic ecosystems started, kicking off with the institutional cooperation with EGU in Kenya in 1994 as part of the Tropical River Ecology Initiative, followed by the establishment of the collaborative Master's Programme with UNESCO-IHE Master's Programme in Environmental Sciences, specialisation in Limnology & Wetland Ecosystems (ES-LWE) in 1997. Around that time, the support of capacity development processes at Eastern African institutions became a central element of the cooperation. Along with this shift towards capacity development, the programme also started to put more emphasis on South-South collaborations, i.e., via the establishment of the East Africa – Austria Water Association (EAAWA) in 2003 that got transformed to Eastern African Water Association (EAWA) in 2006.

Building on IPGL, CAPAQUA started in 2009, putting further emphasis on the expansion of capacity development in East African countries. With the establishment of the **International Joint-Degree Master's Programme in Limnology & Wetland Management (LWM)**, the project coordination shifted from ILIM-AAS Mondsee to BOKU in 2012. One year later, another Joint Master's Programme was established, focussing on Aquatic Ecosystems & Environmental Management (AEEM) and integrating three Ethiopian institutions into the cooperation: Addis Ababa University, Bahir Dar University and the Ethiopian Institute for Agricultural Research. Thereby, the programme established a cooperation with another East African country and further expanded its network of Eastern African HEST institutions.

The AQUAHUB project started in 2018, building on learnings from the long-term collaboration. Expanding the Master's programme **AEEM towards an Eastern African Joint Degree Master's programme** in 2019, implemented by AAU, BDU, EIAR-NFALRC and EGU, AQUAHUB established a sustainable South-South collaboration around education and research on aquatic ecosystems and a Master's programme that may serve as a role model in the region. Further, the project extended its outreach and networking activities and created the web-based AQUAHUB network platform.

Summing up the genesis of AQUAHUB, the overall programme has moved forward along **two main lines of development**:

A) From training abroad to capacity development at a broader scale, directly integrating the countries institutions and training on-site
B) From North-South collaborations to emphasising South-South collaborations and larger networks.

Further, the project is characterised by two approaches that can also be seen as **implementing principles**: One central aspect is the networking with institutions that play an important role in educating and training highly qualified professionals, carry out relevant research and extension activities and also contribute to evidence-based

policy making. Another central aspect is the focus on hands-on training in practical and soft skills that enriches the otherwise mostly knowledge-focussed programmes in the Eastern African region. All three projects (IPGL, CAPAQUA and AQUAHUB) build on these implementing principles and on one funding line. Therefore, AQUAHUB should not be considered as a stand-alone project but rather as **one phase of the long-term collaboration** between Austria and East African countries.

3.2 Capacity Development in the Education Sector (Context Analysis)

A key approach in AQUAHUB's Theory of Change is capacity development, both on the level of individual capacity and ultimately on the level of the institutional and systems capacity to manage water resources. In the following, the state of the art in the research on capacity development is presented.

In this regard, it can be stated that the focus on aid effectiveness and its central role in poverty reduction has led to a new consensus, that "capacity development is one of the most critical issues for both donors and partner countries" (OECD, 2006, p. 4), as articulated among others in the Paris Declaration on Aid Effectiveness (2005), the Accra Agenda for Action (2008) and the Busan Principles (2011). At the core of this consensus, according to Mizrahi, is the assumption that, "transference of resources from rich to poor countries, although important, is not sufficient to improve the performance of public and private organisations in developing countries" (Mizrahi, 2014). It is considered of equal importance that organisations in the developing countries enhance their capacity to utilise, manage and deploy their resources in order to achieve their strategic (development) objectives.

Although the central role of capacity development is new, the concept itself is not. Capacity and capacity development are pervasive concepts in international development cooperation since the late 1980s. However, according to Baser and Morgan this pervasiveness was not accompanied by a thorough understanding of 'capacity' as a concept, on the contrary, "for the most of the 1990s, both capacity as an outcome and capacity development as a process [...] attracted little in the way of serious research" (Baser and Morgan 2008, p. 7).

As a consequence, we are faced with a paradoxical situation where, on the one hand, capacity development is seen as a corner stone in development policies of donor countries and partner countries alike and a key element in achieving the Agenda 2030 and its Sustainable Development Goals, and, on the other hand, there is not even a broadly-accepted definition of what 'capacity' actually is. The commonly used definitions ranging from the narrow to the more holistic are:

1. "'capacity' [is] the ability of an organisation to produce appropriate outputs" (Boesen & Therkildsen, 2005, p. 3)
2. "'capacity' is that emergent combination of attributes, assets, capabilities and relationships that enables a human system to perform, survive and self-renew" (Morgan, 2006, p. 2-3).

Definitions of the first category define capacity as the ability of an individual, organisation or institution to perform certain predefined functions. At the core of these definitions is an understanding that there is some kind of existing norm regarding the performance of a given individual or organisation. 'Capacity development' is seen as a mean to the end of closing the gap between actual and desired performance (Baser and Morgan, 2008).

The more holistic definitions share a general understanding of 'capacity' as the product of the interplay of different elements in a system and as the overall ability of an organisation to deliver a service and to adapt to a changing context. Capacity development in these definitions is thus primarily seen as an end in itself and only secondary as a mean to a greater end (Baser and Morgan, 2008).

Capacity and capacity development as an end in itself

A starting point for the definition of capacity and capacity development according to the second definition is the theory and practice of complex adaptive systems (CAS). From the systems thinking perspective, cause and effect relationships are seen as multiple, delayed in time and place and non-linear.

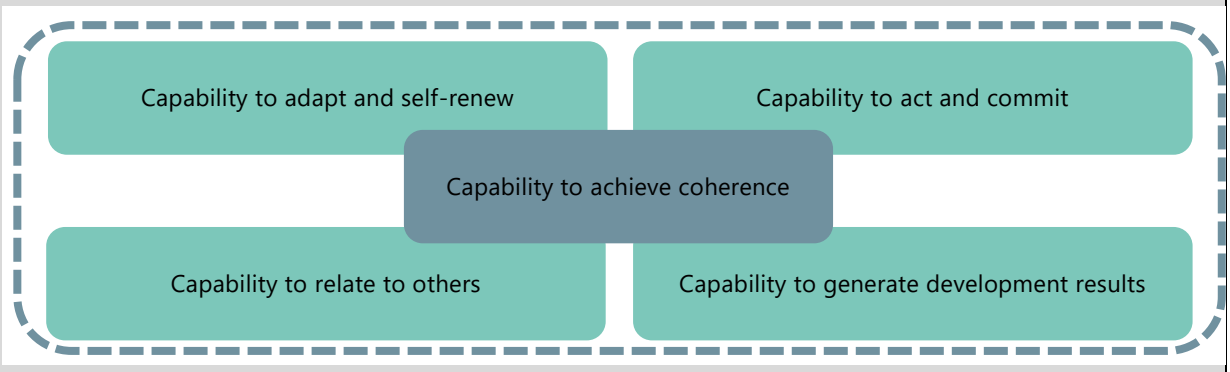
A central feature of the systems thinking perspective is the concept of 'emergence', understood as the process whereby "elements (of capacity) combine and interact over time to create a greater whole […]" (Morgan, 2006, p.3). This notion entails that capacity development outcomes cannot be engineered simply through the delivery of inputs (funding, expertise), but as a result of a complex interplay of system variables. As a consequence, outcomes remain uncertain and difficult to predict.

One model, which has already been widely used in the field of development cooperation – especially in the sector of university development cooperation –, is the 5C-Model of Morgan (Raetzell, 2012, Raetzell et al. 2018). The basic assumption in this model is that every organisation needs basic capabilities if it aims to achieve development goals. It is those capabilities that enable an organisation to fulfil a function ("to do things") and at the same time to sustain itself. The model thereby identifies "five core capabilities" in organisations and systems (Morgan, 2006, p. 8-19):

1 The **capability to act** is fundamental for an organisation to have volition, to choose between options, exert influence and to change and develop on the basis of strategic intent.
2 The **capability to generate development results** is closest to the core of the 'reductionist' capacity paradigm. In many cases this capability is to a high degree equated with effective performance management in the form of better service delivery. There are two interrelated types of development results: The first type of development result is improved capacity itself. The second type is programmatic, in the form of organisation-specific outputs and outcomes.
3 The **capability to relate to other actors** within the context in which a system functions is seen as imperative. To gain support and protection, form informal alliances and/or formal partnerships affects the legitimacy of the organisation and thus how effectively it can pursue its mandate.
4 The **capability to adopt and self-renew** affects the ability of an organisation or system to change and adapt to external or internal developments, new ideas and ultimately to learn.
5 The **capability to achieve coherence** relates to a central tension in all human systems, between the need to differentiate and diversify and the need to maintain a common strategic focus.

These five capabilities are separate but interdependent. Figure 1 shows the interdependence of the five capabilities with the capability to achieve coherence at the centre.

Figure 1: The five capabilities by Morgan



Source: Morgan 2006, adapted by Syspons 2021

Consulting the extensive literature on university development cooperation, it becomes apparent that capacity development is the paradigm of the day. Depending on the understanding of the term and their object and level of inquiry, some authors stress the need of a functioning system of tertiary education for a country's overall capacity development: Vincent-Lancrin states that "[...] tertiary education contributes to capacity development by training a country's workforce in all fields relevant to its development" (Vincent-Lancrin, 2007b, p. 31). Other authors focus on capacity development within the higher education system while investigating human capacity development in universities (Collins, 2011) or capacity development for research and training institutions (Young & Kannemeyer, 2001).

In addition to the general popularity of the concept in the development discourse, two developments contribute to the fact that university development cooperation institutions and cooperation agencies have turned to using capacity development as a guiding strategic principle.

First, developing and especially emerging economies have adjusted their university development cooperation strategies from classical, donor-oriented development cooperation to more self-sufficient and self-reliant forms of development in order to increase their university development cooperation capacity on their own. The formal untying of aid in 2000 has also triggered a development that encourages aid receiving countries to formulate their own development strategies and to continuously build up South-South partnerships instead of exclusively pursuing a classical North-South knowledge transfer (King, 2009).

Second, the financial constraints of many universities in the South and the fact that they face the threat of losing pace with the global knowledge economy requires clear and systematic solutions that provide answers on how to alleviate this situation and empower university development cooperation systems and research institutions in developing countries.

Against this background, international organisations and education services increasingly and explicitly aim at capacity development and incorporate up-to-date strategies derived from the practices of international development cooperation (Bo, Boeren & Maltha 2005; ADA 2009; Stephans 2009; Vincent-Lancrin 2007). They include:

- the alignment of tertiary education collaboration programmes with (bilateral) sectoral aid;
- an emphasis on programme support rather than projects;
- a shift from bilateral interventions to multi-lateral interventions;
- a focus on development and policy relevance in teaching and research;
- the stimulation of ownership in the South;
- a concentration on fewer countries;

- the introduction of tendering processes: enhancing competition in the North;
- the transfer of responsibility for programme administration to intermediary organisations;
- transparency in programme funding and accountability in international cooperation;
- budget controlling shifts from input to output financing;
- consortia formation both in the North and in the South;
- the untying of aid in tertiary education cooperation;
- a focus on demand orientation and ownership;
- context orientation and a focus on complementarity;
- results-orientation and the introduction of quality assurance, monitoring and evaluation systems.

However, it is important to note that there is still no comprehensively defined framework of capacity development measures in university development cooperation. Rather, the principles listed above are informed by other areas of international cooperation, such as financial and technical assistance, and have been adopted on the basis of best practice. While some education cooperation agencies, especially those in Northwest Europe, have been frontrunners in applying these principles for some years, others, for example in Austria and Germany, are gradually making use of them (ADA, 2009).

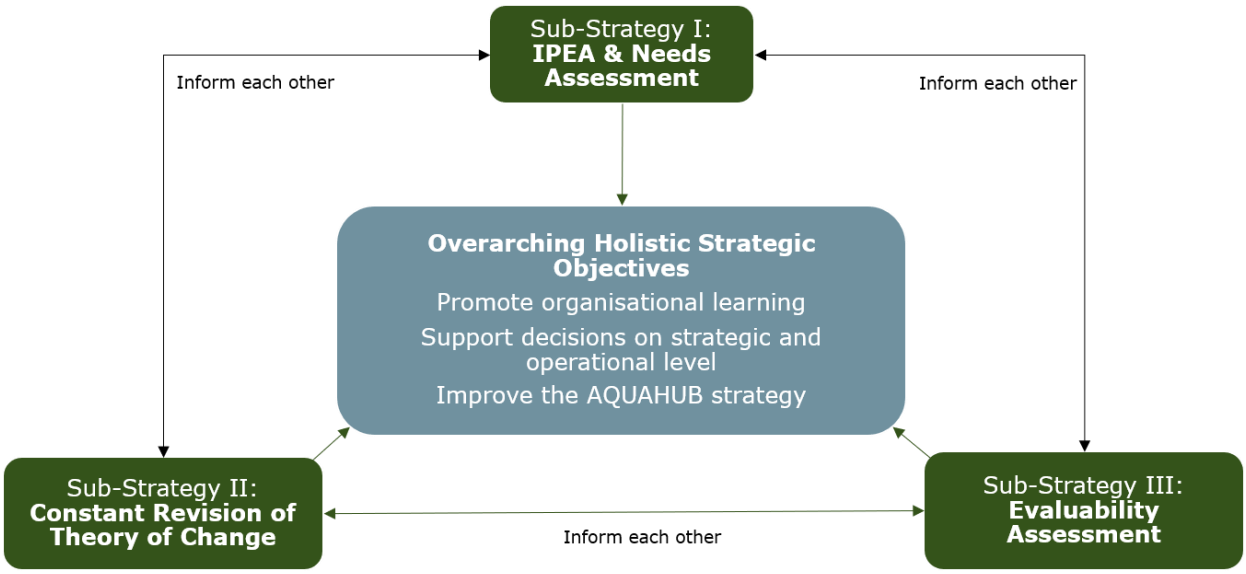
Regarding the impact of capacity development in university development cooperation, it still seems too early to make well-founded and general statements (Vincent-Lancrin, 2007). However, it is widely recognised that student and scholar mobility and its increase has allowed developing countries to access recent knowledge and research methodologies (Vincent-Lancrin, 2007) and there is evidence that the introduction of quality assurance systems as part of capacity development and international cooperation has already improved the quality of teaching and research in some developing countries (Hopper, 2007). To the best of our knowledge, no in-depth and broad impact evaluation has been carried out which systematically describes and analyses the impact of university development cooperation in the global south.

4 Design and Approach of the Assignment

4.1 Design

The assignment was based on a **holistic strategy** that takes into account the three overarching objectives stipulated in the Terms of Reference and at the same time allows for specific analytical foci to answer all the research questions. On the one hand it was therefore essential to develop **sub-strategies** for the three different analytical aspects to be able to robustly answer in detail the specific epistemological interests for each objective. In all three areas moreover, also the underlying nature of the AQUAHUB project as a capacity development project had to be taken into account. On the other hand, it was equally important to identify overarching themes and patterns in each of these three analytical aspects to be able to inform overarching learning processes in terms of capacity development and other aspects on strategic and operational level for the current project phase as well as the planned follow-on phase (see Figure 2).

Figure 2: Our Holistic Research Strategy



Source: Sypons, 2021

Sub-Strategy I

- We conducted an adapted **Integrated Policy Effectiveness Assessment (IPEA)** to answer the questions regarding the relevance and coherence of the different AQUAHUB interventions (sub-strategy I – objective 1). The conceptual approach behind IPEA assumes that the current situation regarding the AQUAHUB project and its capacity development interventions is influenced by other policies and interventions in the three focus countries Kenya, Uganda, and Ethiopia. The IPEA illustrates how the different policies and other interventions relate to each other and whether they support or hinder the achievement of the AQUAHUB's interventions, including **empirical observations** for the potential effectiveness of the AQUAHUB project. Moreover, to further support the IPEA, **data on the needs** of students, scholarship holders, potential employers and cooperation partners were collected to compare these to the AQUAHUB activities.

Sub-Strategy II

- Our outlined sub-strategy I for the relevance and coherence analysis of the AQUAHUB project as well as a state-of-the-art literature review on capacity development approaches and theories in higher education informed the revision of the current ToC of the project. The core element of our sub-strategy II was the **regular revision of the existing ToC** based on the insights obtained in the IPEA and interviews, focus groups and workshops. In order to provide a reliable basis for the upcoming impact evaluation, Syspons revised the ToC, answering to what extent it conceptualises **key change mechanisms**, captures the **most significant causal links** and which factors are **affecting the achievement of goals**.

Sub-Strategy III

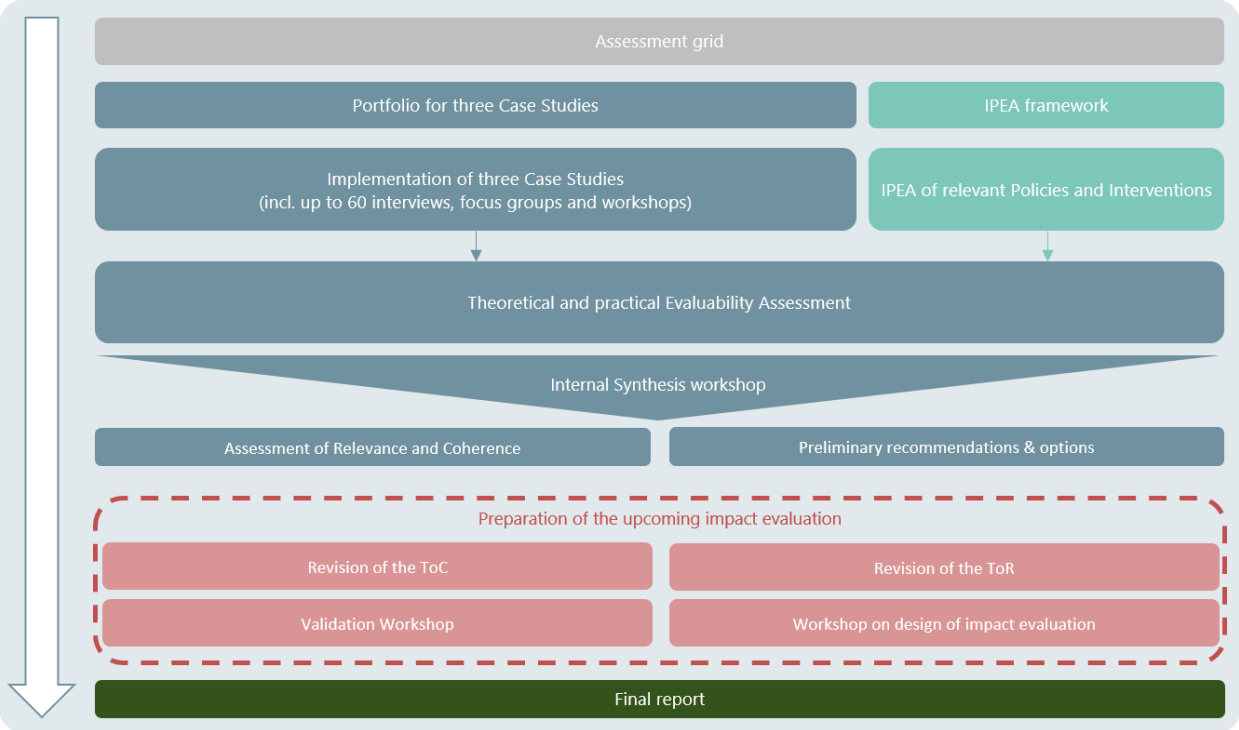
- To come up with an appropriate design for the foreseen impact assessment we conducted an **evaluability assessment** of the AQUAHUB project in general and particularly for its capacity development approach. We thereby distinguished between the **theoretical and practical evaluability** of the AQUAHUB project. While the theoretical evaluability assessment focused on the dimensions of underlying analysis of the intervention, its Theory of Change, the data availability and quality, and the proposed M&E System, the practical availability assessment focused on the evaluation context, the M&E system in practice and data availability and quality in

the field. The evaluability assessment was developed as a scoring system organised along different analytical dimension and assessment criteria (see annex 8.5). Moreover, to further support decision-making at the strategic and operational level, Syspons assessed the management response to the evaluation study 2018 and then analysed which elements remain relevant for the design of a next phase.

4.2 Methodological Approach

The methodological approach was structured along **three phases**. Starting with the **inception phase**, the objective was to get a detailed overview of the AQUAHUB project and to identify all relevant analytical aspects for the assignment. To this end, a **desk research** of key documents was conducted in order to gain a thorough understanding of the subject and to build the foundation for the following analytical steps. This included a literature review of state-of-the-art capacity development approaches and theories, which is summarised in chapter 3.2. Moreover, the desk research also involved a preliminary analysis of the policies and interventions in which AQUAHUB is operating in the three Eastern African countries. Simultaneously, seven in-depth semi-structured interviews with the representatives from BOKU, ADA, EGU, BDU, AAU, EIAR-NFALRC and Makerere University were conducted to gain a deeper understanding of the structures, objectives, relevance and coherence of the project. During the inception phase, a preliminary version of the ToC was drafted, an assessment grid (see annex 8.4) to structure our further methodological approach was developed, and a scoring system for the evaluability assessment of AQUAHUB was set up. These tools were the basis for the data collection phase and were therefore discussed first with BOKU and the other implementing partners in a workshop and incorporated into the inception report.

Figure 3: Overview of the data collection and reporting phases



Source: Syspons 2021

The objective the **data collection phase** was to build a representative and comprehensive data base for the assignment as well as to analyse and answer the research questions and criteria set out in the ToR. The core element of this phase was the implementation of **three case studies in Kenya, Ethiopia, and Uganda**. The objective of the

case studies was to collect the necessary data for the IPEA, the revision process of the ToC and the ToR as well as the evaluability assessment. During the case studies a wide arrange of stakeholders were included, such as project coordinators, faculty management at different institutions, academic and technical staff, representatives of other interventions or policies as well as alumni and current students.[2] As the Covid-19 Pandemic continued restricting international travel during our assignment, all case studies were conducted remotely.

After the case studies, the in-depth desk research and the evaluability assessment were completed, the **data analysis** started, which included the synthesis of the collected information and the triangulation of data, methods, and perspectives. The findings regarding the ToC were presented to BOKU and other relevant stakeholders in a validation workshop to come to a common understanding about a possible revision in the Theory of Change for the AQUAHUB project in the current and follow-up phase. Simultaneously, we used the results of the ToC development and the evaluability assessment to develop an appropriate design for the foreseen impact evaluation in 2022 that also allows for a potential publication of the results. Finally, a final **report** was drafted to document the relevance and coherence assessment, the revised ToC and the revised ToR for the planned impact evaluation. The findings were presented to BOKU and the other implementing partners in a workshop, which included discussions on suggested options and preliminary recommendations.

4.3 Limitations, Risks and Mitigation Measures

During the implementation of this assignment, three central limitations and risks were identified, and mitigation measures drafted and – if relevant - implemented

A **first limitation** concerns the analysis of the project's coherence through the IPEA matrix. A limitation exists due to the high number of existing policies and intervention in the three Eastern African countries. Accordingly, only a certain number of policies and intervention could be taken into account to enable a more in-depth analysis. The assignment confronted this limitation by working together with BOKU and its partners in Kenya, Ethiopia, and Uganda, who assessed the policies in terms of priority for AQUAHUB. Those policies rated as being of high priority for the project were then specifically addressed during the data collection phase.

A **second limitation** emerged during the implementation of the IPEA. During the interviews we were not able to collect specific knowledge on particular policies but rather mostly general insights into them. Moreover, those persons and stakeholders identified to be key interview partners for delineating the implementation practice of the selected policies did often not respond to our interview request.

The **third risk** is related to the timeframe of the assignment. In total, 5 weeks were available to prepare, organise, implement, and synthesise the interviews, workshops, and focus group discussions. To mitigate the risks, the project partners in each country were a key resource to organise and mobilise central interview partners. However, during the implementation, we experienced "no shows" and cancellations. If this had implications for the data analyses, this is pointed out in the relevant subsections.

[2] A list containing information on interview partners can be found in annex 8.3.2

5 Findings

5.1 Relevance and Coherence Assessment

5.1.1 IPEA

5.1.1.1 Methodology and Data Collection

An Integrated Policy Effectiveness Assessment (IPEA) was conducted to answer the questions regarding the relevance and coherence of the different AQUAHUB interventions. The conceptual approach behind IPEA assumes that the current situation regarding the AQUAHUB project and its capacity development interventions is influenced by policies in the three focus countries Kenya, Uganda, and Ethiopia. The IPEA illustrates how the different policies relate to each other and whether they support or hinder the achievement of the AQUAHUB interventions. Besides the policy-based perspective, the IPEA also includes empirical observations on the potential effectiveness of the AQUAHUB project that can inform an assessment and potential revision of the existing ToC.

Policies were identified by conducting an explorative desk research and in the explorative interviews during the inception phase. They were then prioritised according to their currentness, their respective field (i.e. education, land management) and their potential to support or undermine the AQUAHUB project. This prioritisation was validated and, where necessary, adapted following feedback by the AQUAHUB project coordinators. Subsequently, our analysis focussed on those policies that were considered of High importance. It is noteworthy that the resulting sample of policies does not include many economic policies. Apart from the national development plans, most policies and regulations have an education or biodiversity focus.

The IPEA to analyse the selected policies and interventions followed the suggested framework by Jacob et al. (2019) that we adapted to the AQUAHUB context. It includes an examination of the point of intervention, the assumed causal mechanism, the policy instrument, the implementation and practical significance as well as to what extent the policy or intervention is aligned with AQUAHUB. Data for the assessment was collected through a document analysis of the policies themselves and other secondary data (e.g. government reports, INGO reports, academic literature) and through interviews with project coordinators, university staff, and stakeholder institutions in the field of the sustainable management of aquatic resources in Eastern Africa.

Additionally, in the aforementioned interviews and focus groups, we collected data on the needs of students, scholarship holders, potential employers and cooperation partners to compare these to the AQUAHUB activities and answer questions regarding the relevance of the intervention.

Data collection proved challenging. From 69 requested interviews, 30 interview partners did not respond to our requests, were not able to make time or did not appear at the scheduled time, often without prior notice or later explanation. While we were able to reschedule some of the no-show interviews, the majority could not be rescheduled without causing major delays in the timeline of this assessment. Additionally, not all interviewees were in a position to adequately comment on individual policies which further made it difficult to assess their practical significance and status of implementation. Lastly, the interviews generated little information about other similar interventions and/or exact details (donor, scope, approach, etc.) about them. Where possible, secondary sources were used to complement the collected data.

5.1.1.2 Overall Findings

The analysed policies, government strategies and legal frameworks generally create a favourable environment for the AQUAHUB project and the project's Theory of Change is well-aligned with national and regional priorities. While important differences exist between the three analysed countries, all countries are investing in the sustainable utilisation of natural resources, access to and quality of higher education, the expansion of high-quality and practice-oriented research and research collaborations, and the increased use of evidence-based policy making.

Recent policies display a strong alignment with the Sustainable Development Goals (SDGs) and regional policies. Most strategies and plans are currently written in reference to the SDGs and/or their operationalisation into Regional and National Development Plans. The "visions", i.e. Kenya Vision 2030 and Uganda Vision 2040, and the Ethiopian Growth and Transformation Plan are central pillars in their respective policy environments and are used to align all efforts towards joint goals. Here, a strong harmonisation can be observed which, in turn, allows projects like AQUAHUB to equally align their approach and priorities.

At the same time, an overarching tension between economic development, infrastructure investments, poverty eradication, and wealth generation on one side and the conservation and protection of the natural environment is common to all countries in the region. One policy may be boosting production and the exploitation of the wetlands while another may favour conservation. As analysed further below, the countries have found different ways of attempting to manage these trade-offs. Generally, emphasis on the sustainable use of resources and environmental protection is strong in policies and strategies, but interviewees across the analysed countries raised concerns about the effects of economic activities, such as an excessive expansion of aquaculture, oil exploitation off the coast or water usage of export-oriented floriculture around Lake Naivasha. In some of these cases, the existing policies and regulations may not be the problem but rather the lack of additional ones.

In other cases, policies and regulations may be in place but implementation and enforcement may be insufficient. Broad strategies and national plans can act as a guiding star but, unless clearly operationalised and mainstreamed, can have limited practical significance. Coding priorities into laws and other regulations, especially those that create oversight bodies, offer more enforceability and give the relevant authorities the power to assert them. However, in practice there may still exist many ways and informal deals to circumvent these laws and, while setting important framework conditions, regulations generally do not incentivise forward-looking development and transformation.

Spun positively, as seen by some interviewees, even unsustainable policies and practices can become an opportunity for AQUAHUB's participating institutions as they can conduct research on and raise awareness about the consequences of these policies. They can become real-life objects of study. Through the exchange with ministries and other policy-making institutions or by educating the next generation of policymakers on these consequences, these policies and practices offer AQUAHUB the opportunity to produce relevant and impactful research.

For AQUAHUB, policies become particularly helpful when they create an enabling environment for relevant activities. When policies create or are used to direct funding opportunities, they create immediate impact through the financing of research and development and can serve research institutions as a base to justify and promote their studies. In discussions with local communities and authorities they can provide an effective framework and rationale for researchers to become engaged with local needs and realities.

Interviewees reported, however, that public awareness of these policies, especially in local communities living adjacent to or within aquatic ecosystems is often low. Even across interviewees, knowledge of and familiarity with the different policies was starkly different. As reasons it was identified that some policies and regulations are too technical to be understood by the general population and that, in many cases, news about relevant policies just does not reach the relevant actors. Low public awareness reduces policy effectiveness and may present challenges to the AQUAHUB project when working with local communities.

The regional and national policies and strategies on education and research are generally favourable towards AQUAHUB. All countries want to make substantial investments into access to higher education and into strengthening research. This includes, in particular, the aim to achieve an increased number of graduates with a PhD or master's degree. As some interviewees noted, however, the focus on access, i.e. an increased number of institutions and students, can be detrimental to the quality of education. AQUAHUB combines both of these aspects as it aims to provide high-quality education in fully-funded Master's programmes and is therefore strongly aligned with national and regional priorities. The possibility to add a PhD-programme is planned to be discussed in the further project planning and could further heighten AQUAHUB's coherence.

An aspect outside of the scope of this assignment is the regional and cross-country harmonisation of key policies, especially around shared water bodies such as Lake Victoria. The effectiveness of national policies can be strongly reduced by conflicting priorities. The status of and opportunities for policy alignment across neighbouring countries deserves further study.

Interventions that support or undermine AQUAHUB exhibit the same conflict between economic/infrastructure development and the sustainable use of natural resources.

Big infrastructure programs, the construction of dams for hydropower, the development of the oil sector, and harmful industrial practices (e.g. insufficient control of environmental pollution) can all threaten AQUAHUB's impact in promoting sustainability. Similarly, while the expansion of aquaculture was generally seen positively, some interviewees warned that a continued increase in fish production could create imbalances in the aquatic ecosystems through increased fish excrements.

There are also a number of non-governmental or inter-governmental organisations that promote environmental protection and/or the sustainable use of natural resources.

The Global Green Growth Institute is a treaty-based international inter-governmental organisation that aims to reconcile economic development with long-term sustainability and thus attempts to overcome the mentioned conflict. While it does not have a country programme in Kenya, it has been active in Ethiopia and Uganda and supports the government in the development and implementation of green and climate resilient economic strategies.

The Lake Victoria Fisheries Organisation is an institution of the East African Community and aims to promote the sustainable management of the fisheries and aquacultures in the region through cooperation, harmonisation of national activities, and development and adoption of conservation and management measures in the countries around Lake Victoria. Simillarly, the World Bank fincanced Lake Victoria Environment Management Project has been running since 1996 and aims to support regional cooperation, resarch and monitoring on the shared water bodies (GEF, 2021, online)

Numerous other organisations exist that focus on particular issues, such as wildlife organisations or wetland protection organisations.

In the academic sector, a number of similar interventions exist as national univerisities and research institutions have scholarship programmes which fund PhD students. In the same vein, Austria's APPEAR programme presents a big opportunity to complement AQUAHUB in funding collaborative and innovative projects that respond to a local need. Furthermore, there exist a number of direct collaborations between African and European universities, for example joint research projects between Delft University and Addis Ababa University. However, no comparable joint-degree programmes exist between European and Eastern African universities. Supporting research and academia, the IMF has provides loans to support Kenya's development of its (higher) education sector, and UNESCO's Intergovernmental Hydrological Programme is supporting water research and management, and related education and capacity development.

5.1.1.3 Ethiopia

The key guiding policy in the Ethiopian context is the Growth and Transformation Plan II which was adopted in May 2016. Since GTPII covers the years 2016-2020 it is currently being revised into GTP III. The plan lays out a comprehensive vision for development and reform of Ethiopian society, economy, and governance and includes the following key areas of intervention: economic growth and development, productive capacity and efficiency, domestic private sector, domestic construction industry and infrastructure, urbanisation, human development and technological capacity building, governance, women and youth empowerment, and green economy. As it is a comprehensive plan, it holds in it the trade-offs between infrastructure investments and economic growth on one hand and sustainability and investment into a climate resilient green economy and sustainable urbanisation on the other hand. Unlike other national strategies, it does not attempt to harmonise these aspects, neither does it give clear precedence to one or the other, although the mainstreaming of the green economy agenda is envisioned.

The AQUAHUB project fits well into the goals of building human capital and strengthening education and research and development activities. In particular, the plan aims to promote research institutions that work on green economy. Aquatic resources or the blue economy do not play a prominent role and are not given particular importance. Water is mostly seen in the context of irrigation and (drinking) water supply.

More explicitly related to the sustainable management of aquatic ecosystems are the national government's Revised National Biodiversity Strategy and Action Plan (based on the Convention on Biological Diversity and adopted in 2014) and the Fisheries Development and Utilization Proclamation (adopted in 2003). Both documents attempt to harmonize the conservation of biodiversity and aquatic ecosystems with the expansion of human use through fishing, aquaculture, and other water-related activities. The proclamation creates the legal framework while the Revised National Biodiversity Strategy and Action Plan aims to raise awareness about biodiversity loss, promote sustainable practices and use of resources, expand protection and conservation efforts, promote value-addition to agro-biodiversity species and products, and mainstream biodiversity protection in policies and laws. Furthermore, it wants to provide tangible benefits of biodiversity to the population, including job creation, and improve knowledge and information exchange between stakeholders. To this end, it established biodiversity focal points (councils, committees, units), a clearing house mechanism and a database linked to the conducting and use of research. This focus on research and a better understanding of biodiversity offers many opportunities for the AQUAHUB project to conduct impactful research. Until 2019, progress towards the set goals was moderate with some aspects on track to achieving the targets while other displayed no significant change. While the legal framework has been updated and conservation efforts have been successful in some areas, public awareness and biodiversity mainstreaming are still lagging (CHM, 2019). Habitat conversion, unsustainable utilization of biodiversity resources, invasive species, replacement of local varieties and breeds, climate change, and pollution remain the central threats to biodiversity and demographic change; poverty, and lack of awareness and coordination further contribute to the situation. Aquatic ecosystems are particularly at risk of being polluted. The track record in knowledge generation, innovation and the compiling of existing (indigenous) knowledge is also mixed.

The Education Sector Development Programmes (ESDP) of the Ethiopian Government, which target the overall system of higher education, including institutions as well as the academic programmes, are the basis for reform and development in the area of higher education. Since 1997, the ESDPs have been continuously updated: the most recent one being ESDP V, which covers the years 2015/16 until 2019/20. The ESDP's strategy includes an intensive expansion policy, increasing the number of students rose from 30.000 enrolled in public HEIs in 1997 to 375.000 studying at public and private Higher Education Institutions in 2010 (Yizengaw, 2005, 1). Moreover, new degree courses were introduced in line with the strategy to align education with labour market needs.

Although the reform agenda led to measurable successes, the most noticeable challenge is still to increase equal access to and quality in higher education (World Bank, 2020). An enormous need for staff upgrading at universities

was identified as a consequence of the increased number of higher university institutions, degree programmes and student numbers (Saint, 2004, 93-94).

The Ethiopian reform efforts in the education sector are accompanied by measures and policies in the field of science and technology, which are linked to the goal of economic growth and development. In terms of science and technology, Ethiopia has been steering its development through a National Science, Technology and Innovation Policy. The policy was ratified in 2012 and in general terms aims at increasing the national capabilities to learn, adapt and utilise technologies and creating national innovation systems. Critical issues identified encompass – among others – technology transfer, human resource development, research, universities, financing and incentive schemes. The Ethiopian government's Higher Education Proclamation stresses that research should be focused on knowledge and technology transfer that is consistent with the country's priority needs. In line with this, the Ethiopian government acknowledges that research has to be promoted and has to be a central objective of higher education institutions. In addition, the proclamation includes that "undertaking and encouraging relevant studies, research and community service in national and local priority areas and disseminating the findings as well as undertaking, as may be necessary, joint academic and research projects with national and foreign institutions or research centers, are responsibilities of higher education institutions" (Mamo et al 2014).

5.1.1.4 Uganda

Uganda stands out as a country with a very active policy-making community. Recent years have seen a wave of new and revised policies on almost every aspect of Ugandan life. Selection the most relevant policies was thus especially challenging.

Central to the further development of Uganda is the Uganda Vision 2040, adopted in 2013, a comprehensive national strategy to achieve the vision of "a transformed Ugandan society from a peasant to a modern and prosperous country within 30 years" (Republic of Uganda, 2013). It is conceptualised around opportunities and fundamentals which are expected to, jointly, bring the country forward. Opportunities include tourism, agriculture, oil and gas, minerals, abundant labour force, industrialisation, knowledge and ICT sector, geographical location and trade opportunities, and water resources. On the other hand, fundamentals are infrastructure (energy, transport, water, oil and gas and ICT), Science, Technology, Engineering and Innovation (STEI), land, urban development, human resource, and peace, security and defence. Generally, the vision exhibits a strong emphasis on economic and infrastructure development, in particular with regards to the extractive industries, energy, and water for production. These are all areas with a high (potential) negative impact on biodiversity and the environment in general and can thus undermine AQUAHUB's efforts in promoting the sustainable management of aquatic resources. At the same time, the vision also foresees investments into the sustainable utilisation of aquatic resources and an increase wetland cover. However, in comparison to the economic aspect, the environmental perspective is rather weak. A recent world bank report finds that Uganda's natural capital has continued to deplete, including its wetlands (World Bank, 2021). It identifies agriculture, Uganda's main economic driver with 25% of GDP and 70% employment, and the demand for biomass for energy as major culprits.

In response to some of these challenges, in recent years various policies and laws have focussed on the environmental aspect of development whose impact and relevance for the AQUAHUB project still remain to be seen. The Fisheries and Aquaculture Bill, which was passed by the parliament but is yet to be signed by the president, aims to improve the management of fisheries and aquaculture and promote control, regulation and coordination of the sector. It aims to both further promote the utilisation of aquatic resources and technological innovation as well as clear guidelines for public participation, quality and safety of fish and fishery products. It encourages research-based decision making and the sharing of information and data. Similarly, the Green Economy Strategy and Implementation Plan emphasises that a green and sustainable economy will lead to faster economic growth and result in higher agricultural yields than the conventional model. To that end, it combines the sustainable use of

aquatic resources and investments in higher education to create and fill more green jobs and is thus in line with the National Biodiversity Strategy and Action II (adopted 2016) that sees the preservation of biodiversity as a necessary condition for national development and poverty eradication. Therefore, it aims to strengthen stakeholder coordination and biodiversity management, and build capacity in research, monitoring, and information management.

The educational and research aspect is aligned with the Uganda Vision 2040 which aims to improve education and invest into research for Uganda to become a centre of excellence for education in the region, especially in the STEI sector. The higher education sector in Uganda is ruled by the Universities and Other Tertiary Institutions Act which has established the National Council for Higher Education and sets clear legal standards for higher education. These standards are important guidelines to any higher education programme and also support cross-institutional management and collaboration. The AQUAHUB Theory of Change is thus well aligned with these educational and research priorities.

5.1.1.5 Kenya

In 2008, Kenya launched its Vision 2030. Based on a three-pillar strategy it aims to boost economic, social, and political development. Specifically it intends to build sustained economic growth, a just and cohesive society in a clean and secure environment and issue-based, people-centered, result-oriented and accountable democratic political to create a globally competitive and prosperous nation with a high quality of life. To this end, it aims to achieve a macroeconomic stability plan, governance reforms, infrastructure, energy and energy efficiency investments, an STI framework, land reform, human resources development, improved security services and public sector reform. When it comes to AQUAHUB, the Vision has gained high importance as all government agencies are required to streamline their work to the Vision's priorities. This includes, for example, the Kenyan Marine and Fisheries Research Institute that has to align all of their activities and research to the Vision. Furthermore, any research project receiving public funding needs to argue how it relates to and further the Vision. While there is no particular focus on aquatic resources, under the social pillar of the policy, the Kenyan Government aims to protect the natural environment and invest in higher education. While there is no explicit emphasis on aquatic resources, the government is currently financing stimulus programmes for fisheries and agriculture, which open opportunities for research and are also in line with the National Oceans and Fisheries Policy. This policy puts a strong emphasis on conservation, education, and research and is therefore strongly favourable to AQUAHUB.

Two further important policies to the AQUAHUB project are the National Biodiversity Strategy and Action Plan which focusses on the management of biodiversity and the Green Economy Strategy and Implementation Plan. While the latter focusses on harmonising economic growth, the promotion of the sustainable utilisation of natural resources, capacity building, and the creation of green jobs, the former puts a strong emphasis on the link between community empowerment, education, research, monitoring, and biodiversity. They both stress the importance of high-quality research and education and offer bountiful opportunities for conducting research. The aspect of community participation and empowerment could be further strengthened in the AQUAHUB programme to align even better with these policies.

Implementation still runs into challenges. There may, for example, be financial incentives for smallholder farmers to adopt certain practices, but the governmental extension services are lacking capacity to reach all potential beneficiaries. This can present itself as an opportunity to universities and programmes like AQUAHUB. If they are able to support these farmers by linking them to a Master's student, they can conduct a needs' assessment and develop a thesis based on these needs. In the interviews, however, we found that the results from the student's research do not always find their way back to the community.

In 2019, the Ministry of Education has passed the Policy Framework for Reforming Education and Training for Sustainable Development in Kenya. In an ambitious project, it foresees a reform of the entire education structure and a review of all education policies. It aims to expand access to university education, transform the educational approach to competency-based teaching, and to further invest into research. Since this is still a young policy, its effects are yet to be fully seen. Its further implementation will have to be monitored closely by the AQUAHUB team to gauge how it may provide opportunities for their research and how it may affect how master programmes will have to be run.

5.1.2 Relevance

In light of the policies analysed above and the challenges faced in the three countries with regards to the sustainable management of aquatic resources, it becomes clear that the knowledge being produced and transmitted in the AQUAHUB project is extremely valuable to the current situation in the local context, especially to harmonise the need for further economic development with the need for conservation of the environment. In our interviews and discussions, all stakeholders, including students, alumni, academic staff, and potential employers, agreed that the content of the Master's programmes is extremely relevant as more information on and knowledge of biodiversity and conservation is needed and more action needs to be taken. Asked in detail, some interview partners valued higher the academic aspects of the programme, i.e., the research project, the lab experience, or the publication support, while others focussed more on the acquired soft skills in conducting research, networking, or engaging with stakeholders. Some alumni wished that the aspect of ecosystem *management* would be further strengthened to prepare better for jobs outside of academia.

Similarly, the employability of graduates of the master's programmes is very high as highly-skilled people with a high-quality education are still needed in the sector. AQUAHUB graduates have a very good mixture of theoretical and hands-on skills. They have more exposure to different contexts than graduates from local programmes and more local expertise in conducting research and locally-relevant knowledge than graduates from other international programmes.

However, although a need for more human capacity was clearly identified, graduates also reported about difficulties to find a job, especially those who did not pursue a PhD after their Master's programme. Furthermore, some students in the AQUAHUB are already connected to institutions (e.g. as graduate assistants). For them, AQUAHUB does not necessarily improve their job prospects but the completion of a Master's programme is a requirement for them to stay employed.

The financial support provided by the AQUAHUB project is central to the project's success. All interviewed students reported that without the financial support they would not have been able to take up a Master's programme – or only at a much later stage in their career. Particularly important is hereby the available budget for the thesis project as in some cases other funds may also be available but their approval would be a very complicated and drawn-out process. Within AQUAHUB the funding enables the students to produce high-quality and relevant research findings.

The non-financial support within AQUAHUB provides the students with the ability to find supervisors that are able to support them in their needs and the exposure to different contexts. Furthermore, the chance to network with many different stakeholders was seen as a major differentiating factor to other programmes. The LWM masters was hereby seen as particularly successful. Due to the global pandemic, recent graduates of the programme have been missing that exposure.

Working with other research institutions and with local communities, and tying it to national policies and strategies makes the final research projects very relevant to the local realities. However, in some cases, the impact of the

findings could be further strengthened through a better dissemination to the local population and relevant authorities.

5.1.3 Overall Conclusions Relevance and Coherence

The focus, approach, and curricuclum of the AQUAHUB project are generally very relevant to the local context and exhibit a strong coherence with local policies and priorities. The knowledge and skills acquired during the Master's programmes are seen as being relevant to the local job market, both by the graduates and by potential employers. The quality of the programme and the broad set of skills (both academic and soft skills) were especially mentioned by employers. The financial and non-monetary support, the exposure to other contexts, and the ability to network with many different stakeholders are particularly relevant to the students' personal and professional development. Adding a PhD programme, individual PhD classes, or other support for PhD students could further increase AQUAHUB's relevance for students and the local job market as the rising number of Master degree graduates is creating the need for further staff upgrading in universities and research institutions.

In its curriculum and positioning, the AQUAHUB project could further strengthen the link between economic development, human use, and conservation of natural resources as a constant and potentially increasing area of tension in all countries. Through its expertise in the sustainable management of aquatic resources and its well-qualified graduates, it can make valuable contributions to the harmonisation of these seemingly competing goals. Similarly, the area of community engagement and the dissemination of research findings to local communities could be further strengthened to achieve higher coherence with current policies that put particular emphasis on such activities. Additionally, a stronger strategic focus on reaching the policymaking community and influencing future policies through publications, networking, and the project's graduates would allow the project to shape a beneficial policy environment and thus increase both coherence as well as effectiveness.

Implications for the Impact Assessment:

- *Supporting and hindering factors:* As described above, various potentially supportive, but also a number of potentially hindering policies and interventions were identified by the IPEA and especially the trade-offs between economic and infrastructure development and environmental sustainability may impact the project's goal attainment. In the impact assessment, detailed data on implementation and practical relevance should be collected to test in how far the current policy environment is acting as a moderating factor for selected causal hypotheses and to what extent synergies or friction exist between AQUAHUB and other interventions. This will allow the validation of these hypotheses and of the attribution of observed changes to the AQUAHUB project. In cases where the desired objective may not be (fully) reached, reasons for the absence of expected impacts should be identified.

5.2 Analysis of the Theory of Change

The current ToC and approach of AQUAHUB is the one that is most relevant for this assignment as it encompasses the entire development of the project and subsumes all earlier components (IPLG, CAPAQUA). The AQUAHUB ToC has been adapted over the course of the project and was developed further in three main steps: First, as part of an evaluation in 2018, the consulting institute CEval developed a ToC for AQUAHUB. This ToC has then been slightly adjusted as part of the project proposal for the current project phase. The third revision of the ToC involved several stakeholders of the project who developed the current ToC in multiple workshops with the aim to encompass the entire project, including assumptions as a preparation for the upcoming impact evaluation.

For this assignment, we will rely on the second and third version of the ToC and further use the following definitions to differentiate between the different levels of the ToC:

- **Inputs / activities:** "the financial, human, and material resources used for the development intervention" (defined according to the OECD-DAC, 2010, p. 25)
- **Outputs:** "the products, capital goods and services which result from a development intervention" (Ibid., p. 28)
- **Outcomes:** "the likely or achieved short-term and medium-term effects of an intervention's outputs." (Ibid., p. 28)
- **Impacts:** "positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended" (Ibid., p. 24)

Regarding the objectives of AQUAHUB, the ToC differentiates between **two levels of impact**, a final impact level and a preparatory impact level. At the final **impact level**, the goal of the project is to foster the conservation and sustainable management of aquatic ecosystems and their resources in order to improve livelihoods in Eastern Africa and to advance the achievement of several Sustainable Development Goals (SDGs) in the long-term: AQUAHUB aims to contribute to *Zero Hunger (SDG 2)* by enhancing the productivity and incomes from aquaculture and fisheries. *Good Health and Well-Being (SDG 3)* is supported by reducing deaths and illnesses from hazardous chemicals as well as air, water & soil pollution and contamination. AQUAHUB further aims to contribute to *Quality Education (SGD 4)* by providing relevant and accessible higher education of good quality as well as to *Clean Water and Sanitation (SDG 6)* by improving water quality, and protect and restore water-related ecosystems. By spreading information and awareness for sustainable development, AQUAHUB targets *Responsible Consumption and Production (SDG 12)*. In addition, it aims to support *Climate Action (SDG 13)* by an improved education, awareness, and capacity and wants to improve *Life on Land (SDG 15)* by supporting conservation, restoration, and sustainable management of freshwater ecosystems and preventing degradation of natural habitats and biodiversity. Finally, it focusses on *Partnerships for the Goals (SDG 17)* by enhancing cooperation in science, technology, and innovation.

At the **preparatory impact level,** and in order to achieve the envisioned contribution to the SDGs as described above, AQUAHUB wants to achieve two preceding objectives which are: An enhanced (1) individual and (2) institutional visibility and prestige by former students and Eastern African HEST institutions to contribute to the sustainable management of aquatic ecosystems and their resources in Eastern African countries and effectively initiate change processes in policy making as well as attitudes and practices in society.

To achieve its long-term impacts, the AQUAHUB project has several objectives at the **outcome level**, which are supported by respective **outputs** that can be formulated as impact hypotheses. The following analysis takes an in-depth look at all six outcome areas of AQUAHUB. Firstly, each of the following chapters contains information about the intended impact hypotheses, which are summed up the grey boxes. Secondly, this is followed by a plausibility analysis to examine to what extent the project ToC captures the most significant causal links between outputs and outcomes, including the key processes and mechanisms delivering change. To this end, the data collected in the case study countries and information from the project reporting and monitoring were used. Thirdly, each chapter includes concluding information about how outcomes of the project ToC could be tested, measured and documented through evaluation activities of the foreseen impact assessment. A visualisation of the proposed final ToC is offered in annex 8.1 of this report.

Implications for the Impact Assessment:
The revised ToC should be the basis of an impact assessment und will lead to adaptations within the following sections of the ToR:

- Chapter 1.3 Project Strategy (overall objective and projects outcomes)
- Chapter 1.4 Project Activities
- Chapter 5. Specific Questions

Finally, it is important to underline that **we did not conduct an analysis of the project's effectiveness or impact**. We are therefore not aiming to find out to what extent the project has reached its objectives. Rather we analysed the extent to which the collected data points out to plausibility strengths and weaknesses of the impact hypotheses and assumptions.

5.2.1 Analysis of Outcome 1

1 Outcome 1: High quality joint-degree master's programmes for the sustainable management of aquatic ecosystems in Eastern Africa are established…

- if the international joint-degree Master's programme in "Limnology & Wetland Management (LWM)" is positioned as a regional flag-ship programme in Eastern Africa **(Output 1)**
- if the Master's programme "Aquatic Ecosystems & Environmental Management (AEEM)" is extended to an Eastern African joint degree master's programme, implemented by Addis Ababa University, Bahir Dar University, EIAR-NFALRC and Egerton University **(Output 2)**
- if the LWM and AEEM programmes follow international standards to ensure a high quality (i.e., Bologna & following declarations, skill-oriented curriculum, student centred teaching approach) (**Output 3**)

The collected data on this outcome area **support the general plausibility** of the links between the described outputs and the outcome, although also some limitations came to light during the case studies.

The project has successfully established the LWM and the AEEM programmes, which is reflected in already having graduates that have obtained the corresponding academic degrees. This result was, in the eyes of the interviewees, overall achieved mainly due to three factors: First, the programmes are the result of a continuous collaboration between partners and support by ADA/BOKU over many years, that included a shift in responsibilities over time and expanded the roles of the Southern partners. Second, the active involvement of faculty management was described as a key influential factor, as it helped develop a sense of ownership for the programmes in the hierarchy of the partner institutions. Finally, the third factor mentioned was the capability to act (e.g., to deliver modules and courses), to adapt (e.g., to establish learning mechanisms), and relate (e.g., to foster outreach activities to key resource persons in the field) of the participating universities.

Moreover, the scholarship holders and alumni interviewed were very satisfied with the master's programmes and reported to have been able to develop their academic, research, and practical skills and to find employment. They hereby emphasised the quality of the teaching and the opportunities offered to apply these skills during e.g., lab work and their master's theses. This holds true for scholarship holders interviewed in the three case study countries. In this regard, students positively described the opportunities offered by the e-learning activities in the context of the current COVID-19 pandemic, notwithstanding also pointing out to challenges related to connectivity and didactics.

While all interviewees from the partner universities moreover acknowledged that the master's programmes can be described as established, individual interviewees also mentioned the need to further cement the study programmes by increasing the number of scholarship holders and students. Asked about how to improve the programmes in the future, these interviewees mentioned the need to increase the number of students and scholarships, especially referring to AEEM, and emphasized two aspects. First, according to the interviewees, there would be sufficient demand for granting access and support to additional students with excellent backgrounds. They hereby referred to the application numbers and the highly competitive selection process that only grants access to a rather small number of students. Second, they also referred to the number of students as a mean to increase the visibility and the impact of AEEM, both within the universities and towards other stakeholders. In this regard, individual

interviewees also mentioned the need to increase the student numbers a mean to secure sustainability of the AEEM programme in the mid- and long-term.

Furthermore, some divergent views were noticeable, with regards to the understanding about what the positioning of the master's programmes as "regional flag ships" in the field of aquatic ecosystem management actually entails. While all interview partners understood this as achieving visibility and a high academic and research reputation of both programmes, their views differed on the specific features that would make the programmes unique (e.g., in comparison better quality of teaching, hands-on research training, etc.). In line with this, some interviewees struggled to describe with certainty in the interviews, why these programmes might be delivering graduates that are better qualified then those graduating from other institutions or master's programmes or even the same institutions from a similar academic field. These results point to the need for an expansion of network and marketing activities and to a possible interlinkage to output 5 and 7, that address network and awareness creation in the field of the sustainable management of aquatic ecosystems.

Finally, the international standards are seen as the most important impact mechanism to ensure the quality and reputation of both programmes. Overall, the quality of both programmes was assessed positively by lecturers and students. Moreover, the quality of the courses offered by Egerton University were specifically mentioned to be of high quality, which was argued by referring to its role on "equal footing" within the LWM programme and the ECTS modules offered. With regards to AEEM, international standards were mostly referred to by interviewees by pointing out the quality assurance role of BOKU and the activities conducted by the Joint Management Committee of the programme. Overall, however, it remained rather unclear what precisely is defined as international standards in the context of the project[3]. Terms that were not used by interviewees, but can be found in the project documents, were e.g., skill-orientated curriculum, and student-centred teaching.

Conclusions with regards to the future project strategy and design, as well the upcoming impact assessment of AQUAHUB:

- *Definition of "regional flagship programme"*: an operationalisation of what is understood under a regional flagship programme is needed. Our current understanding would be, that regionality is mostly to be understood as "within Eastern Africa" and in the main countries Kenya and Ethiopia, and to some extent Uganda. However, as students from other countries are also included, although to a lesser extent, the understanding of regionality could also be expanded. This is important, as it can influence aspects such as outreach activities and impact intentions. Furthermore, the reference as a flagship alludes generally to features like quantity of modules and topics offered, quality of teaching and research (incl. completeness and uniqueness of the offered programme content), exclusiveness in terms of access, prestige for those involved (e.g., for graduates, lecturers, and researchers as well as the institutions), and an implementation that is measured by best international standards (e.g., such as external accreditations)[4].
- *Understanding of when programmes can be considered as "established"*: some findings point to the sustainability of the master's programmes. Accordingly, the term "established" can refer not only to having functioning programmes that already have delivered graduates, but also to the degree of institutionalisation of curricula, processes, structures, and tools as well as to the degree of self-sustaining financial and administrative aspects should the external financial support be reduced in the future.

[3] According to BOKU project members, international standards of the project can be defined by the following aspects: Curriculum structure and processes as to Bologna standards; student-centred teaching approach and skill-oriented curriculum; external accreditaion processes; international standards for quality assurance processes; quality of research output from MSc theses according to internationa l standards.

[4] Further ideas to operationalise the definition of a "regional flagship programme" have been proposed by BOKU project members and relate to a) quality of the curriculum, teaching, research & mentorship for students and graduates; b) delivery of high quality graduates competent to as the 5C model in capacity development; c) quality assurance measures such as accreditation via external agencies & annual internal evaluations.

- *International standards*: the term "international standards" needs to be demarked more specifically. On the one hand in the project documents this term is further described by referring to the Bologna and following declarations, skill-orientated curriculum, and student-centred teaching approach. On the other hand, interviewees would point in another direction.
- *Institutional Capacities:* with regards to the aspect of institutional capacity development, further topics could be addressed and tested in a future evaluation. Especially the aspects of diving into how the programmes might have triggered and supported capacities to act, adapt, and relate in the participating institutions could be analysed. For example, it could be tested to what extent administrative, teaching, and research human resources capacities would be available in the same quantity and quality in the participating institution without external support. Moreover, also the international standards could be further tested in terms of the capability to adjust. For example, it could be tested if participating institutions have institutionalised these standards and are using them when the curriculum needed to be adjusted or new staff members onboarded to deliver skill-oriented and student-centred courses. Finally, the capability to relate could also be analysed to understand better to what extent the participating institutions have further developed their capabilities to relate (e.g., implement outreach activities, establish collaboration structures, etc.).

5.2.2 Analysis of Outcome 2

2 Outcome 2: South-South collaborations are intensified and an enhanced collective impact via networking is reached …

- if the Master's programme "Aquatic Ecosystems & Environmental Management (AEEM)" is extended to an Eastern African joint degree master's programme, implemented by Addis Ababa University, Bahir Dar University, EIAR-NFALRC and Egerton University **(Output 2)**
- if staff members from different countries and Eastern African institutions contribute as resource persons including staff of research and policy institutions (**Output 5**)
- if a network of Southern and Northern HEST institutions with common interests towards the sustainable management of aquatic ecosystems in Eastern Africa is established **(Output 4)**
- if a web-based network platform that interlinks different institutions is established (**Output 6**)

Overall, the plausibility of the impact hypotheses underlying this outcome is supported by the collected data. All interviewees involved in the AEEM (coordinators, lecturers, students) and the corresponding institutional actors (faculty management representatives) stressed the importance and attractiveness that the South-South cooperation is adding to the programme's quality, visibility, and reputation. Especially the faculty management and the programme coordinators emphasised the intensified collaboration and the contributions to the institutions' internationalisation efforts, among others, by stressing that such South-South cooperation within a joint master's programme is still seldom. In this regard, the most commonly mentioned impact mechanism relates to the network effects that are created at the level of research and teaching, which in the view of interviewees adds attractiveness and increases the reputation and visibility of AEEM. Interviewees underlined that the network effect becomes apparent as it allows lecturers from different universities and countries to disseminate knowledge, offering students a wide opportunity to not only develop their academic skills, but also find topics they can focus on in their master's thesis. Having for example the possibility to search and find a supervisor with specific knowledge and expertise is seen as being of great added value to the students. Also, the knowledge of lecturers is seen to be benefiting from having students from other countries, as this allows them to expand their knowledge on regional and country-specific topics.

When referring to the South-South collaboration and its network effects, interviewees also validated the importance of involving representatives of other HEST institutions in the implementation and quality assurance of AEEM. For example, the assumption was made by interviewees that network effects emerge when and because (1) representatives from other HEST institutions offer inputs during teaching modules and hands-on training exercises, (2) when staff members from these institutions get enrolled as students, (3) when students are offered options to write their master's thesis in in line with institutional demands and interests and (4) when these institutions are asked for feedback to ensure the curriculum and the skillset of graduates fit their demand. Accordingly, the multi-faceted involvement of resource persons is seen a central impact mechanism for creating network effects.

Furthermore, the hypothesis of achieving network effects via a network of Southern and Northern HEST institutions was validated to be a proven impact mechanism of the project. Here, the LWM was the main reference point of interviewees. While the cooperation prior to the LWM was seen as mostly driven by a North-South approach, it was stressed that the LWM was a key step towards distributing responsibilities more equally between partner institutions, giving Egerton University the opportunity to successfully prove its quality in fund administration, teaching, and research. According to some interviewees the good experiences made in the LWM was key to enable conceptualising and implementing the AEEM programme and further distributing responsibilities. The Joint Management Committee (JMC) and the coordinating role of BOKU were in this regard seen as key elements enabling discussions and finding collaborative solutions. Overall, the increased distribution of responsibilities to Southern partners was described as key element in further supporting their capacity development.

Finally, the idea to establish a web-based network platform to interlink Southern and Northern HEST institutions with common interests towards the sustainable management of aquatic ecosystems in Eastern Africa was seldomly referred to by interviewees as a key impact mechanism. At this point in time, the platform does not seem to be yet a primary mechanism of change in the eyes of the interview partners. However, this could be related to the fact that the platform was launched just recently in 2020. Moreover, the design of the platform changed from being a platform where formal institutional membership is required to a platform for individuals with similar academic interests. The already large number of registered individual members from different countries suggests that the platform could be used and become an important contributor for expanding the network of interested and engaged stakeholders across various countries, with its intended benefits, such as supporting collaboration and disseminate insights and knowledge. In this regard, this output seems to be interlinked with outcome 6.

Conclusions with regards to the future project strategy and design, as well the upcoming impact assessment of AQUAHUB:

- *Measuring Network characteristics*: to measure the network effects, three dimensions could be addressed in the upcoming impact assessment. First, the communication level should be addressed. This includes aspects such as communication frequency, timeliness, and accuracy between the partner institutions. Second the quality of the cooperation should be taken into account, for example by testing the extent to which partners support solving problems, understand each other's work and role in the master's programmes, give and receive appreciation and feedback and have a common understanding of the programme and cooperation goals. Third, next to the communication and cooperation levels within the implementing partner institutions, also the development of linkages to other stakeholders could be assessed, such as Ministries, NGOs, other HEST institutions, programme alumni, etc. Here, it would be needed to assess both, the nature of the relationship (from simple information exchange to institutionalised or project-related cooperation) and the overall benefits each network participant takes from this relationship (e.g., expansion of knowledge, ability to apply it, opportunities to find research partners, options for accessing infrastructure, to present and publish, etc.). These aspects are closely linked to the capability to relate of the partner institutions, which could therefore be part of the impact assessment related to outcome 2.

- *Role of the web-based platform*: the role of the web-based platform could be further included to test the above-mentioned South-South-North cooperation. To this end, the platform already takes into account key information, such as member profiles and activities within the network/platform. Further evaluation activities could address the platform as a result of prior cooperation efforts but also as a contributor for further cooperation.

5.2.3 Analysis of Outcome 3

3 Outcome 3: Highly qualified graduates are provided to the job market in order to improve the management of freshwater ecosystems …

- if the international joint-degree Master's programme in "Limnology & Wetland Management (LWM)" is positioned as a regional flag-ship programme in Eastern Africa **(Output 1)**
- if the Master's programme "Aquatic Ecosystems & Environmental Management (AEEM)" is extended to an Eastern African joint degree master's programme, implemented by Addis Ababa University, Bahir Dar University, EIAR-NFALRC and Egerton University **(Output 2)**
- if the LWM and AEEM programmes follow international standards to ensure a high quality (i.e., Bologna and following declarations, skill-oriented curriculum, student centred teaching approach) (**Output 3**)
- if research, teaching, and project management skills of staff are increased, high quality curricula and equipment are provided, and high-potential students are recruited **(Output 7)**
- if selected high-potential students attend the LWM and AEEM programmes and obtain their MSc degree (**Output 8**)

The results from the case studies suggest that both LWM and AEEM have been successfully providing highly qualified graduates to the job market. When asked to discuss the plausibility of those graduates being highly qualified, interviewees pointed out to three main aspects of quality assurance within the master programmes. First, it was stressed that the curricula are approved in the corresponding institutional committees, already making sure that it fits their institutional standards. In this regard, the capability to act with trained staff and accessible equipment of the partner institutions was mentioned as a key to deliver high quality programmes. Second, the programmes have installed several quality assurance mechanisms that allow for learning, steering and adjustments in the course of the project's implementation. At the university level, the Joint Management Committee (JMC) of each Master's programme steers the collaboration and engages in quality assurance discussion, if necessary. Such was the case, when the Covid-19 pandemic made changes in the implementation necessary, such as the shift towards e-learning. Moreover, student expectation before and experiences after the courses is monitored and results discussed in the JMCs. Here, interview partners from the participating institutions as well as the students themselves pointed out to the overall high satisfaction rates. Finally, it was mentioned that external experts and representatives from sectoral institutions are also invited to give inputs into their needs in terms of qualifications, which is seen by the interviewees as an important aspect ensuring labour-market orientation. These resource persons are therefore perceived as key mechanism to achieve this outcome.

Furthermore, during the interviews, emphasis was also made on the selection process for students of LWM and AEEM. Here, interview partners stressed that the selection procedure is very competitive, which accordingly translates into enrolling only those students in the master's programmes that promise to deliver the best academic performance and – possibly – future career development. Therefore, also the selection process was seen as a leverage for achieving the outcome of highly qualified graduates.

Moreover, the interviewees from sectoral stakeholders that have employed LWM and AEEM alumni state an overall satisfaction with the quality of graduates. At the same time however, it became clear that the job market is heterogeneous in its needs. Some interviewees stressed the importance and relevance of lab work and research experience for the future career, e.g., especially when pursuing an academic career. Other interviewees mentioned to especially value and appreciate the graduates having (project) management and soft skills (e.g., presentation skills, team leadership skills). In the course of the interviews, it also became apparent that differences exist about what it entails to "provide" the job market with graduates. Interviewees understood this differently and described – for example – how graduates enter new jobs, others pointed to new and/or higher positions in former employer institutions of the graduates and others to graduates being able to assume more responsibilities. However, some critical notes were given by pointing out that it is not always clear how many graduates have struggled to enter the job market. Moreover, it was mentioned that, especially in the academic field, master graduates are by default not given the same level of responsibility regarding e.g., decision-making, as professionals holding a PhD. Finally, it became clear through the interviewees that graduates are seen as the vehicles of impact, but that the mechanisms behind "why and how" graduates are able to impact and drive change in their employer organisations remains unclear.

Conclusions with regards to the future project strategy and design, as well the upcoming impact assessment of AQUAHUB:

- *Alumni/Tracer Study*: to further shed light into this outcome area, a tracer study of alumni should be a key component of the impact assessment of AQUAHUB. Such a tracer study would need to address at least four main dimensions. First, it should show if graduates are "provided to the job market", meaning that after their graduation they move into new or between different positions, both within and between relevant organisations in or outside the intervention sector and countries. This includes showing the level of unemployment among graduates and difficulties entering the job market. In this regard, the tracer study should shed light into why this is the case. Second, the tracer study should show what kind of responsibilities alumni have (or had) in their employer organisations. This entails for example to position themselves within certain levels of responsibilities (e.g., from lower to higher management), and within dimensions such as decision-making, financial, personnel, and technical responsibilities. Moreover, the tracer study could shed light into their work-related development relevance towards the most relevant challenges in aquatic / freshwater management issues in their respective countries. Finally, the tracer study should also try to identify the extent to which certain sectoral organisations might have captured a higher number of graduates and therefore should have benefited most from highly qualified expert alumni.
- *Employer case studies to determine impact of graduates in their work environment*: future evaluation activities could also include employer case studies to analyse the extent to which alumni have been able to apply knowledge and skills within their work environment and shape at a project or even organisational level, how aquatic management is conducted. Such case studies could be particularly interesting in employer organisations that have absorbed several graduates. Aspects such as transfer of knowledge, creation of awareness for sustainability issues, use of networks built during the study programmes, application of skills and uptake of responsibilities within an organisation can help to better understand how and when alumni are able to positively impact their employer organisation to – in the long-term – contribute to the sustainable management of aquatic ecosystems and their resources in Eastern African countries and effectively initiate change processes. Such case studies would moreover create insights into understanding the limitations that graduates face, for example, if their job positions do not allow them to take decisions, work on projects related to their main skillset, or if they do not have access to resources (e.g., such as equipment or funding).

5.2.4 Analysis of Outcome 4

4 **Outcome 4: Projects and research towards the sustainable management of aquatic ecosystems and its resources are developed and implemented …**

- if the international joint-degree Master's programme in "Limnology & Wetland Management (LWM)" is positioned as a regional flag-ship programme in Eastern Africa **(Output 1)**
- if the Master's programme "Aquatic Ecosystems & Environmental Management (AEEM)" is extended to an Eastern African joint degree master's programme, implemented by Addis Ababa University, Bahir Dar University, EIAR-NFALRC and Egerton University **(Output 2)**
- if a network of Southern and Northern HEST institutions with common interests towards the sustainable management of aquatic ecosystems in Eastern Africa is established **(Output 4)**
- if the LWM and AEEM programmes contribute to research, e.g., via MSc research projects and achieve higher research output via publications (**Output 9**)

Complementary to the analysis conducted above in other outcomes, this outcome includes a new output alluding to the contribution of the master programmes in the field of research (Output 9). Research was mostly reflected by interview partners in terms of publications by staff members and by the research projects conceptualised and conducted by the students during their master's thesis. In this regard, interviewees validated the links between output 9 and outcome 4. Interviewees also pointed out that in their view, master students have sufficient resources available to design and conduct research studies. Interview partners validated this view by referring to the number of publications that have been published (and many peer reviewed) by both master students and resource persons that collaborated in the research. When discussing the students' research projects, interviewees from the partner institutions emphasised the need-orientation and explained how students are demanded to explain why and how their research projects are aligned to existing policies and could benefit target groups, such as farmer groups. At the same time however, interviewees struggled to some extent to plausibly show how research knowledge is transferred and taken up by the target audiences. While it was pointed out that workshop with target groups have been conducted in the past, a systematic mechanism to ensure research applicability and uptake seems not to be in place yet.

Furthermore, in some cases, interviewees reflected this aspect against the backdrop of a higher education system that increasingly demands quality research and does so especially at the level of a PhD candidate. Accordingly, while the research conducted via master's theses was deemed relevant and as a sign of quality of the programmes, some interviewees also indicated that expanding the support to also include PhD research could be a way to further develop the project. In this regard, existing policies and regulations were mentioned that demand a PhD degree for all those interested in pursuing an academic career. Moreover, when discussing the development-relevance of the research conducted, individual interviewees mentioned that attracting third-party-funding from e.g. international donors, could further increase the plausibility of ensuring that the research is oriented towards development challenges.

Conclusions with regards to the future project strategy and design, as well the upcoming impact assessment of AQUAHUB:

- *Insight into research uptake and applicability of research*: AQUAHUB has already a list of master's thesis and publications that reflect the above-mentioned aspects. While this is in line with the formulated outcome, the implicit assumption is that the knowledge that is generated and published will also be taken up and/or applied to contribute to the sustainable management of aquatic ecosystems. Accordingly, the upcoming impact evaluation should assess to what extent the research is mostly of academic value, or if the explicit or implicit target groups (such as fisherman or smallholder farmers, policy makers or extension officers, etc.) can derive practical value from these research results and incorporate them in their field of work. To do this, representatives

of these target audiences need to be involved. Moreover, the focus should be in understanding if, why and how knowledge transfer and uptake takes place to shed light on the mechanisms in place.

5.2.5 Analysis of Outcome 5

5 **Outcome 5: An increased capacity of Eastern African HEST institutions to strengthen them in achieving their development goals is achieved …**

- if a network of Southern and Northern HEST institutions with common interests towards the sustainable management of aquatic ecosystems in Eastern Africa is established **(Output 4)**
- if research, teaching, and project management skills of staff are increased, high quality curricula and equipment are provided, and highly potential students are recruited **(Output 7)**

Overall, interviewees validated the plausibility that AQUAHUB has been able to contribute to an increased capacity of HEST institutions. Mostly, interviewees understood that this outcome points out to the capacities developed in the Southern partner institutions of both Master programmes. Hence, a link to outputs 1 and 2 was made by most interviewees. Accordingly, these interview partners interpreted and validated that the participation of these institutions has resulted in increased capacities to address teaching, research, and outreach activities by the involved universities. In this regard, interviewees mentioned aspects related to the training of human resources (e.g., via IPGL courses), knowledge development, research output, curriculum development, infrastructure and equipment availability and maintenance, as well as network expansion of the participating higher education institutions (e.g., through the cooperation with key resource persons). It is therefore assumed that the participation in IPGL, CAPAQUA and AQUAHUB has contributed to capacity development in on various levels of the involved institutions, whereby a special impetus was made on Egerton University.

Next to the participating institutions moreover, capacity development was also referred to when discussing the value of the graduates working within their employer organisations, more specifically other HEST institutions. Here, the assumption was made, that the main driver and impact mechanism are the graduates who, through their own skills-development and application of skills, transfer their knowledge and insights to the employer organisations. The underlying assumption here is that skills developed by graduates in LWM and AEEM can be applied in their corresponding working environments. Within this line of discussion, it was also mentioned that it is presumed that graduates will hold positions or move into positions that allow them to take on responsibilities that shape how their organisation performs or their field of work or projects, in which they work, are implemented. In line with this, it was underlined that AQUAHUB intends to contribute to both, research capacities within HEST institutions, but also capacities and knowledge within institutions that work or are relevant to the management of aquatic ecosystems (e.g., NGOs, public entities, etc). In this line, individual interviewees pointed to the capability of the involved institutions to relate, collaborate, and conduct outreach and research activities and projects. However, as mentioned in the findings of outcome area 4, it was unclear how the mechanisms work that enable graduates to impact their work environment. Again, also hindering factors came up during the interviews, such as access to funds and infrastructure.

Conclusions with regards to the future project strategy and design, as well the upcoming impact assessment of AQUAHUB:

- *Link between skills-development and capacity development*: one of the most relevant impact mechanisms described above are the graduates that start working and shaping their work environment. However as described in the employer case studies from outcome 3, such a link assumes certain favourable conditions. For example, if the graduate works in a HEST, it is assumed that access to modern equipment and material is provided and that the graduate will be able to transfer knowledge into teaching, research, and outreach activities. This however can be severely hampered, especially due to the increasing requirement for teaching and research staff at HEST institutions to have a PhD. Accordingly, future evaluation activities should assess (and possibly compare) to what extent master graduates are enabled in their employer organisations to act as change agents, or if a PhD is required to reach a position in the organisation that allows them to shape their work environment.
- *Dimensions of capacity development:* possible dimensions of capacity development have already been mentioned in the previous outcome areas. However, this specific outcome is the one most specifically addressing capacity development directly. In the upcoming impact assessment, capacity development could be assessed along the 5C-Model described in chapter 3.2. However, when doing so, the evaluation design should further describe, which capabilities are explicitly addressed to be increased, and which are not or only indirectly influenced (e.g. in terms of being a positive not intended impact). This is important to avoid false expectations assuming AQUAHUB would have the same degree of impact on all capabilities. Accordingly, it should be differentiated which capabilities are explicitly targeted as well as further explored to what extent further positive or negative impacts on capacity development can be identified through data collection.

5.2.6 Analysis of Outcome 6

6 **Outcome 6: Knowledge and awareness on sustainable management of aquatic resources are increased …**

- if a network of Southern and Northern HEST institutions with common interests towards the sustainable management of aquatic ecosystems in Eastern Africa is established **(Output 4)**
- if the quantity, quality, and relevance of research is enhanced and the dissemination of research results as well as the outreach to stakeholders and society is amplified **(Output 10)**

With respect to its underlying outputs, the data collected in the three case studies verified that a plausible relation exists with the outcome formulated here. Interviewees agreed that the knowledge and awareness on sustainable management of aquatic resources have been increased through IPGL, CAPAQUA and AQUAHUB. They hereby stressed that this knowledge creation and awareness is a continuous process that has been developing for many years. They referred in the interviews to the different project phases and the graduates of all courses and master's programmes implemented since the corporation started between Northern and Southern partners. Due to the long-standing cooperation, the dynamics of knowledge creation are seen in courses being designed, curricula developed, etc. Moreover, the use of key resource persons is perceived to be a key component of the knowledge dissemination and creation approach. Therefore, knowledge creation and dissemination are seen as cross-cutting components of the project's trajectory. In this regard, a connection to outputs 1 and 2, as well as 7 was perceived as plausible, as well as to outcome 3.

While interviewees did not question the link between output 4 and outcome 6, some reservations came to light when addressing output 10. In general, interviewees agreed that better research and its dissemination contribute to increased knowledge and awareness, it was also questioned by some, if this is sufficient to also influence behaviour of those impacting (positively or negatively) the aquatic ecosystems. These interviewees acknowledged that while knowing about the benefits of a certain good practice is important, it seldomly and automatically translates into action. In this regard for example the question was expressed, if target groups are able to access the research results, take them up and apply them, after the students have concluded their activities. Here it was noticed that application can require financial support or specialised knowledge and accompanying measures.

Conclusions with regards to the future project strategy and design, as well as the upcoming impact assessment of AQUAHUB:

- *Bridging the gap between knowledge and behaviour change*: in line with some of the conclusions stated in other outcome areas, once again plausibility is restricted by the gap existing between knowledge that has to transfer to changes in the target groups' behaviour. A plausible link between research and development-relevance as well as impact of AQUAHUB could be strengthened by including activities specifically targeting this challenge. A future impact assessment could also focus on finding examples and good practices, as well as analyse existing literature and insight on this matter. For example, this could be done by using theories of behavioural science, as for example the theory of planned behaviour, which is one of the most commonly used theories to understand and analyse how intentions and behaviours are influenced. It distinguishes three components: the normative beliefs (what is my attitude towards a certain behaviour?), the perceived subjective norms (What do others (e.g., my supervisor, my peers, etc.) think about that specific attitude?), and the perceived control over that specific behaviour (such as regulatory restrictions, organisational rules of engagement etc. that might restrict or hinder a specific action).

5.2.7 Underlying assumptions

Next to the hypotheses analysed above, the logic of AQUAHUB's ToC contains six implicit assumptions:

- *1st assumption - Stable framework conditions in all participating countries concerning socio-political and legal aspects as well as conflicts in the region exist.* Interview partners all assessed the framework conditions, referring to conditions allowing teaching and research, to be in general stable at the participating institutions. Conflicts and socio-political instabilities, such as in political and military conflict in Ethiopia, COVID-19 restrictions in all countries, however, exist and could potentially destabilise project activities in the future. Also, higher education policies demanding PhD degrees, as it is the case in Kenya, could have – in mid and long-term affect on the project's plausibility to achieve its intended impacts.
- *2nd assumption - The management of institutions and existing policies continuous to support the project.* In all three countries, the faculty management expressed a firm commitment and support to the project. When doing so, it was stressed that the project genesis already took faculty management considerations and views into account. The result is that the faculty management perceived a high amount of ownership for the project.
- *3rd assumption - Financial resources for the internal or external funding of programme participants as well as resources for teaching and research activities are available.* No interview partner formulated an emergent risk of not being able to deliver the planned financial and human resources to the programme and all partners were confident to be able to do so in the future. However, concerns were raised individually for the financial sustainability in the mid- und long-term. Third-party funding and a higher amount of self-paying students were named as important milestone to secure the master programmes in the future.

- *4th assumption - The participating institutions continue showing interest in collaboration and alignment*. Interviewees at all institutional levels (incl. lecturers) underlined their interest in further implementing and developing the project. Moreover, it was stated that the current mechanisms to ensure alignment, both within and between the participating institutions, have been working well and have enabled trust building between the partners.
- *5th assumption - Students, alumni, staff and other stakeholder groups are motivated to actively contribute to the implementation of an impact assessment study and the further development of AQUAHUB*. No indication was made by the interview partners that students, alumni, staff and other stakeholder groups would not be motivated to actively participate in the upcoming impact evaluation.
- *6th assumption: Stakeholder consider the AQUAHUB project as relevant and are willing to collaborate*. In line with the results stated above, interview stakeholder organisations assessed the project as relevant and confirmed their present and future willingness to support the master programmes as resource persons.

6 Evaluability Assessment

To gain a better understanding of the **evaluability** of the impacts of the AQUAHUB project (formative aspect of the evaluation), an evaluability assessment of the the project was carried out on the basis of a desk review as well as interviews and focus groups. The analysis of the evaluability will inform the design for the planned impact assessment. Likewise, it will contribute to overarching strategic and operational learning and change processes for the AQUAHUB project in terms of achieving e.g., maximal organisational learning in the future.

The assessment framework is based on a **scoring system** organised along different analytical dimensions and assessment criteria for which we developed indicators (see Figure 4 and annex 8.5). The **aggregation** of the assessments of the individual dimensions makes it possible to analyse the evaluability at different levels. The assessment framework consists of three different levels.

- The first level is made up of **analytical dimensions**: the underlying analysis of an intervention, its theory of change, the proposed M&E system, the data availability and quality overall and for each project phase, as well as the evaluation context.
- Each analytical dimension is broken down into several **assessment criteria**.
- Each assessment criterion is subdivided into several **indicators**.

Figure 4 visualises the structure and contents of the evaluability assessment along these levels. The appraisal of each dimension was done at indicator level. The evaluators studied the project documentation, including the project proposal, annual reports, and further project evaluations and M&E documents. On the basis of the project documentation, a given indicator could either be assessed as fulfilled (score 1) or not fulfilled (score 0)[5]. The assessment at the level of an assessment criterion corresponds to the average score of the indicators allocated to that criterion[6]. The assessment at the level of the analytical dimensions corresponds to the average score of the assessment criteria allocated to that analytical dimension.

Before presenting the results of the evaluability assessment, it is important to highlight that the findings only provide insights on the basis of documentation available. For example, the score for the M&E system only refers to the quality of the documentation that was made available to the evaluators, which is not necessarily the whole M&E system developed for and used by the AQUAHUB project. In addition, **an assessment of the evaluability of a project is by**

[5] The option "not relevant" was also possible for some indicators. If an indicator was not relevant for a given criterion, it did not factor into the assessment.
[6] Not all assessment criteria have the same number of indicators allocated to them. The score at assessment criteria level is calculated on the basis of the arithmetic average of the indicator score to account for this fact. The same principle is applied at the level of the analytical dimensions.

no means an assessment of the development value of that project – it is possible that highly valuable projects are hard to evaluate.

It should further be noted that the assessment framework measures the project against a set of standards that correspond to an ideal in terms of theoretical evaluability and also practical implementation of an evaluation. These **exigent standards** were chosen in order to be able to provide a precise analysis of how evaluability can be optimised. A full score (score of 100%) at the level of analytical dimensions and assessment criteria should therefore not be realistically expected. Finally, it should be taken into account that the evaluability assessment applied the **same standards to different stages of the project**. In particular, the evaluability assessment for project stage 1 and 2 is less reliable due to the comparatively limited documentation and provides less information on evaluability, in turn affecting average scores in the evaluability assessment.

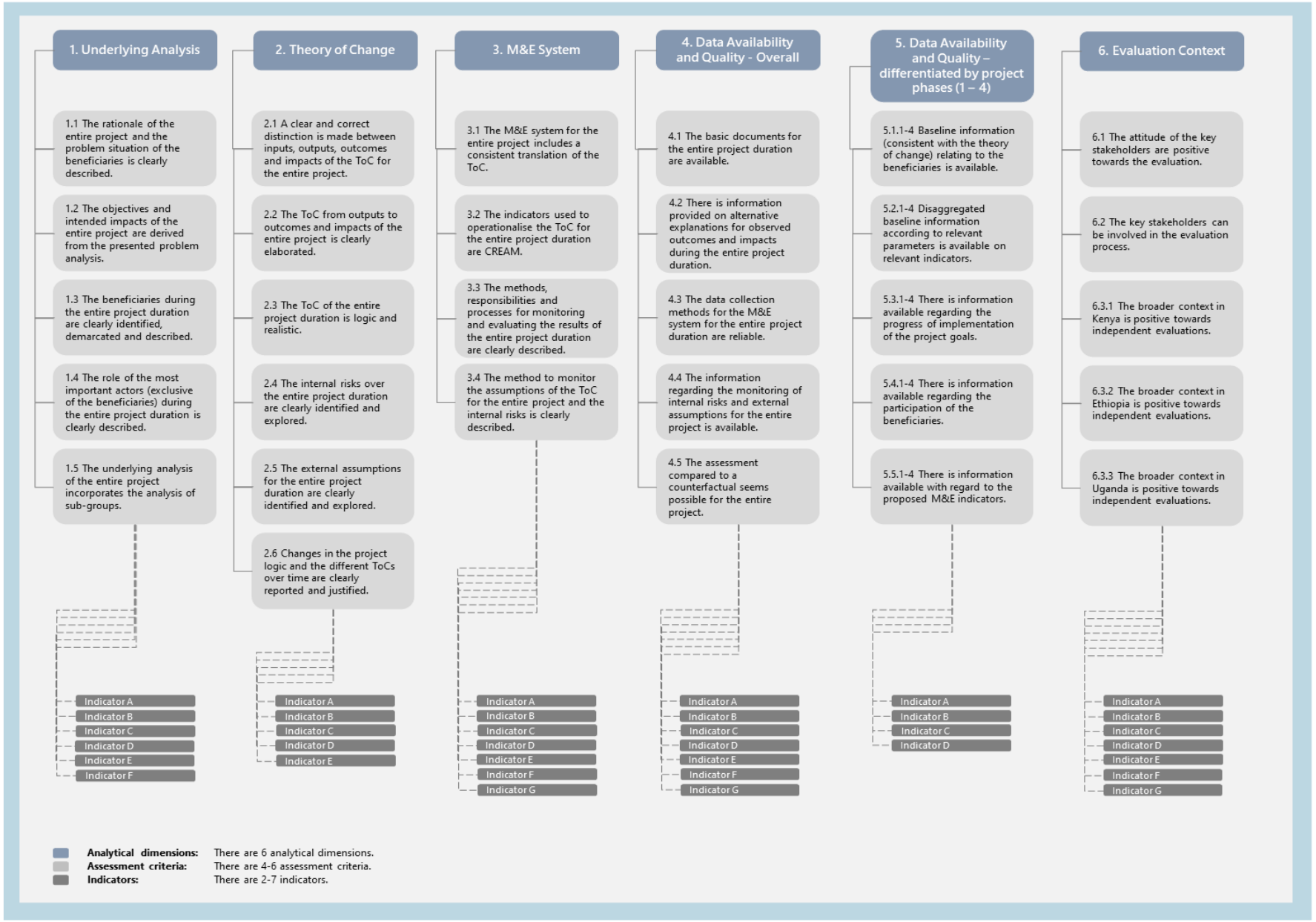


Figure 4: Structure and content of evaluability assessment

6.1 Overview of Results of the Evaluability Assessment

Table 1 depicts the average scores for each analytical dimension. The average scores for the dimensions range between 100% and 30%, with the dimension **"Evaluation Context"** ranking highest and **"Data Availability and Quality Overall"** ranking lowest. In the following, we will take a closer look at the assessment criteria for the analytical dimensions. A complete overview of results for all analytical dimensions, assessment criteria and indicators can be found in annex 8.5.

Table 1: Overall Average Scores

Analytical dimension	Average score
1. Underlying Analysis	59%
2. Theory of Change	83%
3. M&E System	70%
4. Data availability and Quality Overall	30%
5. Data availability and Quality differentiated by project phase	42%
6. Evaluation Context	100%

Table 2 summarises the scores of the assessment criteria for the **dimension "Underlying Analysis"**. **Criterion 1.1** has a score of 60%, which is based on the the problem analysis describing the characteristics of i) higher education & science, ii) water & aquatic resources, iii) environmental conservation in Eastern Africa and iv) climate change.

The relevance of aquatic ecosystems (i.e., providing crucial resources such as water for drinking and irrigation schemes, fish, grazing area for livestock, plants as house-building material) is lined out as well as how those ecosystems are at risk in Eastern Africa (i.e., due to the growing population, high poverty prevalence, climate change effects, and the increasing discrepancy among demands and availability of aquatic ecosystem resources and services). Furthermore, it describes the relevance of Institutions of Higher Education and Research (i.e., key-agents for innovation, transformation and the provision of highly qualified professionals), and that there is a need for capacity development of Higher Educaton Institutions. The possibility for change of the described challenges is also taken into account. However, the problem analysis does not name existing challenges of the indirect or direct beneficiaries. The objectives on impact as well as outcome level correspond with the identified core problem of the problem analysis (**criterion 1.2**). Taken togther, the core of the problem analysis is the threat of degradation of aquatic ecosystems in Eastern Africa due to the growing population, high poverty prevalence, climate change effects, and the increasing discrepancy among demands and availability of aquatic ecosystem resources and services. Given that institutions of Higher Education and Research are key-agents for innovation, transformation and the provision of highly qualified professionals, there is a need for capacity development of Higher Educaton institutions. Regarding the beneficiaries, the project proposal outlines the group of direct and indirect beneficiaries, however, it lacks an analysis of the socio-demographic set-up of those groups (**criterion 1.3**). Furthermore, the project proposal describes the local project partners, but does not include an analysis of stakeholders, boundary partners, or a description of the sphere of influence of the actors and its consequences for the project (**criterion 1.4**). Finally, the project proposal does include explicit gender analysis, it reports on gender sensitive issues and takes into account measures to counteract the gender disparities in higher education sector (**criterion 1.5**).

Implications for the ToR::

- ToR chapter "1.5 Beneficiaries" should be updated based on the new definition of beneficiaries (i.e., including institutional and individual categories)
- The forthcoming impact assessment should take into account that a reconstruction of the socio-demographic set-up of the beneficiaries might be necessary
- Furthermore, the impact assessment should assess to what extent a reconstruction of a stakeholder analysis, boundary partners, and a description of the sphere of influence would benefit the final impact assessment

Table 2: Assessment criteria for Underlying Analysis

	Average score
1. Analytical Dimension "Underlying Analysis"	**59%**
Assessment criteria	
1.1 The rationale of the entire project and the problem situation of the beneficiaries are clearly described.	60%
1.2 The objectives and intended impacts of the entire project are derived from the presented problem analysis.	100%
1.3 The beneficiaries during the entire project duration are clearly identified, demarcated, and described.	67%
1.4 The role of the most important actors (exclusive the beneficiaries) during the entire project duration is clearly described.	0%
1.5 The underlying analysis of the entire project incorporates the analysis of sub-groups.	100%

The average scores for the assessment criteria of the second **analytical dimension "Theory of Change"** are listed in Table 3. The evaluation basis for this dimension is the revised ToC by Syspons, which will be used for the future impact assessment. The revised ToC makes a clear and correct distinction between inputs, outputs, outcomes, and impacts (**criterion 2.1**), elaborates on the link from outputs to outcomes and impacts (**criterion 2.2**) and is overall logic and realistic (**criterion 2.3).** Furthermore, the initial poject proposal described external assumptions for the project and reflected on the consequences of the external assumptions for the project through their description of mitigation strategies (**criterion 2.5**). The lower scores were attributed to the lack of an internal risk assessment and potential mitigation strategies **(criterion 2.4)** as well as a limited documentation regarding the reports and justification of changes in the initial ToC (**criterion 2.6**). It should be noted that the project proposal includes a risk assessment, however, the assessment considers mainly external risks, such as "*Weak enforcement of environmental policies and regulations in Eastern Africa*", "*Research findings are not fully considered to formulate evidence based policies and/or considered in environmental management*", or "*Eventual university strike periods in Kenya and Ethiopia*", or "*Lack of support of AAU/BDU/EGU/EIAR management*".

Table 3: Assessment criteria for Theory of Change

	Average score
2. Analytical Dimension "Theory of Change"	**83%**
Assessment criteria	
2.1 A clear and correct distinction is made between inputs, outputs, outcomes, and impacts of the ToC for the entire project.	100%
2.2 The ToC from outputs to outcomes and impacts of the entire project is clearly elaborated.	100%
2.3 The ToC of the entire project duration is logic and realistic.	100%
2.4 The internal risks over the entire project duration are clearly identified and explored.	0%
2.5 The external assumptions for the entire project duration are clearly identified and explored.	100%
2.6 Changes in the project logic and the different ToCs over time are clearly reported and justified.	67%

Table 4 summarises the results for the assessment criteria of the thrid **analytical dimension "M&E System"**. The methods, responsibilities, and processes for monitoring and evaluation (**criterion 3.3**) as well as the indicators used to operationalise the ToC (**criterion 3.2**) were overall rated as positive. The M&E System describes data collection methods, makes a distinction between monitoring and evaluation and describes different processes for internal and external evaluations. Indicators for the ToC were evaluated against CREAM standards (i.e., clear, relevant, economic, adequate, monitorable). The main factors contributing to lower scores for some assessment criteria result from an incomplete translation of the ToC into the M&E System (**criterion 3.1**). For example, not every outcome or impact hypothesis of the initial ToC was included in the M&E System. Finally, Syspons found only weak descriptions to monitor assumptions and internal risks **(criterion 3.4)**.

Table 4: Assessment criteria for M&E System

	Average score
3. Analytical Dimension "M&E System"	**70%**
Assessment criteria	
3.1 The M&E System for the entire project includes a consistent translation of the ToC.	71%
3.2 The indicators used to operationalize the ToC for the entire project duration are CREAM.	80%

3.3 The methods, responsibilities, and processes for monitoring and evaluating the results of the entire project duration are clearly described.	100%
3.4 The method to monitor the assumptions of the ToC for the entire project and the internal risks is clearly described.	25%

An overview of the results for the assessment criteria of the analytical dimension "Data Availability and Quality – Overall" is summarised in Table 5. This dimension has a lower average score (30%) than other dimensions in the assessment. The main reasons for it's relatively low average score are that the reports do not provide alternative explanations for observed outcomes and impacts. Additionally, the design of the AQUAHUB project did not forsee a treatment and control group, therefore assessment **criterion 4.2** and **criterion 4.5** were rated with a score of 0%. Furthermore, there is little information regarding the monitoring of internal risks for the entire project (**criterion 4.4**). The annual reports report mainly on external risks and provide mitigation trategies for some of them. However, they do not specifically report on internal risks and their consequences for the ToC or the project implementation. Criteria that were assessed as positively on this dimension relate to the reliability of data collection methods for the M&E system (**criterion 4.3**), and the availability of basic documents for the entire project duration (**criterion 4.1**). For example, the described data collection methods for the M&E system forsee a data as well as a method triangulation, as they include alumni surveys, a data base to monitor placement and job profiles, and evaluations of programme participants. Furthermore, basic documents such as a theory of change, a Logic Framework, or a budget proposal are available for the more recent phases of the project.

Table 5: Assessment criteria for Data Availability and Quality - Overall

	Average score
4. Analytical Dimension "Data Availability and Quality – Overall"	**30%**
Assessment criteria	
4.1 The basic documents for the entire project duration are available.	57%
4.2 There is information provided on alternative explanations for observed outcomes and impacts during the entire project.	0%
4.3 The Data collection methods for the M&E System for the entire project duration are reliable.	100%
4.4 Information regarding the monitoring of internal risks end external assumptions for the entire project is available.	25%
4.5 The assessment compared to a counterfactual seems possible for the entire project.	0%

Additionally to the overall data availability and quality, Syspons also assessed this dimension with respect to each phase of the project (1-4). The results are depicted in Table 6. In general, the available data for project phases 1 & 2 is more limited in comparison to phases 3 & 4. The data does provide information about the progress of the implementation of the project goals for phase 3 & 4 (**criterion 5.3**), the participation of beneficiaries (**criterion 5.4**) and the M&E system (**criterion 5.5**). For example, the annual reports report on the project's achievements on output level and describe the involvement of the direct beneficiaries. Furthermore, there is information available for the indicators on output and outcome level for project phases 3 & 4. The lower scoring factors relate mainly to the

limited baseline information of benficiaries (**criterion 5.1**) and limited disaggregated baseline information on relevant indicators (**criterion 5.2**).

Implications for ToR:

- The evaluability results from dimension 4 and 5 should be taken into account in the ToR and lead to adaptations in the following chapters:
- Chapter 2. Purpose
- Chapter 3. Objective
- Chapter 4. Subject and Scope
- Chapter 6. Approach and Methods

Table 6: Assessment crtieria for Data Availability and Quality - differentiated by project phase

	Overall average score	Score Phase 1	Score Phase 2	Score Phase 3	Score Phase 4
5. Analytical Dimension "Data Availability and Quality – differentiated by project phase"	**42%**	**8%**	**18%**	**50%**	**72%**
Assessment criteria					
5.1 1-4 Baseline information (consistent with the ToC) relating to the beneficiaries is available.	13%	0%	0%	25%	25%
5.2 1-4 Disaggregated baseline information according to relevant parameters is available on relevant indicators.	29%	0%	0%	0%	100%
5.3 1-4 There is information available regarding the progress of implementation of the project goals.	70%	0%	50%	100%	100%
5.4 1-4 There is information available regarding the participation of the beneficiaries.	50%	50%	50%	50%	50%
5.5 1-4 There is information available with regard to the proposed M&E indicators.	60%	0%	0%	100%	100%

Finally, Table 7 summarises the results of the assessment crierion of the **analytical dimension "Evaluation Context"**. The evaluation context scored highest amongst all analytical dimensions. This is due to an overall positive attitude amongst key stakeholders towards the evaluation (**criteria 6.1**). Stakeholders are willing to participate in the upcoming impact assessment and are ready to share information and relevant data with the evaluators (**criteria 6.2**). Furthermore, the broader context in all three countries is positive towards independent evaluations, meaning that the socio-cultural context at the level of direct and indirect beneficiaries allows for adequate collection of information.

Table 7: Assessment criteria for Evaluation Context

	Average score
6. Analytical Dimension "Evaluation Context"	**100%**
Assessment criteria	
6.1 The attitude of the key stakeholders is positive towards the evaluation.	100%
6.2 The key stakeholders can be involved in the evaluation process.	100%
6.3.1 The broader context in Kenya is positive towards independent evaluations.	100%
6.3.2 The broader context in Ethiopia is positive towards independent evaluations.	100%
6.3.3 The broader context in Uganda is positive towards independent evaluations.	100%

6.2 Review of the Management Response to the CAPAQUA 2018 Evaluation

In addition to the evaluability assessment, Syspons reviewed the management response to the evaluation in 2018. The 2018 evaluation provided recommendations regarding the relevance, effectiveness, efficiency, and sustainability of the CAPAQUA project. The assessment of relevance was part of the current assignment, but not effectiveness, efficiency, and sustainability, therefore, our assessment regarding the later aspects can provide only limited conclusions. Regarding the relevance of the CAPAQUA project, the 2018 evaluation recommended to integrate an international component into the AEEM programme. Syspons' assessment found that international aspects of the programmes are seen as a key impact mechanism to maintain the quality and reputation of both programmes. Therefore, we conclude that the recommendation was implemented by extending the AEEM Master programme to an international joint-degree Master programme with cooperation from Ethiopian and Kenyan Universities and research institutions. The second recommendation from the relevance criterion concerns the LWM curriculum, and suggests that policy and legal contents should be included in the programme. Syspons did assess AQUAHUB's coherence with national and international policies, however, it was not part of this assignment to assess the LWM curriculum regarding it's coverage of policy and legal content classes. After reviewing the LWM curriculum 2019-2021, Syspons cannot confirm that the LWM Master offers a course on policy and legal contents, however, based on the conducted interviews with alumni or policy institutions, we did not find the need for a policy course.

The 2018 recommendations for the effectiveness component referred to revisions in course contents, online visibility of the AEEM programme, gender equality in student admission rates as well as lecturers, and graduates ability to contribute to impact on policy level. Regarding the course content, Syspons' assessment revealed that the quality of both Master's programmes and LWM & AEEM graduates was considered as outstanding by the interviewed alumni, institutions and lecturers. Especially the pratical and research orientation was mentioned as a unique feature of both master's programmes. The recommendation regarding increasing the online visibility of the AEEM programme should in our opinion not be of highest priority, since the number of applicants is at around 150 per year, that is far above the number of schlarships that can be provided per year and indicates a high visibility and poplularity of the programme. Syspons agrees with the management response to target marketing efforts towards potential female students in order to improve gender equality in higher education. Syspons has found that project coordinators of the AQUAHUB project place a high priority on admitting high-potential female students to the

programmes. The recent annual reports (2019 & 2020) of the AQUAHUB project reflect those efforts – despite the relatively low number of female applicants, the number of female participants in the AEEM/LWM programmes almost equals the number of male participants (i.e., 19 female, 21 males in 2019; 16 females, 18 males in 2020). Finally, the last recommendation referring to the effectiveness component concerns graduates' ability to use evidence from research and for decision making in future positions in order to be able make an impact on policy level. Similar to CEval's recommendation, Syspons identified that research uptake and applicability should be evaluated in the upcoming impact assessment (see chapter 5.2.4). More precisely, the assessment should consider to what extent target groups (e.g., fishermen, farmers, policy makers, etc.) can derive pratical value from research outcomes and incorporate them in their field of work.

Finally, the recommendation regarding the sustainability component can be grouped in two broader categories. First, a set of recommendations refers to the development of a networking instrument, research projects that promote long term networking, and a strategy for training new staff members in order to keep up the achievements of the programme when old staff retires. Based on our analysis, networking was seen as a key impact mechanism to assure the quality, visibility, and reputation of the programmes. The AQUAHUB project has invested large efforts into networking activities: it created two joint Master's degrees (LWM & AEEM) which involve resource persons from various research institutions and universities. Both master's programmes require field visits in different locations and studies at different internation universities. Finally, a web-based networking platform has been established that interlinks Southern and Northern experts, stakeholders, and alumni. What remains relevant for the upcoming impact assessment is the evaluation of the network characteristics, such as communication level, quality of cooperation, and the overall benefits for the network participants (see chapter 5.2.2). The second group of recommendations refers to the development of a logical framework, a clear ToC, a mointoring instrument, and a careful planning of the future evaluations. Building up on AQUAHUB's documents and with the help of this assignment, Syspons revised the ToC, updated the ToR for the upcoming impact assessment and provided recommendations for the future trajectory of the project.

6.3 Implications of the Evaluability Assessment for the Impact Assessment

The results of the evaluability assessment (EA) point to several opportunities and limitations for the upcoming impact assessment. The evaluation context a solid basis to start from. The limiting factors are rooted in the data availability and quality for the entire project and for each phase of the project. The assessment showed that the evaluability of more recent project phases tends to be higher than the evaluability of earlier project phases.

Overall, the results of the EA on the Underlying Analysis show that a suitable basis for an impact analysis exists. Important prerequisites to verify the impact are fulfilled and future evaluations can refer to corresponding documents and explanations. In particular, the clear presentation of the objectives as well as the link to the core problem is such a prerequisite for an impact assessment. With regard to a future impact assessment, however, it should be taken into account that the group of beneficiaries is not yet sufficiently differentiated with respect to their socio-demographic set-up. The same applies to partners; here, for example, greater clarity can be achieved through a stakeholder analysis as part of the impact assessment.

With regard to data availability and quality, the EA shows that there are limitations for an impact assessment, which can only be partially countered by measures within the evaluation. In particular, it should be emphasized that the design of the AQUAHUB intervention as a whole is not suitable for a counterfactual evaluation. This concerns, among other things, the interconnected impact dimensions, which make an isolated consideration of individual causal chains difficult, the treatment group is comparatively small and that no baseline information is available at the

impact level and a reconstruction at this level is not possible. Against this background, no evaluation design should be assigned explicitly for the impact assessment. Instead, the "most appropriate" design should be used. Based on the available information, it can be assumed that this is a contribution analysis. A contribution analysis is an approach to assess the performance of policies and programmes towards an outcome or various outcomes. It focuses on the questions of "contribution", specifically, to what extent observed results (whether positive or negative) are the consequence of a policy or in this case the AQUAHUB project (Mayne, 2001). Based on the revised Theory of Change, which shows the causal relationships between inputs, outputs, outcomes, and impacts, data can be collected to test its underlying causal mechanisms.

In addition, the available documents do not sufficiently address assumptions and risks as well as possible alternative explanations for observed changes. It should therefore be the task of a future impact assessment to systematically review such assumptions, risks, and alternative explanations. For this purpose, a suitable approach to check impact hypotheses can be process tracing. The process-tracing method is based on presenting the observable implications of a theory, as well as alternative explanations that are inconsistent with the theory. After these observable implications are presented, they are then tested empirically to see which of the observable implications can be observed and which cannot. However, it should be considered that process tracing requires an intensive examination of the object of evaluation and also, depending on the form of the test (Straw-in-the-wind tests, Hoop tests, Smoking gun tests, Double decisive tests), requires a high input of resources. Positive for an impact assessment is that with the M&E system and the available data there is the possibility of triangulation of primary data from the impact assessment. However, data are available mainly at the output level and not for all phases of the project. Therefore, a systematic collection of all outputs and outcomes in an impact assessment seems necessary.

By revising the ToC and explicitly formulating impact hypotheses, an important basis for an impact assessment was created. This is a crucial prerequisite, especially in the context of a contribution analysis. A renewed consideration of the ToC in the context of an impact assessment could therefore be omitted if the questions of the TR are harmonized with the ToC.

7 Recommendations

In a follow-up phase, **research uptake strategies** could be developed. Currently, a gap exists regarding the question on the extent that research results are readily available and applicable to those who can benefit from it (e.g. farmers, fishermen, etc.). While AQUAHUB ensures that research is needs-oriented, the plausibility of that research having a direct impact on the beneficiaries and AQUAHUB's coherence with policies emphasizing community engagement needs to be strengthened. Accordingly, the project strategy should also include activities and mechanisms through which such uptake is facilitated and fostered. Possible options for activities/outputs addressing this issue could be: identify which research results have the most potential for dissemination and uptake; involve extension officers, local authorities, smallholder farmer groups, etc. to a follow up; set-up knowledge transfer activities to encourage result uptake; involve stakeholders from the start of research activities to create sufficient ownership. A future impact assessment could also focus on finding examples and good practices, as well as analyse existing literature and insight on this matter.

To foster **impact at the level of employer organisations, mechanisms** could be included in the ToC. Such mechanisms could be developed at the level of master research projects, as graduates working in HEST institutions, governmental agencies or other type of employer organisation remain the key drivers of change. The project implements activities that to a certain extent support graduates impacting their working environment (e.g., through modules within LWM on research proposal), however those activites are not yet included in the ToC. Therefore, the future ToC could explicitly define how during or after graduation, alumni are supported in their efforts to transfer

knowledge, increase awareness, and enhance capabilities of their employer organisations. Further possible options for activities/outputs addressing this issue could be: include a "Personal Action Plan" in the curriculum to create the opportunity to transfer knowledge to a practical setting and help push change processes and specific research topics. Such a Personal Action Plan could be a project/course within the master programmes or a follow-up through which alumni and their employer apply to receive support from AQUAHUB (e.g., access to equipment, co-supervision on research projects, etc.).

Concerning the sustainability of the AQUAHUB project, **sustainability targets** could be developed oin the long-term, to promote the longevity of the project. While the analysis revealed that both master's programmes are being implemented successfully, the question of how to increase sustainability in the long term remains. The ToC of future project phases could explicitly define a sustainability target at outcome level. This would force all involved parties to design activities and outputs that contribute to the sustainability of programmes. Possible activities/outputs could be:

- Design a (hypothetical) exit that addresses the question on how sustainability should be addressed at the financial and institutional levels. This exit could use the five capabilites model as a blueprint
- Strategize about how to further increase third-party-funding for scholarships and research
- Strategize about how to increase the number of self-funding student
- Strategize about options to increase resource mobilisation of participating institutions.

Furthermore, current experiences on e-learning could be used to **digitize** certain programme components in a follow-up phase. During the COVID-19 Pandemic **e-learning components** were introduced, which – in a first assessment – were mostly assessed positively, even though the networking aspects and the exposure to different contexts was limited. The current experiences on e-learning could serve as a learning ground to expand digitization efforts within the master's programmes.

Similarly, **knowledge creation, transfer and awareness raising** could be further strengthened in a follow-up phase. Networking, outreach, and research activities are key components of AQUAHUB and are already used to create and disseminate knowledge, and to raise awareness on issues relevant to the sustainable management of aquatic ecosystems. Key outputs concerning networking and awareness raising exist, such as the web-based platform. Accordingly the future ToC should also include a specific outcome, such as outcome 6 of the revised ToC, and include a target on knowledge transfer, awareness building and – possibly - multiplication measures. Conducting a project-internal mapping exercise to centralise the existing knowledge on other interventions – both supporting and undermining AQUAHUB –, potential partners and other stakeholders could be used to strengthen AQUAHUB's network more strategically.

Finally, the planned **impact evaluation** based on the revised Terms of Reference should be used to test the revised Theory of Change and its underlying assumptions. It should focus in particular on those aspects of the ToC that have been identified as having limited plausability and should try to uncover good practices and possible ways of improving plausability. Given the results of the evaluability assessment and the review of the ToC, the impact evaluation should, in particular, employ a contribution analysis to attempt to validate the underlying causal mechanisms and a tracer study or case studies to assess the impact of graduates and of the link between skills development and organisational capacity.

8 Annexes

8.1 Consolidated ToC

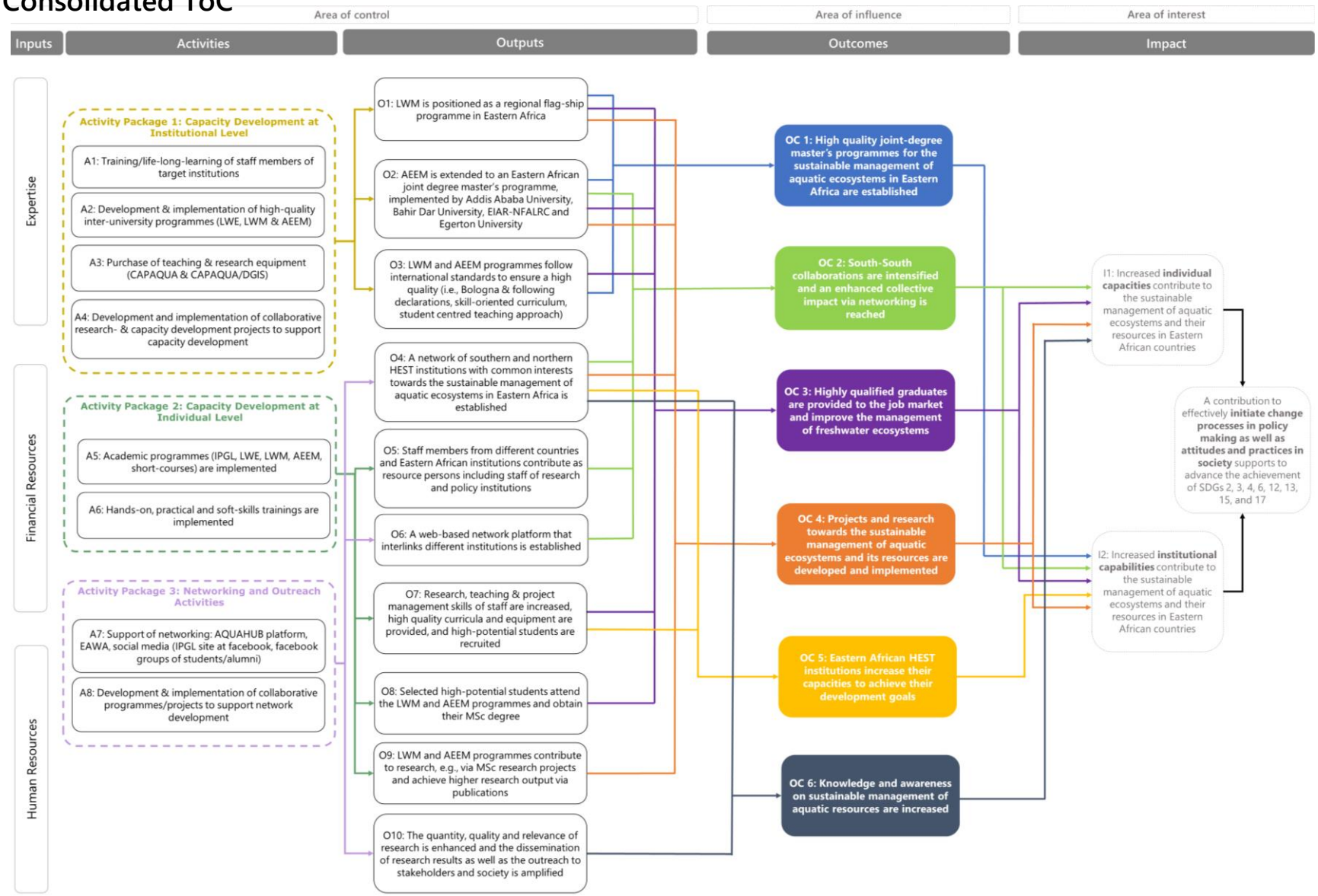


Figure 5: Visualisation of the Theory of Change

8.2 Revised ToR for the planned impact assessment assignment

See separate document.

8.3 Data Collected and Analysed

Table 8: Analysed Documents

Type	File Name
AQUAHUB Project Proposal	AQUAHUB_2018_21_ProjectDocument_final
AQUAHUB Logic Framework	AQUAHUB_2018_21_AnnexI_LogFrame_final
AQUAHUB Budget	Budget 0612-00-2018
AQUAHUB annual reports and M&E System	1_AQUAHUB_ProjectReport_July2019_per30June2019 2_AnnexI_ProjectResultsStatus Matrix_per30June2019 3_Management_Response_Matrix_CEvalEvaluation_per30June2019 1_AQUAHUB_ProjectReport_per30_06_2020 2_AQUAHUB_AnnexI_ProjectOutcomeStatus Matrix_per30_06_2020 3_AQUAHUB_AnnexII_Management_Response_Matrix_CEvalEvaluation_per30_06_2020
AQUAHUB Draft ToR	Draft_ToR_ImpactAssessment_AQUAHUB ToR_IA_AttachmentII_ToC
CAPAQUA Project Proposal	ProjectProposalDocument_CAPAQUA_2015_2018_final
CAPAQUA Logic Framework	CAPAQUA_LogFrame_2015_2018
CAPAQUA annual report	1_CAPAQUA_ProjectReport_3Y_July2017_October2018 2_AnnexI_ProjectResultStatusMatrix_CAPAQUA_31October2018 FinalReportCAPAQUA_StudentSatistics_2015_2018_final40PercentFemales
CAPAQUA M&E System	AnnexIV_MonitoringPlan_CAPAQUA_2015_2018
CAPAQUA Evaluation	FinalReport_CAPAQUA Evaluation ResultsForm_CAPAQUA II 2015-2018
IPGL Evaluation	IPGL_Evaluierung_2001_Zauner_Siebel

8.3.1 Table of Conducted Interviews & Focus Groups

Table 9: Conducted Interviews

	Kenya	Ethiopia	Uganda	Total
Project coordinators	1	1	1	3
Faculty management	1	1	1	3
Stakeholder institutions & relevant organisations	3	3	3	9
Lecturer focus group	1	1	1	3
Alumni focus group	1	1	1	3
Austrian Institutions				
Austrian Development Agency		1		1
Ministry for Foreign Affairs		1		1
		Total:		**23**

8.3.2 List of Contacted Persons

See separate document.

8.3.3 Bibliography

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8.4 Assessment Grid

See separate document.

8.5 Evaluability Assessment

See separate document.

8.6 IPEA

See separate document.

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