

**CAPACITY BUILDING ON THE WATER-ENERGY-FOOD SECURITY NEXUS
THROUGH RESEARCH AND TRAINING IN KENYA AND UGANDA
(CAPNEX)**

REPORT ON THE STAKEHOLDER WORKSHOP

6th February, 2020

Elegant Hotel, Bungoma





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Photos courtesy:

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Table of contents

| | |
|--|----|
| Table of contents | 3 |
| Introduction | 4 |
| Programme of activities | 5 |
| Stakeholder feedback | 7 |
| 1. Land use change trends summary | 7 |
| 2. Water availability summary | 8 |
| 3. Water quality summary | 8 |
| Participants list and affiliation | 13 |
| Appendix | 15 |
| 1. Invitation letter | 15 |
| 2. Workshop location | 16 |
| 3. Post presentation | 16 |

List of Figures

| | |
|--|---|
| Figure 1. Presentation session at the seminar | 6 |
| Figure 2. Group discussion and presentations | 9 |

List of Tables

| | |
|--|----|
| Table 1. Workshop program | 5 |
| Table 2. Bungoma stakeholder feedback | 10 |



Introduction

The “Capacity building on the Water-Energy-Food Security Nexus through research and training in Kenya and Uganda (CapNex)”-Project convened a stakeholder/dissemination workshop in Bungoma County, Kenya at the Elegant Hotel on 6th February, 2020.

The meeting was aimed at sharing preliminary results obtained from research work conducted in the Sio-Malaba-Malakisi river basin and subsequently, gathering feedback from the invited stakeholders in order to verify and validate the results.

The meeting was hosted by the Technical University of Kenya and facilitated together with BOKU University from Vienna, Austria.

Stakeholders for the workshop came from various organizations working within the basin including government ministries, civil society organizations, representatives from academia, county government officials and representatives from line ministries and community-based organizations from both Kenya and Uganda. The stakeholders were drawn from locations such as Tororo and Busia in Uganda, Kakamega, Bungoma, Kitale, Busia, Nambale and Bumala in Kenya.

The presentations mainly focused on case studies A and B as follows:

Case study A: Water use and allocation, water demand of crops, satellite precipitation products (hydrology, water quantity)

Case study B: Erosion (erosion models, nutrient flows, water quality)

Case study A was presented by Mr. Paul Omonge who is a PhD student at the BOKU University together with Dr. Mathew Herrnegger, who is the supervisor and one of the CapNex project co-principal investigator. The presentations also included work by Hope Mwanake, who is also a PhD student at the BOKU University.

Case study B presentations were done by Mr. Stanley Chasia and Mr. Nathan Muli both PhD students at the Technical University of Kenya and supervised by Dr. Luke Olang who is the co-principal investigator for the CapNex project in Kenya.



Programme of activities

Table 1. Workshop program

| Time | Presentation | Facilitator |
|---------------|--|--------------------------------|
| 09:00 – 09:30 | Arrival & Registration | Paul Omonge and Stanley Chasia |
| 09:30 - 09:45 | Welcome and opening Remarks Dr. Lewis Sitoki (TUK) Julia Lichtkoppler (OeAD) County Government Minister/Representative (Bungoma County) | Dr. Lewis Sitoki (TUK) |
| 09:45 – 10:00 | Introduction to CapNex Dr. Mathew Herrnegger (BOKU Vienna) | Dr. Lewis Sitoki (TUK) |
| 10:00 – 10:30 | Assessment of current and projection of future land use/cover state in the Sio-Malaba-Malakisi River Basin in Kenya and Uganda Stanley Chasia (TUK) | Dr. Mathew Herrnegger |
| 10:30 – 11:00 | Current and future Water Resources in the Sio-Malaba-Malakisi River Basin Paul Omonge (TUK, BOKU Vienna) | Dr. Mathew Herrnegger |
| 11:00 – 11:15 | Tea | |
| 11:15 – 11:45 | Water Quality in the Sio-Malaba-Malakisi River Basin in Kenya and Uganda Nathan Muli (TUK) | Dr. Lewis Sitoki |
| 11:45 – 12:30 | Influence of agricultural practices and soil water conservation measures on water quality – interrelating aspects of the Water-Energy-Food Nexus in a practical assessment in Kenya and Uganda Dr. Mathew Herrnegger (BOKU Vienna) | Dr. Lewis Sitoki |
| 12:30 – 13:30 | Discussion and Recommendations | Hon. Eng. Moses Wakala |
| 13:30 – 13:45 | Closing remarks Dr. Lewis Sitoki (TUK) | |
| 13:45 – 15:00 | Lunch | |



Program coordination by Dr. Lewis Sitoki – TUK (Kenya)



Presentation by Appear representative: Julia Lichtkoppler



Presentation by Mr. Stanley Chasia – TUK (Kenya)



Presentation by Mr. Paul Omonge – BOKU (Austria)



Presentation by Mr. Nathan Muli – TUK (Kenya)



Presentation by Dr. Mathew Herrnegger – BOKU (Austria)

Figure 1. Presentation session at the seminar



At the end of the meeting, the organizers and presenters from both TUK and BOKU Universities sought the comments from the participants/stakeholders on key issues related to land use, water availability and water quality, which were captured by the following three questions:

1. Land use change trends that may affect type of crops farmed: Are there crops that have been replaced? Which ones and how does the future look like for certain crops?
2. Water availability: what is the status of the water sources in the area (springs/boreholes/springs – longevity)? What are current and potential future challenges to the water resources?
3. Water quality in surface waters: are there changes in water quality over time as far as memory goes? What do you think has led to these potential changes?

The stakeholders were divided into three groups each tackling all the three questions and making a presentation thereafter.

Stakeholder feedback

The summary of the stakeholder's comments was captured in Table 2.

1. Land use change trends summary

On land use trends, the participants observed that future changes in land use/cover, will largely be driven by changes in household size/population which will lead to further land fragmentation. The acreage under conventional cash crops in the area such as Tobacco, Cotton, *Bambara* nuts and Simsim has reduced overtime due to low yields per unit (reduced soil fertility), pests and diseases as well as delayed payments by relevant companies. Maize crop production is expected to remain the same in the coming years since it's a staple food in the area. Cash crops like sugarcane and sorghum will largely be driven by market dynamics including mechanization of sugar factories and the improvement of commodity prices. Sugar cane production may decrease due to increasing fragmentation of land. The demand for sorghum by manufacturing companies will lead to the conversion of some of the cropland to sorghum. There are also new or emerging cash crops in the area such



as Avocado, Macadamia nuts and mangoes which currently experience an increased demand. Government programs like the Big 4 Agenda in Kenya that focuses on food and nutrition, would also influence the type of crops grown in the area especially when incentives are provided to the farmers.

2. Water availability summary

On the issues related to water availability, the stakeholders reported that the main sources of water in the basin include: boreholes, seasonal and permanent rivers and streams, springs, wells and rain water harvesting. However, there is a steady rise in cases where springs and streams are drying up, with permanent rivers turning to seasonal rivers. Sunken ground water sources such as wells and boreholes, are continuously located at greater depths, increasing in number, as well as affected by siltation. These changes can be attributed to the destruction of riverine vegetation due to expansion of farmlands, land fragmentation as well as climate change.

Encroachment of wetlands is also increasing while drinking water is contaminated by fertilizers. There was a general observation that all the anthropogenic activities that impact the environment in the Sio-Malaba-Malakisi basin is due to ignorance and lack of knowledge on existing laws governing use and access of resources. There is need to harmonize the legal framework between Kenya and Uganda in order to avert future conflicts while stemming the environmental destruction. The missing enforcement of already existing legislations was also addressed a big problem.

3. Water quality summary

The poor water quality in the basin is driven by several factors including: sedimentation due to soil erosion, increased use of pesticides and inorganic fertilizer, uncoordinated and illegal mining activities which contaminate stream water with heavy metals, industrial wastes from factories like sugar companies, poor sewerage disposal with effluents being discharged into rivers as well as illegal car washing along streams and rivers. Addressing these problems would require harmonized policies and enhanced enforcement by relevant government bodies i.e. the National Environmental Management Authorities in both Kenya and Uganda, and active engagement of local water resource uses (WRUA's) in the management efforts at grassroot level.



Figure 2. Group discussion and presentations

Table 2. Bungoma stakeholder plenary feedback

| Group | Land use change trends | Water availability issues | Water quality issues |
|-------|--|--|---|
| 1 | <p>Market dynamics, population increase, low yields per unit, low prices, pests and diseases, delayed payments, reduction in land size(fragmentation), reduced soil fertility, competition between cash-crops and food crops, new crop variety i.e. avocado, mangoes, macadamia etc.</p> | <ul style="list-style-type: none"> • Drying of springs and streams due to deforestation and riverine farming • Wetland reclamation • Wells – increase in number and depth, siltation. <p><i>Challenges:</i></p> <ul style="list-style-type: none"> • Sanitation, availability and degradation, water resource conflicts. | <ul style="list-style-type: none"> • Poor quality due to sedimentation, increase use of pesticides, fertilizer mining, industrial wastes, sewerage disposal • Lack of a harmonized policy and overlapping mandates coupled with weak enforcement by NEMA, WRA etc. • Prolonged dry spell • Livestock – multiple use of water points • Carwash activities that contaminate water with oil • Inadequate toilets compromising sanitation |



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| 2 | <p>Trends:</p> <p>Commodity market dynamics, climate change, food and nutrition security, population growth, uncontrolled development and lifestyle.</p> <p><i>Sugarcane</i> – driven by dynamics in the management of the sugar sector; failing of the industry because of sugar imports, improvement in technology to boost productivity.</p> <p><i>Maize production</i> will remain the same in the foreseeable future because ugali is the staple for the people; whereas sorghum production will increase due to new commodity market and competitive prices.</p> | <ul style="list-style-type: none"> • Significant water fluctuations • Boreholes dry up during dry seasons. • Use of fertilizer has affected the quality of water <p><i>Sources of water:</i></p> <p>Ground water, rain-harvested water and surface runoff/streams</p> <p><i>Future challenge:</i></p> <p>Preservation of water sources</p> | <p><i>Causes of deteriorating water quality:</i></p> <ul style="list-style-type: none"> • Poor agricultural practices, farming along river banks and fertilizer use |
|---|--|---|--|



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|---|--|--|---|
| 3 | <ul style="list-style-type: none"> • Land subdivision • Cash crops i.e. sugarcane • Urbanization i.e. changes from agricultural land to settlement • There's a possibility in the near future that all crops currently produced in the basin would have to be imported from elsewhere due to the reduction in agricultural land and land conversion from agricultural to built-up. | <ul style="list-style-type: none"> • Most boreholes are drying up. • No more permanent springs (changes to seasonal rivers) with low volumes/discharge. • Destruction of wetlands (conversion into built-up and croplands). <p><i>Challenges:</i></p> <ul style="list-style-type: none"> • Non-adherence to laws and regulations • Political interference • Land fragmentation • Lack of knowledge/information by the communities regarding government laws and policies • Conflicts on access to natural resources i.e. water and land. | <p><i>Changes in water quality:</i></p> <ul style="list-style-type: none"> • Degradation of the watershed leading to soil erosion. • Deposition of farm and industrial waste into rivers • Domestic pollution from human and animal waste. |
|---|--|--|---|



Participants list and affiliation



appear

AUSTRIAN
DEVELOPMENT
COOPERATION

Dissemination Workshop

Capacity building on the Water-Energy-Food security Nexus (CapNex) through research and training in Kenya and Uganda

Thursday 6th February, 2020 (Elegant Hotel, Bungoma)

| Sn. | Name | Address/contacts | Country | Signature |
|-----|---------------------|--|---------|-----------|
| 1. | BENJAMIN BAHATI | BUSIA COUNTY MET. SERVICE 9723232323 | KENYA | |
| 2. | JENIPHER K. LUTOMIA | NANBALE - BUSIA COUNTY AGRICULTURE | KENYA | |
| 3. | KONA PAULINE | BUSIA COUNTY - LIVESTOCK PRODUCTION OFFICER | KENYA | |
| 4. | ODIKORI M. OMUSEE | COUNTY ASSEMBLY OF BUSIA C/CLERK FB TOURISM/WATER | KENYA | |
| 5. | MOSES WAKALA | 0724748171 | KENYA | |
| 6. | DAVID MONDORF | CAPNEX / TU MUNICH +49176 4533 2138 | GERMANY | |
| 7. | BENIFACE WAWUMUYI | COUNTY DIRECTORATE OF IRRIGATION - BUNGOMA COUNTY 0724316647 | KENYA | |
| 8. | MABEL SICHANGI | COUNTY WATER OFFICE 64 64 Bungoma 0723232323 | KENYA | |



appear = AUSTRIAN DEVELOPMENT COOPERATION

| | | | | |
|-----|-------------------------------------|---------------------------------------|---------------|--|
| 9. | Jacob C. Masinde | BUNGOMA - Tolso MALAKSI WUBA | KENYA | |
| 10. | Martin Okunje | Kakamega | KENYA | |
| 11. | Prof. Dr. ING. BENEDICT M. MUTUA | BUNGOMA | KENYA | |
| 12. | Matur: Frank | Busia Home | Kenya | |
| 13. | ACHOLA TERRICA | BUSIA AGRIC | Kenya | |
| 14. | Ebednet Idro | Toro yard | Uganda | |
| 15. | Christine Apeli | Water resources Authority | Kenya | |
| 16. | Onyiah Amosah | Forth Environt Service Bris Uganda | Uganda | |
| 17. | Dr. Lewis Sitoki | TUK Sitoki@hotmail.com | Kenya | |
| 18. | Dr. Mathias Herwegger | BOKU - Vienna | Austria | |
| 19. | DMONGE PAUL | BOKU - TUK | Kenya/Austria | |
| 20. | STANLEY CHABIA | TUK - KENYA | KENYA | |



appear = AUSTRIAN DEVELOPMENT COOPERATION

| | | | | |
|-----|-------------------|---------------|---------|--|
| 21. | JULIA LICHTKOPFER | OeAD / APPEAR | AUSTRIA | |
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Appendix

1. Invitation letter



TECHNICAL UNIVERSITY OF KENYA
SCHOOL OF INFRASTRUCTURE AND RESOURCE ENGINEERING
DEPARTMENT OF BIOSYSTEM AND ENVIRONMENTAL ENGINEERING
Haile Selassie Avenue, P.O. Box 52428 – 00200, Nairobi, Kenya.
Tel. +254(020)2219929

January 22, 2020

Ms. Teresa Achola,
Sub-county Local Development Officer,
Nambale,
Kenya.

Dear Ms. Achola,

Re: Invitation for the dissemination workshop for the project “Capacity-building on the Water-Energy-Food- Security Nexus (CapNex) in Kenya and Uganda”

The project “Capacity Building on the Water-Energy-Food Security Nexus through Research and Training in Kenya and Uganda (CapNex)”, in partnership with **TU Wien** (Austria), **University of Natural Resources and Life Sciences Vienna** (BOKU, Austria); **Technical University of Kenya** and **Makerere University** (Uganda), will hold a one-day workshop to disseminate results of the just completed study done in the Sio-Malaba-Malakisi river basin.

As a key stakeholder in the catchment and the region at large, we are pleased to invite you to attend a one-day workshop to disseminate results of the research carried out, as well as hold discussions to validate the obtained results.

The workshop will take place at the Elegant Hotel, Bungoma in Kenya, on Thursday, 6th February, 2020, starting at 9:00am. A draft program is attached for your perusal.

We look forward to your participation at the workshop.

Yours sincerely,

Dr. Luke O. Olang
Senior Lecturer and Researcher of Hydrology and Remote Sensing &
CapNex Project coordinator, Kenya
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2. Workshop location

3. Poster presentation

