

Final report

Summer School „One Health and the Role of Water“



Person in charge

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Granted 78.200 €

¹ Jeweils eigene Abbildungen

Proposal August 14th, 2019 / supplemented in October 2019

Parties

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Project Summer School “**One Health and the Role of Water**”

The Summer School “One Health and the Role of Water” was held from the 14th of March 2022 to the 19th of March 2022 in Kilifi, Kenya, and was funded by the VW foundation.

The Summer School thus took place in the wake of the COVID-19 pandemic that had shown the need for a broader understanding of health. Government institutions like the Federal Ministry for Economic Cooperation and Development of Germany have now acknowledged this need and the related importance of One Health:

“The current pandemic, as well as the emergence of other zoonotic diseases and the growing number of antimicrobial resistances, illustrate the importance of approaching the topic of "health" with a broader understanding than before” (FMECD 2022).

On its homepage, the Ministry considers the pandemic a wake-up call for related changes.

Based on related scientific insights, the Technical University of Munich (TUM), Germany, Pwani University (PU) and Taita-Taveta University (TTU), Kenya, hosted the Summer School and based it upon the VW proposal from 2019.

This report describes the course of the Summer School and its main content, and lists the findings that emerged from it. By reporting from the multiple perspectives involved, the Summer School’s participants also come together in this report.

Attached to this report are the Summer School’s program, the lists of speakers and participants as well as the full versions of the student reports.

1 General objective and major goals of the Summer School

The Summer School was designed to enable postgraduate candidates to develop an increasing awareness that human health is closely interlinked with the health of animals, plants, and the environment. By research, programmes, policies and legislation including multiple sectors to communicate and collaborate in order to attain optimal health for people, domestic animals, wildlife, plants as well as the environment, One Health takes their interdependence into account.

To introduce doctoral candidates and Master students to the One Health concept and the importance of inter- and trans-disciplinary connections in research and teaching, the Summer School was designed to bring together experts from different fields from Africa and Europe. It was comprised of suitable postgraduate candidates drawn from the three participating universities and other universities in Africa.

In total, students from eight different countries participated in the Summer School. Moreover, established researchers from various institutions also played a part in the conference giving keynote speeches and other related presentations oscillating on the predetermined thematic areas

(lists of participants and the detailed Summer School Program can be found in the appendix).

Thereby, the Summer School aligned with the Sustainable Development Goals (SDGs). It was organized to achieve three main goals:

- Workshop proceedings completed with workshop reports, financial report and action plan
- Research study designs and new insights that inform the doctoral candidates' and Master students' future research projects
- Strengthened and newly established networks between TUM, PU and other participating universities as well as between participants, thereby contributing to Global South-Global North as well as South-South collaborations.

For goal attainment, the Summer School had a diverse programme, combining theory and practice by lectures, field excursions, and group work.

Experts from TUM and PU presented on the four foundational pillars of the programme:

Day I	Day II	Day III	Day V	Day IV
water management	Excursion / case studies	agriculture and One Health	societal Factors	water quality and human health

Over the six-day course of the conference, various activities took place. Two field excursions were made as case study points to the theme. The remaining days were dotted by keynote speeches and presentations from senior researchers, participating doctoral candidates, and focus group discussions, on a daily basis. The conference adopted a hybrid format because of the COVID-19 pandemic. Some of the presenters

were allowed to make virtual presentations, while a good number of them presented in person. After the lectures and excursions, students worked in groups to find solutions to pressing One Health issues in intercultural teams.

To illustrate goal attainment, this report is structured into

- Achievements of the Summer School: Lessons learned and networks (2.)
- Results of the online survey on the three major lessons learned during the Summer School (3.)
- What next? Way forward based on the achievements of the Summer School (4.)
- The financial report (5.)

2 Achievements of the Summer School: Presentations, Lessons learned and networks

The Summer School gathered qualified scholars to proliferate knowledge about structures, institutions, and actors in One Health as well as current research on pressing issues.

To assess the lessons learned and new insights generated during the Summer School, different tools were applied.

Firstly, participating students wrote daily reports on the Summer School program including the bespoke topics of the day and their personal lessons learned supplementing the formal reports about the Summer School days.

Secondly, participants from all universities have been asked to complete an online questionnaire on the three major lessons learned during the Summer School (see chapter 3). New networks and personal contacts have been established and strengthened over the course of the Summer School (see chapter 4).

In the following, the Summer School days, the daily workshops and lessons learned are summarized based on personal student reports of the day (Full versions of the student reports can be found in the Appendix).

Day I: Introductory remarks and Water management | 15th of March, 2022

The meeting was opened by a word of prayer from **Dr. Chimoni**, followed by a round of introductions by all participants.

The Vice Chancellor, Pwani University, **Prof. Dr. Mohamed Rajab**, welcomed all members by recognizing members from Technical University of Munich (TUM), Taita Taveta University (TTU), Pwani University (PU) and all participants from other universities. He reiterated the importance of the discourse noting that scientific environmental and health research are core in improving health.

The VC stated that water is one of the essential elements that sustain life on earth is directly connected to people's health, sanitation, hygiene, socio-economic development, and ecosystems functions. Forums like this Summer School could be an effective medium for exchanging research results and good practices.

Prof. Dr. Halimu Shauri (PU) welcomed all participants and gave a brief description of Pwani University, which was started 11 years ago and at the moment had more than 10, 000 students. He gave history of the MOU between PU and TUM, the various grants and projects and joint seminars and conference between the universities. He later welcomed **Prof. Dr. Elisabeth Wacker** and **Prof. Dr. Oberhoffer-Fritz** from TUM to give introductory remarks.

Prof. Dr. Oberhoffer-Fritz (Dean, TUM) made a virtual presentation and observed that the school embraces transformation by creating new internal structures to promote innovation. She further explained the role of SDGs, their applications, and the link with One Health. She encouraged the need to increase awareness of mental health issues, especially depression and anxiety related to COVID-19, HIV and TB.

Prof. Dr. Wacker (TUM) introduced the concept of One Health and the Role of Water, while proposing future research of the young researchers and exchange among different disciplines and different continents.

Keynote Speech on One Health

Dr. Patience Kiyuka (PU) did a keynote speech on One Health. She defined One Health as “the collaborative efforts of multiple disciplines working locally, nationally, and globally, to attain optimal health for people, animals, and our environment,” referring to the AVMA One Health initiative task force 2008.

Her presentation acknowledged that One Health covers among other issues, anti-microbiological resistance, and environmental matters. She reiterated that exploring One Health calls for more multi-disciplinary approaches.

The introduction was rounded off with the focus on the opportunity for young scientists to gain scientific qualifications. A TUM model was presented for this purpose by **Prof. Dr. Wacker** (TUM) on applying the Interdisciplinary and International Graduate School of Science and Engineering (IGSSE) approach to One Health. She emphasized that the approach dates back to 2016 with an aim of training new generations of young scientist and experts in their area of research through scientific knowledge and skill transfer.

The Afternoon Session

In the afternoon session, three presenters made presentations on different topics.

The anchoring of the content of the entire conference week was presented by

- **Prof. Dr. ing. Luke Olang** (TUK) on Water and One Health.

Then two virtual recorded presentations and discussions from TUM were made by

- **Prof. Dr. Gabriele Chiogna** (TUM) on Integrated water resources management and introduction to boDERECCE and by
- **Prof. Dr. Peter Rutschmann** (TUM) on Modelling exercise about flow and transport of contaminants in aquifers.

Prof. Dr. Luke Olang's presentation focused on water and health, with the presenter showcasing the continuous movement of water with the Earth and atmosphere. He echoed the sentiments earlier made about water as a contributing factor to the impasse between Ukraine and Russia.

“Conflict directly reflects to the health issues especially in Africa”.

He mentioned about the world meteorological congress, which highlighted the possible climate changes in the future.

He emphasized that Africa is enriched with vast diversity relating to different climatic, socio-cultural and geopolitical conditions of different regions in Africa. However, he underscored that over 300 million people do not have access to safe and clean water in Africa. In Kenya, only 59 % of people have access to safe drinking water. Furthermore, his presentation noted that almost one third of the world population are affected by epidemics caused by water. As a way forward, the presenter suggested that;

- Sustainable, equitable and efficient water resources management, while engaging in a multisectoral approach.
- Integrating traditional knowledge in the management of water resources.
- Responding effectively to transboundary conflicts bordering water basins, e. g. Kenya vs. Uganda.

Prof. Dr. Gabriele Chiogna introduced the participants to the ModePROCON model as a decision-making tool for emerging contaminants. The tool is used in the detection awareness of PPCP in the water sources. The presenter went further to mention the *International Water Resource Management (IWRM)* that began in 1992 during the Earth Summit in Rio de Janeiro that was followed by the Millennium Development Goals (MDGs) in 2000.

He emphasized on the significance of policy and legal framework in the management of water, while asserting there is need of political good will to realize this.

He suggested the following as way forward:

- Political will is key in the management of water resources
- Capacity building of water champions
- A safe space or trusted platform to converse on water management
- Knowledge about national context
- Adopt sustainable technologies in water management
- Build on existing expertise

- Community involvement in water management practices; bottom-up model

Prof. Dr. Rutschmann's presentation was largely based on Hydropower as a renewable energy with significant progress in its utilization, especially in developing countries. The presenter emphasized on the potential of hydropower worldwide with Africa only realizing 8 % of its potential in hydropower:

“Personally we cannot decide on how countries generate power but we can provide guidance on the sustainable use of resources that generate power. This is especially on water which also supports aqua-life.”

He reiterated on the need for an eco-friendly hydropower generation plants. He suggested development of hydropower plants that supports the fish migration downstream.

At the end of the first day, the focus was on the state of practice in Kenya by two further speakers:

Mr. Ernest Chea of the Kilifi Water Company gave a brief background of water issues in Kenya. He emphasized the fact that over time, there has been deficiency in water supply hence exposing humans to diseases because of sharing water pans between humans and animals.

This presentation was followed by a presentation from **Ms. Elizabeth Lusweti** (KU; Kenyatta University), a postgraduate student, on heavy metals concentration, surface water, sediments and characterization of hydro chemical faces.

Generally, all the presentations were followed by an interactive discussion with the participants from different disciplines.

Day II: Excursion to Jaribuni and Gedi Ruins | 15th of March, 2022

Day two of the Summer School was probably the most impactful day when it comes to a call for action concerning One Health.

As one German student puts it:

“Our first trip led us to a rural community roughly 1 ½ hours away from the university. The stark contrast of the roads already showed us Kenya is quickly developing but still carries the burden of poverty for most. Even with a motorized vehicle, the next doctor is at least an hour away and at least two hours to the next hospital. Hence, One Health is also a question of infrastructure, not just hospitals, but also roads and quick means of transportation.

During travel preparations for Kenya one stacks up on malaria pills, gets vaccinated against yellow fever and packs Buscopan against unusual bowel movements.”

Excursion to Jaribuni



- First visit Kwa Maya village

The main objective of this excursion was to demonstrate the Role of Water on sanitation and hygiene. It was observed from the field trip that lack of enough and safe water has the potential to catalyze the re-emergence of zoonotic diseases. In particular, it was witnessed that a one of the family who had a leprosy victim. A water pan, the only source of water in the village was dry, and reports were rife that animals and humans have had to share the same source of water. The available water was equally dirty and unsafe for human and animal consumption, and that ash is used to purify the water for drinking.



- Jaribuni health facility

The participants were introduced to the facility and staff members and given a brief history of the facility. It emerged that there is the only hospital within a wider geographical circumference that takes care of the entire community. It was further established that myths and illiteracy about leprosy fueled stigma whereby patients did not want to continue with the medication after they were released to go home because of lack of knowledge about the disease.

This offered a unique occasion to enlarge individual horizons:

The visit to Jaribuni demonstrated the rare but severe occurrence of leprosy in the very poor community visited. Leprosy is a very preventable, but when undiagnosed, very deadly communicable disease. When diagnosed too late, patients might survive, but will have to live with handicaps of amputated limbs. Leprosy is transmitted by bacteria that are transmitted via droplets from the nose and mouth during close and

frequent contact with untreated cases. Prolonged, close contact with someone with untreated leprosy over many months is needed to catch the disease. This is the reason, why the Summer School organizers chose the community we visited where two leprosy survivors were so kind to tell us their story and explained their struggles. One Health issues do not just affect the condition and health of a person in the short term. The handicap of a mother led to her incapacity for work making her son the sole income provider of the family, which led to his struggles earning enough to be able to pay for his school fees.

- Excursion to Gedi

The field trip to the Gedi historical site was a crucial part of the conference as it demonstrated the importance of water to the development of civilizations. It was revealed that

Swahili people had inhabited and abandoned the site following the scarcity and salinity of the water sources that hit the historical city. This was after diseases and a continued lack of fresh drinking water hit the town that the inhabitants had to abandon it. This excursion was equally relevant and in line with the objectives of the conference.

The visit offered important insights for One Health scholars:

On the other hand, Gedi city, while being a ruin, still presents the marvelous architecture the Swahili culture was able to enact during the Middle-Ages and Renaissance era. Inhouse shower and latrine implementations display a high sense of hygiene and remarkable engineering skills. Still, the city was given up in the 16th century. The Swahili culture did not use a written communication system to our knowledge. Therefore, experts assume the city society broke down due to plague and cholera rampages. Gedi city symbolizes what an inadequate One Health system can cause in a broader sense – the bereavement of a highly developed culture.

Both trips were very crucial for students and researchers to be reminded how important it is to step out of the ivory tower academia often is and re-focus on the exact needs of the target groups when it comes to One Health by meeting up with them.



Day III: Agriculture and One Health | 16th of March, 2022



The third day saw cross-cutting presentations and discussions on issues ranging from water quality effects on plant health to land-water-food-health nexus, water quality effects on animal health, water quality effects on human health and food handling in local markets.

Morning session

Dr Elisha Gogo (Department of Crop Sciences, PU) presented on **Assessment of Water Quality Effects on Plant Health**

She noted that water quality revolves around physical, chemical and biological characteristics. Salinity is among the most common problem affecting water quality in the region. Nature of the soil is one of the factors to be considered when talking about water quality. Therefore, water quality problems also affect water absorption rates by plants. When the plant takes up toxic soil and water, there is damage to the crop causing low yields, which results into food and nutritional insecurity with health consequences such as under- and malnutrition.

Prof. Dr. Walter de Vries from TUM (School of Engineering and Design, Centre of Land, Water and Environmental Risk Management) presented on **Land and water**

He explained how low-level lands are prone to floods even though they are fertile. The increase of floods affects crop production. He suggested that the solution for such an area is to install dykes such as canals.

On land-water-food-health nexus, Prof. de Vries shared experiences from Portugal (Netherland), Lampurg (Indonesia) and Windhoek (Namibia) where he noted challenges and opportunities of modelling the nexus. He called for interaction between scientists and politicians since a good land-water-food-health nexus project intervention would require political will be implemented. In addition, he noted that scientists and politicians view issues differently and have varying priorities, which sometimes calls for scientists to reframe projects and research topics to win political will.

We learned from his presentation that urban-rural dichotomies, unclear administrative boundaries and differential scales of available data pose some of the greatest challenges in modelling the land-water-food-health nexus.

Dr. Noah Maritim from PU presented on **Water quality and animal health**

He noted that water is life and one of the most important resources **as a nutrient** for humans, animals and plants. Moreover, he noted that for water to be safe for all animal species it should be clean. Moreover, food and animal produce can be affected by the quality of water that the animals take in. He concluded that water should be tasted to ensure it is safe for animal consumption.

He put the discussion in the context of One Health, positing that poor water quality for animals tends to affect human health as we consume animals that ingest bacteria from poor quality or contaminated water.

Prof. Dr. Maarifa Mwakumanya from PU presented on **Food quality and water**

The presenter noted that most of the foods in the market are over processed, which means most of what we eat is contaminated. He prescribed that quality food is characterized by proper sanitation, meets the required political and sociological aspects of health, safe, ethical and has aesthetical value, culturally functional, convenient and authentic. Therefore, he observed that there is need to look into issues of food handling in order to improve on food quality and human health.

Prof. Dr. Marianne Maghanga (School of Agricultural, Earth & Environmental Sciences, Taita Taveta University) shared insights on **Food handling in the local markets**.

A key highlight in her presentation in relation to the Summer School theme was that, water scarcity has increased dependency on contaminated water food production and preservation in local markets.

Afternoon session

Eng. James Thubu and **Mr. Charles Dadu** (Kilifi County) presented on **Water Quality in the Coastal Region**

Eng. Thubu highlighted that rural areas face challenges in accessing water as compared to urban areas in the region. In addition, he pointed out the ongoing County Government initiatives at the community level including community sensitization programs, such as campaigns against open defecation, and conservation of water catchment areas.

Mr. Charles Dadu noted the need for a

“Multisectoral approach in tackling health needs of population as envisaged in One Health”.

He further noted the emerging health concerns relating to open-air defecation and Rabies and Anti-Microbial Resistance (AMR). Hon, Charles Dadu also identified Food Security as an emerging issue, while also highlighting the progress made with the support of like-minded NGOs in ensuring Food Security. He acknowledged the robust networking between the Pwani University and County Department of Health. While highlighting the Universal Health Coverage, as one of the BIG FOUR Agenda, he acknowledged that the county administration had invested in training Community Health Volunteers (CHV) in the bid of alleviation of water borne diseases such as cholera.”

The county executive committee member in charge of health acknowledged the importance of the One Health concept and the need for interdisciplinary cooperation to

address contemporary health challenges in the county including zoonotic, antimicrobial resistance and food safety. He noted that the One Health concept has a direct nexus with the Universal Health coverage drive of Kenya, and touted several initiatives, all of which aim at bringing different stakeholders and sectors on board to achieve good health.

Dr. Noah Maritim from PU presented a **Case Study on water quality, animal and human health**

He emphasized on the dangers associated with humans and animals simultaneously sharing water sources. He noted that persons who ingest chemical toxins in water risk being diagnosed with cancer, altered brain function, hormone disruption and kidney problems. Already, early puberty because of hormone disruption is being witnessed among young people and that globally, humans are being exposed to veterinary drugs.

He concluded that we all have a responsibility in ensuring there is safe and clean water available for all animals.

Finally, the day was concluded with graduate student pitches on cross-cutting topics including

- post-harvest losses
- WASH for early childhood learners
- One Health and climate change
- microplastics ingestion
- food safety interventions in informal markets

Day IV: Human Health and Water Quality – Summary | 17th of March, 2022

The fourth day of the Summer School was dedicated to the pillar Human Health and Water Quality.

Morning session

Mr. Obeka Bonventure from PU and TUM presented on **Food Security and health: A practical approach to improving equitable health outcomes**

He acknowledge that Food Security is necessary for the realization of positive health outcome of people. He drew a rife nexus between the lack of adequate food access to emergence of non-communicable diseases. He therefore called for the need for a multilayered approach in handling issues of improving Food Security to maximize access to quality food necessary for human health.

Food Security means that all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs for an active and healthy life. As global human population is on the rise (expected to hit 9.7 billion by the year 2050), challenges related to access to safe, nutritious and hence poor health outcomes could increase. Different dimensions of food insecurity (e. g. high, marginal, low, very low food secure) should be considered. Ways to ensure Food Security were discussed, including increasing climate resilience across all food systems, strengthening the resilience of the most vulnerable to economic adversity and intervening along the food supply chains to lower the cost of nutritious foods.

Dr. Susanne Ferschl from TUM presented on **Towards environmental justice in the context of water-borne disease. By applying a lens of the Capability Approach**



She emphasized that environmental justice can be attained if people are given a fair chance to participate in making decisions that influence their life, especially their health outcomes. Consequently, she draws the need to encourage active participation of community members in improving the quality of water resources.

Water-borne diseases (e. g. diarrhea, cholera, typhoid, hepatitis A and E) lead to 1,5 Mio. deaths a year and are associated with a lack of water resources, water infrastructure and clean water. Environmental justice refers to fair treatment and meaningful involvement of stakeholders, which means all people have the opportunity to participate in decisions about activities that affect their life. According to the Capability

Approach, it is important to ensure freedom to achieve those things that people value, diversity, structure and agency.

Afternoon session

In a further talk by **Dr. Patricia Mbogo** (Department of Food Nutrition and Dietetics, PU) the topic of **Food insecurity** was discussed more deeply, particularly with regard to malnutrition. Every country is affected by malnutrition (e. g. undernutrition, inadequate vitamins/minerals, overweight, diet-related non-communicable diseases) The causes for food insecurity are multiple: a lack of access to farming land, land grabbing, conflicts, fast-paced population growth, natural disasters, climate change, and wastage of food. Numerous effects of food insecurity have been presented (e. g. undernutrition, hunger, a rise in health-related costs, violent conflicts, and increased risks of birth defects, anemia, cognitive problems, aggression and anxiety, behavioral problems, depression as well as high suicide rates). Solutions to improve access to food comprise reduction of food waste and postharvest losses, improvement of trade policies, promotion of dietary and food diversification, and education programs for women.



Dr. Makoran Mjidho (School of Human and Health Sciences, PU) described a holistic perspective on health within the Kenyan context in his lecture. Therefore, physical, social, cognitive, emotional, mental, environmental, spiritual aspects regarding health should be considered. Spiritualism is related, for example, to the questions ‚How do we reconcile African tradition and contemporary medicine?’

In addition to the lectures, graduate and PhD students presented their research projects in short pitches with regard to ‚Water and Human Health’. Topics such as

- ceramic filters to improve water quality,
- sustainable plant medicine,
- perception of climate change in communities,
- assessment of groundwater quality in coastal areas and
- water access inequalities

were discussed.

Day V: Societal Factors | 18th of March, 2022



The theme of day 5 of the Summer School was “Societal Factors.” The morning started with an introductory presentation by **Prof. Dr. Halimu Shauri** on the broad topic of Societal Factors.

Morning session

Prof. Halimu Shauri (PU) presented on **The Social Factors in relation to the concept of One Health** on Sustainable Development Goals 6 and 17. In the Kenyan context, he highlighted that the attainment of Vision 2030 is based on 3 pillars; economic, social and political pillar.

He illustrated how One Health Summer School ties these together from the global context coming down to the local context. The speaker emphasized that water is necessary for survival of all forms of life, and as such, access to it has a direct impact on human health. It was further noted that human behavior is key in the management of water. Socialization on the usage of water is therefore important. Culture can be a barrier or enabler to sustainable water for good health and sanitation. In order to mitigate this, the speaker suggested the need for socialization and education to change consumption and lifestyles, investment in wastewater recycling and economize use of fresh water for irrigation and agriculture. Additionally, he prescribed the need to price water appropriately and develop energy efficient desalination techniques and plants among others. The importance of Public-Private Partnerships (PPP) for sustainable water development was also covered in his presentation.

Ms. Andrea Göttler (TUM) presented on **How One Health can benefit from an intersectionality lens to address health inequalities.**

She addressed the role of Societal Factors in One Health, levels of inequality, the leave no one behind policy, and understanding intersectionality of inequality. She therefore suggested the importance of minimizing cultural essentialism on one hand and the need to address cultural logistics and barriers. This could be achieved through

adopting approaches based on cultural competence, community-based research, participatory approaches and ethnographic research.

Ultimately, she encouraged the group that One Health can benefit from an intersectionality lens by understanding power relations and the fact that inequalities arise in a cultural context that needs to be understood.

The following questions and discussion session dove into the topic of gender roles through the example of women fetching water, and provoked questions regarding discrimination and the subsequent inclusion of women in policy decisions.

Afternoon session

Dr. Ulrike Fettke (TUM) introduced the phrase **Health in All Policies (HiAP)** and delivered a presentation on utilizing this approach to promote health equity. Major challenges were discussed, ranging from the lack of communication and resources to conflicting goals of policy fields to power structures. The take-home message focused on the need for HiAP as well as inter- and transdisciplinary assessments of health.

Scattered throughout the day were individual pitches given by graduate student participants of the Summer School. Topics ranged from Planetary Health to community perceptions and influences on water and plant quality to the development of a new, local water quality index.

Day VI: Interdisciplinary group work | 19th of March, 2022

During the sixth and last day of the Summer School, participants started the morning with interdisciplinary group discussions to develop a student **One Health Action Plan** (see chapter 3 for details on the group work and the achieved results).

Finally, and to close the Summer School, Prof. Dr. Dr. Andrea Winkler (TUM and Lancet Commission on Inter- and Multidisciplinary Approaches to Human, Veterinary and Environmental Health ("One Health")) gave a final key note lecture on One Health and its relevance in the future global research agenda.

Final Keynote Speech on One Health

Prof. Dr. med. Dr. phil. Andrea Winkler from TUM outlined the history of **One Health and its relevance in future global research agenda.**

She outlined the history of One Health from a biomedical perspective made definitions of related concepts and showed the need for a holistic health approach that underpins interdependence in assessing One Health.

Special attention was given to The Lancet One Health Commission on One Health research areas and the need to put emphasis on Neglected tropical diseases, Antimicrobial resistance, Non-communicable diseases, Global Action Plan on epilepsy and One Health and Governance.

Prof. Dr. Shauri (PU) and **Prof. Dr. Wacker** (TUM) gave final **Votes of thanks.**

They linked One Health with Vision 2030 and once more reiterated the need for participants to apply what they learned in the conference and consolidate networks for possible future cooperation in the field of One Health. They further thanked the participants and all stakeholders for making the Summer School possible and the organizers and hosts for the good job in making it all possible for the long awaited Summer School that had now been achieved.



One Health?

3 Results of the Online Survey on the three major lessons learned during the Summer School

Eventually, participating candidates were asked to enumerate some of the key messages learned during the six day workshop period. Prof. Dr. Mahenda, Prof. Dr. Wacker, Dr. Susanne Ferschl and Dr. Ulrike Fettke prepared questions for the participating postgraduates for an online questioning about the take home-messages of the Summer School. The questionnaire contained open questions about the major lessons learned in regards of One Health challenges, solution identification, and implementation.



With no doubt, most of the participants found great relevance between their research interests and the theme of the conference. It is further appreciated that majority of the responses indicate that the participants now appreciate the interconnection between human, animal, and plant health more than ever. Additionally, majority of the participants reported that by the end of the workshop, it was clear for them that

“water and sanitation practices are important for health.”

Additionally, responses from the survey indicate that the participants acknowledge the need for multi sectoral cooperation within the health care system with a focus on water, sanitation, and hygiene. This is visible through assertions that “sanitation and health are a collective responsibility” and that

“the use of water should adopt a sustainability approach”

to guarantee the future of health systems. Generally, the survey demonstrates that the respondents acknowledge that health inequalities could be minimized if the concept of One Health is to be taken seriously.

The participants acknowledge that the excursions taken within the conference were very valid because they helped underscore the whole point of “One Health and the Role of Water.” The practical examples seen demonstrate the intricate relationship between One Health and how water can help achieve sanitation and hygiene in securing healthy communities. Consequently, the participants reported that they had every intention to use the lessons drawn from the conference to contribute to the whole discussion. Some of them look forward to raising awareness of the role of Water to sanitation and hygiene to health within their communities. This is set to be achieved through lobbying for relevant policy adoption, applying for grants centered on WASH, and implement them in affected communities, direct participation in water conservation initiatives in the community and generally raising awareness on local levels that can positively influence health-seeking behaviors.

During the last day of the Summer School, students with diverse study backgrounds and levels (Social Sciences, Engineering Sciences, Health Sciences, Environmental Sciences, Medical Sciences, Agricultural Sciences on Bachelor, Master, and PhD level) engaged in four inter-disciplinary discussions to develop new solutions to the One Health challenges as experienced during the excursion to the community of Jaribuni and the Gedi Ruins.

The results were finally presented to the plenary and open questions or commentaries were discussed with all other participants. Inspired through the mutual exchange, new research approaches and perspectives were discovered which ultimately also enriched the own current research of the participants.



Moreover, ideas on potential future research topics emerged and were discussed. In the following, an example of the results of a group work is presented:

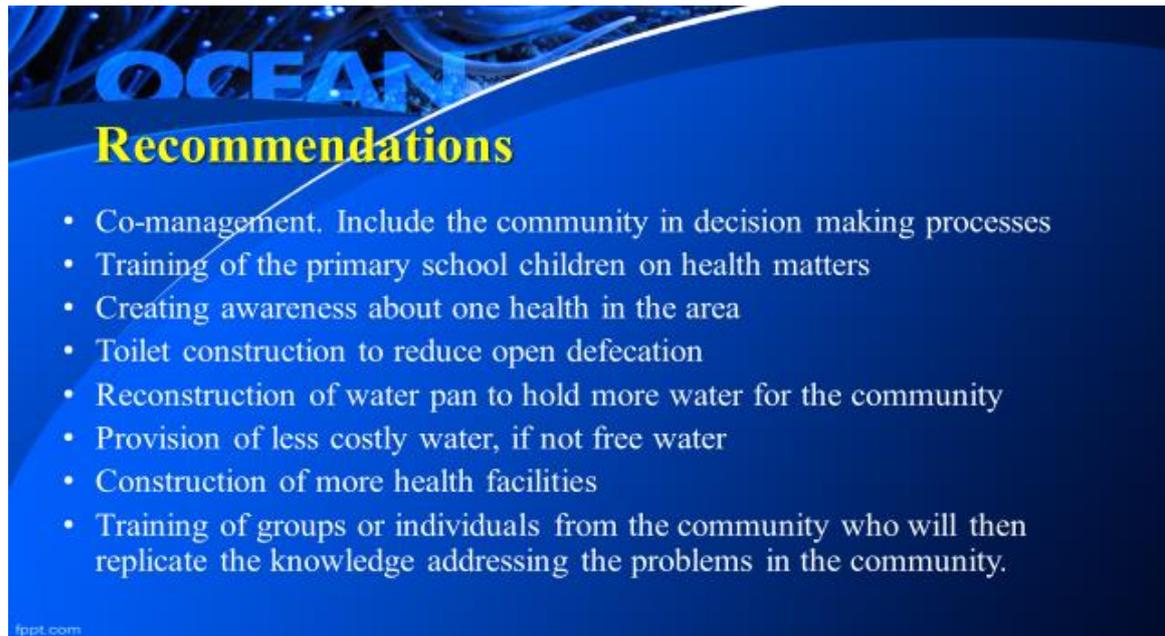
The group observed One Health challenges such as

- inadequate water supply,
- poor road infrastructure,
- lack of in-house toilets and health facilities,
- dry land and poor food handling techniques in the study sites.

These challenges were deemed to relate to One Health due to their relevance for

- emerging zoonotic diseases,
- animal, environmental and human health.

The recommendations to counter these challenges and related One Health issues were elaborated by the student group, including the following:



OCEAN

Recommendations

- Co-management. Include the community in decision making processes
- Training of the primary school children on health matters
- Creating awareness about one health in the area
- Toilet construction to reduce open defecation
- Reconstruction of water pan to hold more water for the community
- Provision of less costly water, if not free water
- Construction of more health facilities
- Training of groups or individuals from the community who will then replicate the knowledge addressing the problems in the community.

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4 What next? Way forward based on the achievements of the Summer School

The students' reports (see appendix), group works (see appendix) and evaluations illustrate that the Summer School showed the pressing One Health problems to the participants' eyes and enabled intercultural experiences, exchange, and cooperation – for some participants the very first time in an African country in their lifetime. Not only emerging health issues like the COVID-19 pandemic but contemporary horrors of war show us how important intercultural exchange, transnational cooperation, and interstate friendship are, and thus how valuable meeting and learning opportunities such as the Summer School described here are.



Over the course of the Summer School, a WhatsApp group including all Summer School participants was created. The WhatsApp group is very active and to date (until now, December 2022). Pictures, job offers, call for grant proposals, internship opportunities, and research articles have been exchanged. Among individuals, email addresses have been exchanged to deepen the contact for research cooperation in the future.

- Joint publication
- Sustainability of networks ongoing
- Implementation of student recommendations for addressing One Health issues
- Further research/meetings/exchange of universities

5. Financial report

*The financial report can all be found
in a separate special appendix.*

APPENDIX

Participants of the Summer School

List of participants – Pwani University (PU) and Kilifi County, Technical University of Kenya (TUK) & Taita Taveta University (TTU)

S/No	Name	Affiliation
1	Prof. Mohammed S. Rajab	Pwani University
2	Prof. Tsanuo Muniro	Pwani University
3	Prof. James Kahindi	Pwani University
4	Prof. H Shauri	Pwani University
5	Dr. Rose Kigathi	Pwani University
6	Prof. Luke Olang	Technical University of Kenya
7	Dr. Otieno Ajwang	Pwani University
8	Dr. Elisha Gogo	Pwani University
9	Prof. Maarifa Mwakumanya	Pwani University
10	Prof. Marianne Maghanga	Taita Taveta University
11	Dr. Noah Maritim	Pwani University
12	Dr. Cheryl Andisi	Pwani University
13	Dr. Osman Abdulahi	Pwani University
14	Dr. Makoran Mjidho	Pwani University
15	Dr. Raphael Mwatela	Pwani University
16	Dr. Sellah Lusweti	Pwani University
17	Mr. Obeka Bonventure	Pwani University & Technical University of Munich
18	. Dr. Patience Kiyuka	Pwani University
19	Eng. James Thubu	Kilifi County Government
20	Mr. Charles Dadu	Kilifi County Government



List of participants – TUM, LMU, Uppsala University (Sweden), University of Nairobi

Name		Affiliation		
1	Dachaga, Walter	TUM, PhD Student (Wissenschaftliche Hilfskraft)	Lehrstuhl für Hydrologie und Flussgebietsmanagement (Prof. Disse)	<input checked="" type="checkbox"/>
2	Butscher, Friederike	TUM, PhD Studentin (Wiss. MA)	Professur für Sport- und Gesundheitsdidaktik	<input checked="" type="checkbox"/>
3	Walker, Erin	TUM (Studentin)	Master Gesundheitswissenschaften	<input checked="" type="checkbox"/>
4	Freund, Johanna	TUM, PhD Studentin (Wiss. MA)	Professur für Psychology & Digital Mental Health Care	<input checked="" type="checkbox"/>
5	Kaiser Annika	Postgraduate TUM and LMU (Studentische Hilfskraft)		<input checked="" type="checkbox"/>
6	Bekele, Meseret	Uppsala University (Sweden)		<input checked="" type="checkbox"/>
7	Majiwa, Hamilton	University of Nairobi		<input checked="" type="checkbox"/>
8	Mekonen, Sisay Simachew	TUM, PhD Student (Stipendiat)	Lehrstuhl für Hydrologie und Flussgebietsmanagement (Prof. Disse)	<input checked="" type="checkbox"/>
9	Sarmiento Velarde, Pablo	TUM, PhD Student (DAAD Stipendiat)	Lehrstuhl für Hydrologie und Flussgebietsmanagement (Prof. Disse)	<input checked="" type="checkbox"/>
10	Ferschl, Susanne	TUM (Wiss. MA)	AG Diversitätssoziologie	<input checked="" type="checkbox"/>
11	Göttler, Andrea	TUM (Wiss. MA)	Lehrstuhl für Soziale Determinanten der Gesundheit	<input checked="" type="checkbox"/>
12	Fettke, Ulrike	TUM (Wiss. MA)	AG Diversitätssoziologie / Lehrstuhl für Soziale Determinanten der Gesundheit	<input checked="" type="checkbox"/>
13	Elisabeth, Wacker	TUM (Chair em.)	AG Diversitätssoziologie	<input checked="" type="checkbox"/>

List of students

S/No	Name	Affiliation
1	Getamesay Shiwenzu Nigussie	Moi University
2	Rebecca Lodi	Moi University
3	Zulfa Adan	Moi University
4	Christine Chepngeno	Egerton University
5	Nyiramvuyekure Verene	Egerton University
6	Esther Mbushi Kinyua	Makerere University
7	Zaccheus Shehu	Makerere University
8	Nathuhwera Merolyne	Makerere University
9	Tabitha Alango	Maasai Mara University
10	Elizabeth Lusweti	Kenyatta University
11	John Nene	Pwani University
12	Muriithi Martin Mbugua	Pwani University
13	Leah Mwangi Muthoni	Pwani University
14	Baka Oluoch Ogalo	Pwani University
15	Geoffrrry Gamoyo Katana	Pwani University
16	Anthony Menza Kenga	Pwani University
17	Catherine C. Munga	Pwani University
18	Kayusi Fredrick	Pwani University
19	Lilian Halima	Pwani University
20	Ernest Chea	Pwani University
21	Dennis Otieno	Technical University of Mom-basa
22	Purity Ncabira	Taita Taveta University
23	Benard Kadwar	Taita Taveta University
24	Christine Mchana Mighulo	Taita Taveta University
25	Danson Nyange Mwakazi	Taita Taveta University
26	Mwambi Grace Mkanjala	Taita Taveta University
27	Paul Mwachila Edward	Taita Taveta University
28	Olabi Leonard Worou	University of Cape Coast
29	Emuobonuvie Grace Ayeta	University of Cape Coast
30	Fred Kwaku Ahiat	University of Cape Coast
31	Dorothy Khasisi Lukhabi	University of Cape Coast
32	Rael Tersa Adhiambo	University of Cape Coast
33	Dinah Ayoma Wechuli	University of Eldoret
34	Edwin Kanda	University of KwaZulu-Natal
35	Protus Yabunga	University of Nottingham



TUM Student Reports

TUM Student 1: *DAY I, 14th of March, 2022: One health and the Role of Water - Summary*

The Summer School started on 14th of March, 2022 at 9:00 am in morning with welcoming remarks by the VC of Pwani University, **Prof. Dr. Mohamed Rajab**. The Prof. began his talk by well coming the participants, and he mentioned that it gives him great pleasure to be here today and open this crucial international Summer School entitled “One Health and The Role of Water.” And he also stated as water is one of the essential elements that sustain life on earth as it is directly connected to people’s health, sanitation, hygiene, all socio-economic development, and ecosystems functions. And he said this kind of international multi-disciplinary Summer School integrating health, water, and Societal Factors are crucial than ever as our plant is under pressure because of population growth and changing climate. He also mentioned that Pwani University highly encourages and welcomes researchers, professionals, and practitioners to be involved in innovations and technology transfer related to the benefit of the community. Therefore, forums like this Summer School could be an effective medium for exchanging research results and good practices. He appreciated the Technical University of Munich and the organizing committee to create and sustain this kind of forum. And he finally mentioned as he wished the participants to have an enjoyable stay and wished to have a very fruitful deliberation and declared that the workshop is officially open. And hoped the participants to fill home during their stay in Pwani University, Kilifi town.

The opening speech was followed by an introductory remark by **Prof. Dr. Elisabeth Wacker** (from the Technical University of Munich) and **Prof. Dr. Halimu Shauri** (Pwani University).

Prof. Wacker said she is with great enthusiasm and always very impressed by this young, dynamic Pwani University and the sworn community of people active in it. She expressed as she was touched by that the Summer School is about the future topic,

future cooperation of young junior researchers, the exchange across disciplines, across countries and continents. Prof. Wacker also shared a German poem by Christian Morgenstern, *'The Impossible Fact'*. She mentioned that the Summer School was supposed to happen before two years; however, it was postponed because of the Covid-19 pandemic. She also will not be able to pass to express her deep feelings on the sufferings in Ukraine. On 24th of February, while the UN Security Council was in session, a nightmare started, troops invaded a free country. Destruction and great suffering set in; more than 1.5 million people have fled their own country, mostly women and children.

Prof. Wacker finally concluded as Global changes affect the interaction of humans, animals, and the environment more than so ever in the context of health. Hence, the professor mentioned that we could address health for all with our means, the means of science. Furthermore, globalization and social policy have become even more visible as integral parts of health issues, and we are called upon to use such impossible facts for joint action. Finally, the Prof. concluded the introductory remark by thanking and wishing a fruitful stay to the participants.

Prof. Shauri addressed a well-coming speech to the participants on behalf of Pwani University and thanked the Technical University of Munich and the donor for supporting the program and making it happen. Then, he used the opportunity to speak a few about Pwani University. The first foundation stone of the current Pwani University was laid in 1984, and later on, in 2007, it was established as a constituent college of Kenyatta University. Finally, in 2013, Pwani University was established as an independent entity and awarded a charter by the third president of Kenya H.E, President Mwai Kibaki. And he mentioned that the collaboration of this project between Pwani and the Technical University of Munich towards enhancing research, publication, intercultural cooperation, student and staff exchanges was signed between the two universities in 2013. And he finally thanked the participants from different countries with broad disciplines and wished them a fruitful Summer School and a pleasant stay.

Then the introductory remark was followed by a keynote speech by **Dr. Patience Kiyuka** on One Health. Dr. Kiyuka mentioned as One Health is a broad perspective as it connects humans, animals, and health in one. And she defined One Health as “the collaborative efforts of multiple disciplines working locally, nationally, and globally, to attain optimal health for people, animals, and our environment,” referring to the AVMA One health initiative task force 2008. She also tried to address the key One Health issues and challenges to the health approach.

Then, a welcoming address (a virtual record) to the participants was made by **Prof. Dr. Renate Oberhoffer-Fritz**, Dean at TUM.

Finally, four presentations on different topics were made by four presenters. Two of the presentations are by Prof. Wacker on applying the interdisciplinary and international Graduate School of Science and Engineering (IGSSE) approach to One Health, and **Prof. Dr. Luke Olang** from TUK on Water and One Health. Then two virtual recorded presentations and discussions from TUM by **Prof. Dr. Gabriele Chiogna** on integrated water resources management and introduction to boDERECCE and **Prof. Dr. Peter Rutschmann** on modelling exercise about flow and transport of contaminants in aquifers were made.

Generally, all the presentations were done on one water health and the Role of Water related topics and then followed by an interactive discussion with the participants from different disciplines.

TUM Student 2: DAY II, 15th of March, 2022: Excursion to Jaribuni – Summary

Day two of the Summer School was probably the most impactful day when it comes to a call for action concerning One Health. The day consisted of two trips, first a visit to a poverty stricken community and second, a historical sight called Gedi city.

Our first trip led us to a rural community roughly 1 ½ hours away from the university. The stark contrast of the roads already showed us Kenya is quickly developing but still carries the burden of poverty for most. While driving in the direction of Mombasa the roads were of German quality but as soon as we turned right of the main road the bus ride turned into a hell ride full of bumps, dust and window shattering. It was the first indication of One Health. Even with a motorized vehicle, the next doctor is at least an hour away and at least two hours to the next hospital. Hence, One Health is also a question of infrastructure, not just hospitals, but also roads and quick means of transportation – a thought most of us probably never had where the next ambulance is 7 minutes away.



During travel preparations for Kenya one stacks up on malaria pills, gets vaccinated against yellow fever and packs Buscopan against unusual bowl movements. Rather unknown to foreigners and Kenyans alike, is the rare but severe occurrence of Leprosy in very poor communities of the country. Leprosy is a very preventable, but when undiagnosed, very deadly communicable disease. When diagnosed too late, patients

might survive, but will have to live with handicaps of amputated limbs. Leprosy is transmitted by open defecation, flies getting in touch with the excrements and then landing on food or other droplet infections due to unsanitary living conditions. This is the reason, why the Summer School organizers chose the community we visited where two Leprosy survivors were so kind to tell us their story and hold a speech about their struggles which again gave us a real-live example of how interconnect aspects of health are. By simple actions, Leprosy contamination can be prevented. Usage of sufficient latrines, uncontaminated water, access to hand washing and sanitation stations, the end of open cooking facilities, a clear separation of human and animal living areas, better schooling of health staff to detect Leprosy in an early stage and many more actions give a halt to the spread of an easily evadable disease and getting a step further to One Health in Kenya. One of the Leprosy survivors, a single mom with two children, lost both her feet and fingers to the illness. One of her sons was also infected but thanks to sheer luck received a diagnosis before losing any limbs. Nevertheless, the son was a prime example of how One Health issues do not just affect the condition and health of a person in the short term. The handicap of his mother led to her incapacity for work making him the sole income provider of the family which led to his struggles earning enough to be able to pay for his school fees. As is known, education and income are highly correlated. Hence, the disease of the household head led to the threat of a poverty trap for the whole family, again leading to the threat of inadequate health care as in Kenya it needs to be paid out of the pocket by patients.

The community is built on a hill and open defecation is practiced. One of the water sources is located down the hill. During rainy seasons the waste on hills is washed down the hill into the pond causing a contamination of precious drinking water. Further, animals roamed around the sleeping and cooking areas. Most animals were malnourished and wasted. Obviously ill animals were not separated from other animals or humans. Garbage, especially plastic material, and medical equipment has been dumped into the environment. The delay of the rainy seasons. Most likely due to the global climate change and obvious agricultural mismanagement such as Eucalyptus in a drought area completed the picture of how important and interdependent all aspects of One Health – the health of humans, animals and the environment – is.

Gedi city, while being a ruin, still presents the marvelous architecture the Swahili culture was able to enact during the Middle-Ages and Renaissance era. The city was built mostly with the typical choral cement-like structure for which the area is still known for. Goods from China, Portugal and India show a highly developed trade system. Inhouse shower and latrine implementations display a high sense of hygiene and remarkable engineering skills. Still, the city was given up in the 16th century. The Swahili culture did not use a written communication system to our knowledge. Therefore, experts assume the city society broke down due to plague and cholera rampages. Their conjectures are based on rat skeletons found in the city's wells and latrines built next to the wells. Gedi city symbolizes what an inadequate One Health system can cause in a broader sense – the bereavement of a highly developed culture.

Both trips were very crucial for students and researchers to be reminded how important it is to step out of the ivory tower academia often is and re-focus on the exact needs of the target groups when it comes to One Health by meeting up with them. On

top, an action group was founded and money was collected to build sufficient defecation areas for the poor community we visited enabling a vulnerable group in Kenya to also profit from our Summer School experience.

TUM Student 3: *Day III, 16th of March, 2022: One Health and agriculture - summary*

The third day of Summer School addressed pillars one and two of the Summer School themes (water and agriculture), which saw cross-cutting presentations and discussions on issues ranging from water quality effects on plant health to land-water-food-health nexus, water quality effects on animal health, water quality effects on human health and food handling in local markets. We learned from **Dr Gogo** (Department of Crop Sciences, Pwani University) that water quality has three dimensions - physical, biological and chemical, and the quality of water affects soil quality, which in turn affects food quality and security. Focusing on irrigation water, salinity, infiltration and solidity were highlighted as key problems of water quality.

On land-water-food-health nexus, **Prof. de Vries** shared experiences from Portugal (Netherland), Lampung (Indonesia) and Windhoek (Namibia) where he noted challenges and opportunities of modelling the nexus. He called for interaction between scientists and politicians since a good land-water-food-health nexus project intervention would require political will to be implemented. In addition, he noted that scientists and politicians view issues differently and have varying priorities which sometimes calls for scientists to reframe projects and research topics to win political will. We learned from his presentation that urban-rural dichotomies, unclear administrative boundaries and differential scales of available data pose some of the greatest challenges in modelling the land-water-food-health nexus.

Further, on water quality effects on animal and human health, **Dr. Maritim** (Department of Animal Science, Pwani University) highlighted that water is a nutrient and as such the water quality for animals should be the same as the quality of water for humans. He put the discussion in the context of One Health, positing that poor water quality for animals tends to affect human health as we consume these animals that ingest bacteria from poor quality or contaminated water.

In a very detailed presentation, **Prof. Maarifa Mwakumanya** (Department of Environmental Sciences, Pwani University) and **Prof. Dr. Marianne Maghanga** (School of Agricultural, Earth & Environmental Sciences, Taita Taveta University) shared insights on food handling in the local markets. A key highlight in this presentation in relation to the Summer School theme was that, water scarcity has increased dependency on contaminated water food production and preservation in local markets.

Later, the county executive committee member in charge of health acknowledged the importance of the One Health concept and the need for interdisciplinarity to address contemporary health challenges in the county including zoonotics, antimicrobial resistance and food safety. He noted that the One Health concept has a direct nexus with the Universal Health coverage drive of Kenya, and touted several initiatives, all of which aim at bringing different stakeholders and sectors on board to achieve good health.

Finally, the day was concluded with graduate student pitches on cross-cutting topics including post-harvest losses, WASH for early childhood learners, One Health and climate change, microplastics ingestion and food safety interventions in informal markets.

TUM Student 4: *Day IV, 17th of March, 2022: Human Health and water quality - Summary*

The fourth day of the Summer School was dedicated to the pillar “Water and Human Health“. The first presentation by Mr **Bonventure Obeka** (TUM/PU) addressed the topic of Food Security and health, focusing on a practical approach to improve equitable health outcomes. Food security means that all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs for an active and healthy life. As global human population is on the rise (expected to hit 9.7 billion by the year 2050), challenges related to access to safe, nutritious and hence poor health outcomes could increase. Different dimensions of food insecurity (e. g. high, marginal, low, very low food secure) should be considered. Ways to ensure Food Security were discussed, including increasing climate resilience across all food systems, strengthening the resilience of the most vulnerable to economic adversity and intervening along the food supply chains to lower the cost of nutritious foods.

The second presentation by Ms **Susanne Ferschl** (TUM) focused on the topic “Towards environmental justice in the context of water-borne diseases. Applying a lens of the Capability Approach“. Water-borne diseases (e. g. diarrhea, cholera, typhoid, hepatitis A and E) lead to 1,5 Mio. deaths a year and are associated with a lack of water resources, water infrastructure and clean water. Environmental justice refers to fair treatment and meaningful involvement of stakeholders which means all people have the opportunity to participate in decisions about activities that affect their life. According to the Capability Approach, it is important to ensure freedom to achieve those things that people value, diversity, structure and agency. This can be achieved by involving community members as active stakeholders in a participatory manner to improve water resources and water quality.

In a further talk by **Dr. Patricia Mbogo** (Department of Food Nutrition and Dietetics, Pwani University) the topic of food insecurity was discussed more deeply, particularly with regard to malnutrition. Every country is affected by malnutrition (e.g. undernutrition, inadequate vitamins/minerals, overweight, diet-related non-communicable diseases.) The causes for food insecurity are multiple: a lack of access to farming land, land grabbing, conflicts, fast-paced population growth, natural disasters, climate change, and wastage of food. Numerous effects of food insecurity have been presented (e. g. undernutrition, hunger, a rise in health-related costs, violent conflicts, increased risks of birth defects, anemia, cognitive problems, aggression and anxiety, behavioral problems, depression as well as high suicide rates). Solutions to improve access to food comprise reduction of food waste and postharvest losses, improvement of trade policies, promotion of dietary and food diversification, and education programs for women.

Dr. Makoran Mjidho (Faculty of Biomedical Sciences, Pwani University) described a holistic perspective on health within the Kenyan context in his lecture. Therefore, physical, social, cognitive, emotional, mental, environmental, spiritual aspects regarding health should be considered. Spiritualism is related, for example, to the questions ‘How do we reconcile African tradition?’ or ‘How can we compliment contemporary medicine?’.

In addition to the lectures, graduate and PhD students presented their research projects in short pitches with regard to ‘Water and Human Health’. Topics such as ce-

ramic filters to improve water quality, sustainable plant medicine, perception of climate change in communities, assessment of groundwater quality in coastal areas and water access inequalities were discussed.

TUM Student 5: Day V, 18th of March, 2022: Societal Factors - Summary

The theme of day 5 of the Summer School was “Societal Factors.” The morning started off with an introductory presentation by **Prof. Dr. Halimu Shauri** on the broad topic of Societal Factors.

Via zoom, **Ms. Andrea Göttler** (TUM) spoke about how One Health can benefit from an intersectionality lens to address health inequities. She introduced the terms intersectionality and cultural essentialism and went on to describe levels of inequalities (macro-, meso-, and micro-). Ultimately, she encouraged the group that One Health can benefit from an intersectionality lens by understanding power relations and the fact that inequalities arise in a cultural context that needs to be understood. The following questions and discussion session dove into the topic of gender roles through the example of women fetching water, and provoked questions regarding discrimination and the subsequent inclusion of women in policy decisions.

Dr. Ulrike Fettke (TUM) introduced the phrase Health in All Policies (HiAP) and delivered a presentation on utilizing this approach to promote health equity. Major challenges were discussed, ranging from the lack of communication and resources to conflicting goals of policy fields to power structures. The take-home message focused on the need for HiAP as well as inter- and transdisciplinary assessments of health.

Scattered throughout the day were individual pitches given by graduate student participants of the Summer School. Topics ranged from Planetary Health to community perceptions and influences on water and plant quality to the development of a new, local water quality index.

Example of an international group work presentation



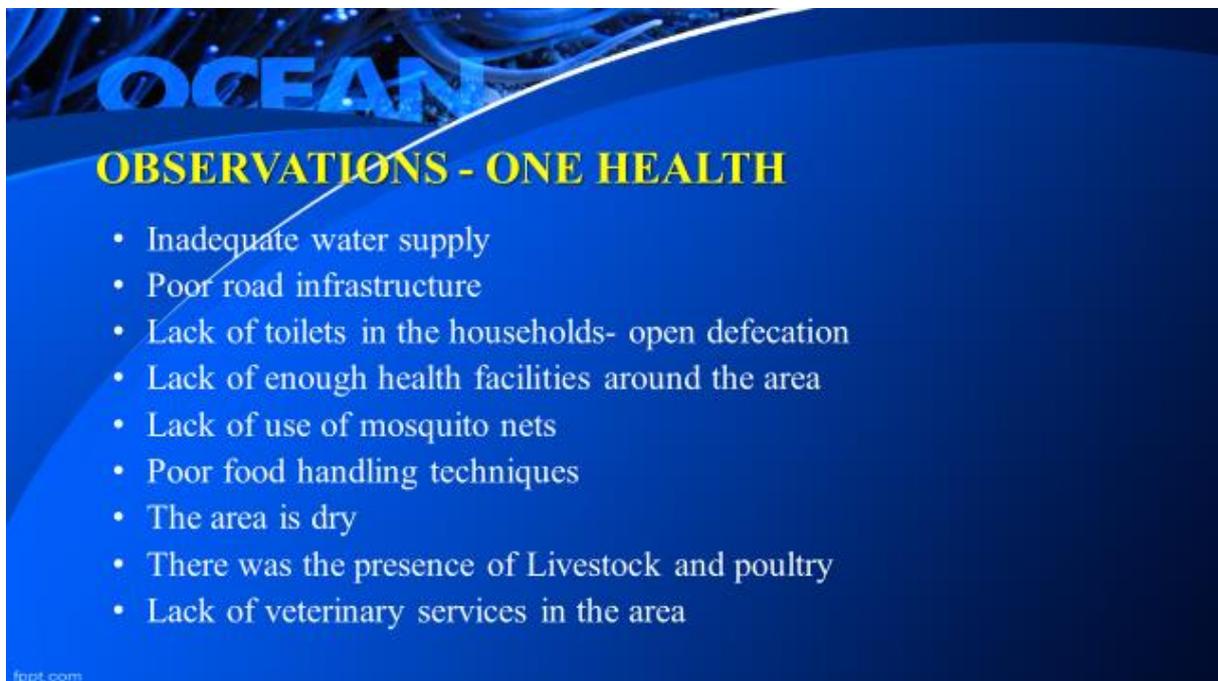
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GROUP ONE

KWAMAYA-JARIBUNI

Name	Institution
LILIAN HALIMA	PWANI UNIVERSITY
EVA-MARIA HIRTREITER	TECHNICAL UNIVERSITY OF MUNICH
CHRISTINE CHEPNGENO	EGERTON UNIVERSITY
NYIRAMVUYEKURE VERENE	EGERTON UNIVERSITY
ESTHER MIBUSHI KINYUA	MAKERE UNIVERSITY
SOPHIA LEISS	TECHNICAL UNIVERSITY OF MUNICH
OLABI LEONARD WOROU	UNIVERSITY OF CAPE COAST
DACHAGA, WALTER	TECHNICAL UNIVERSITY OF MUNICH
FREUND, JOHANNA	TECHNICAL UNIVERSITY OF MUNICH
DENNIS OTIENO	TECHNICAL UNIVERSITY OF MOMBASA
BEKELE, MESERET	TECHNICAL UNIVERSITY OF MUNICH

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OBSERVATIONS - ONE HEALTH

- Inadequate water supply
- Poor road infrastructure
- Lack of toilets in the households- open defecation
- Lack of enough health facilities around the area
- Lack of use of mosquito nets
- Poor food handling techniques
- The area is dry
- There was the presence of Livestock and poultry
- Lack of veterinary services in the area

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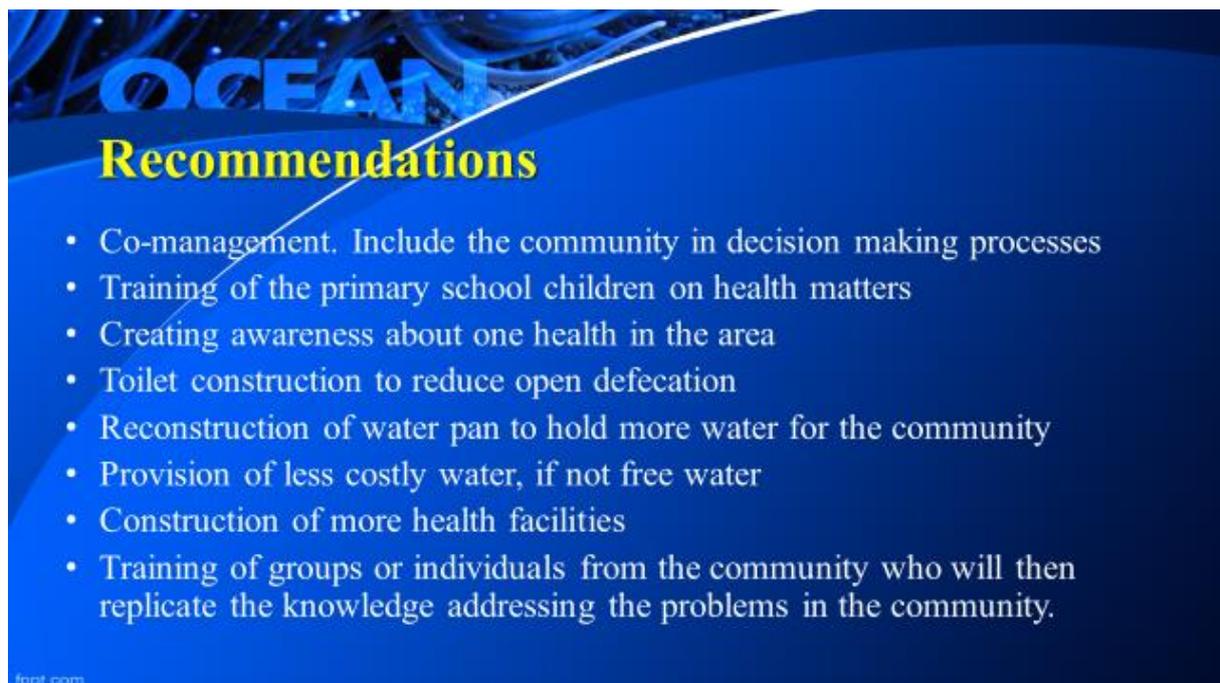


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How they relate to One - Health

- Direct contact with animals –zoonotic diseases
- Poor health facilities – Human health
- Dry land - Environmental health
- Livestock and poultry - Animal and human health
- Food handling safety techniques - Human and Animal health
- No mosquito nets - Animal, environment, and human health
- Insufficient water – Environment, Human, and animal health

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Recommendations

- Co-management. Include the community in decision making processes
- Training of the primary school children on health matters
- Creating awareness about one health in the area
- Toilet construction to reduce open defecation
- Reconstruction of water pan to hold more water for the community
- Provision of less costly water, if not free water
- Construction of more health facilities
- Training of groups or individuals from the community who will then replicate the knowledge addressing the problems in the community.

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THANK YOU

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