Report

scaleWAYS Final Workshop

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scaleWAYS

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About scaleWAYS

The project 'Scaling out resilient Water and Agricultural Systems (ScaleWAYs)' is collaborative research for development project between the International Institute for Applied Systems Analysis (IIASA), the Lake Victoria Basin Commission (LVBC) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The geographic focus of ScaleWAYs is in the extended Lake Victoria Basin (e-LVB), which encompasses the headwaters of the river Nile to its outlet at Laropi, at the border of Uganda and South Sudan. The e-LVB is an international transboundary watershed including Burundi, Kenya, Rwanda, The United Republic of Tanzania, and Uganda. The ScaleWAYs stakeholder-based approach identified two production systems of relevance for upscaling to achieve development and sustainability in the e-LVB, namely rice production systems and fodder/livestock systems.

Acknowledgments

We are deeply indebted to the participants of the final scaleWAYS workshop. Many of them have been regular participants in earlier thematic and preparatory webinars.

ScaleWAYS received funding from the Austrian Federal Ministry for European and International Affairs through its Austrian Development Agency (Project 2725-00/2018).

Background

ScaleWAYS project

ScaleWAYS is a project designed as research for development. It investigates agricultural, water and environmental management practices to enhance the resilience of land and water resources and improve human wellbeing and ecosystems in East Africa in view of increasing food demand and climate change. Local stakeholders have identified rice and fodder/livestock production systems for testing the integrated scaling simulation framework to achieve sustainable production systems. The geographic focus of ScaleWAYS is in the extended Lake Victoria Basin (e-LVB), which encompasses the headwaters of the river Nile to its outlet at Laropi, Uganda. The e-LVB is an international transboundary watershed including Burundi, Kenya, Rwanda, The United Republic of Tanzania, and Uganda.

The simulation framework developed combines biophysical crop suitability analysis, governance analysis, and agro-economic optimization. The biophysical suitability analysis at high spatial resolution identifies suitable areas for resilient agricultural management. Together with food demand projections we develop multi-dimensional upscaling simulations using accounting frameworks and optimization to identify strategic opportunities in the eLVB. However, such opportunities can only be realized when political-economy aspects are conducive to implementation. Therefore, governance and cultural aspects including gender are analysed using interviews with local experts to uncover enablers and obstacles for increasing sustainable rice and fodder production. ScaleWAYS seeks to identify strategic opportunities for scaling resilient agricultural practices.

Partnership and implementation

ScaleWAYS is implemented by an interdisciplinary team of researchers at the International Institute for Applied System Analysis (IIASA), and the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) and the Lake Victoria Basin Commission (LVBC) of the East African Community (EAC) and its member countries. We examine strategic opportunities for scaling proven technologies and methods enabling the sustainable and resilient intensification of important agricultural commodities in the eLVB by collaborating across disciplines, including the natural and social sciences.

The scaleWAYS project implementation is formally anchored and overseen by the governance structures of the Lake Victoria Basin Commission (LVBC) based in Kisumu / Kenya as local implementing partner. The LVBC, a transboundary water commission, is a key constituency in East Africa mandated by the East African Community. This close vicinity of the LVBC to East African policy making is a key asset for an effective delivery of the scaleWAYS research – policy – practice approach. The scaleWAYS policy oversight is based on the Partnership MoU signed between the LVBC and IIASA after approval by the Sectoral Council of Ministers for Lake Victoria Basin (LVB-SECOM).

To enrich traditional scientific assessments that aim to produce mainly 'knowledge products' such as scientific and policy studies, the ScaleWAYS project not only combines biophysical and agro-economic simulations with political economy analysis, but also anchors scientific knowledge through the ScaleWAYS East Africa Community

of Practice (CoP) to support scaling up sustainable rice and fodder production. The CoP is a key actor for achieving the targeted project outcome of achieving an improved understanding of up-scaling of local and regional land and water management practices for sustainable intensification of rainfed and irrigated agriculture.

The CoP was established during the scaleWAYS Workshop held from 26th to 28th February 2020 in Entebbe, Uganda. During this workshop, the researchers deliberated and agreed on the formation of a Community of Practice for Researchers and Practitioners from the Eastern Africa region and beyond. The specific objectives of the CoP were to:

a) improve the capacity of members to undertake and deliver services for scaling out resilient water and agricultural management systems.

b) increase the visibility and policy outreach of its membership to be more influential in the regional, national and local policy and practice; and

c) enhance the impact of its members in scaling up resilient water and agriculture management systems.

The researchers agreed on the Structure of the CoP which included voluntary membership drawn from relevant research and field practice disciplines of water, agriculture and land management systems with a Core Group responsible for the day-to-day running of the affairs of the CoP.

ScaleWAYS supported research of 11 master students (6 females and 5 males; from 5 EAC countries) and integrated them into the research activities. Many of the student supervisors are members of the CoP.

Theory of Change

The Theory of Change (ToC), a dynamic tool well known to development practitioners, has proven to offer a useful framework for mutual connecting research with policy and practice related to the upscaling sustainable agricultural practices in East Africa. Throughout the project, the ToC has been updated following internal workshops and discussions among project partners and stakeholders on how best to link the research design and activities to the intended im-pact pathways of the Research for Development project. The ToC therefore served the important function of a tool for communicating the evolution of the project and guiding discussions with stakeholders.

A tiered strategy was established to clearly communicate the project's increasing complexity to stakeholders and policy makers. Several ToC sub-frameworks were developed for scaleWAYS including ToCs for i) political economic analysis; ii) the rice system, iii) the fodder/livestock system; and iv) gender analysis.

For the ScaleWAYS final workshop and ease of readability, we reunited the individual nested ToCs to one overarching ScaleWAYS ToC (Figure 1). The aim is to highlight the strategic relevance of the scaleWAYS approach. The four pillars of activity (blue boxes) lead to several outputs (white boxes) that are relevant to research and practice.

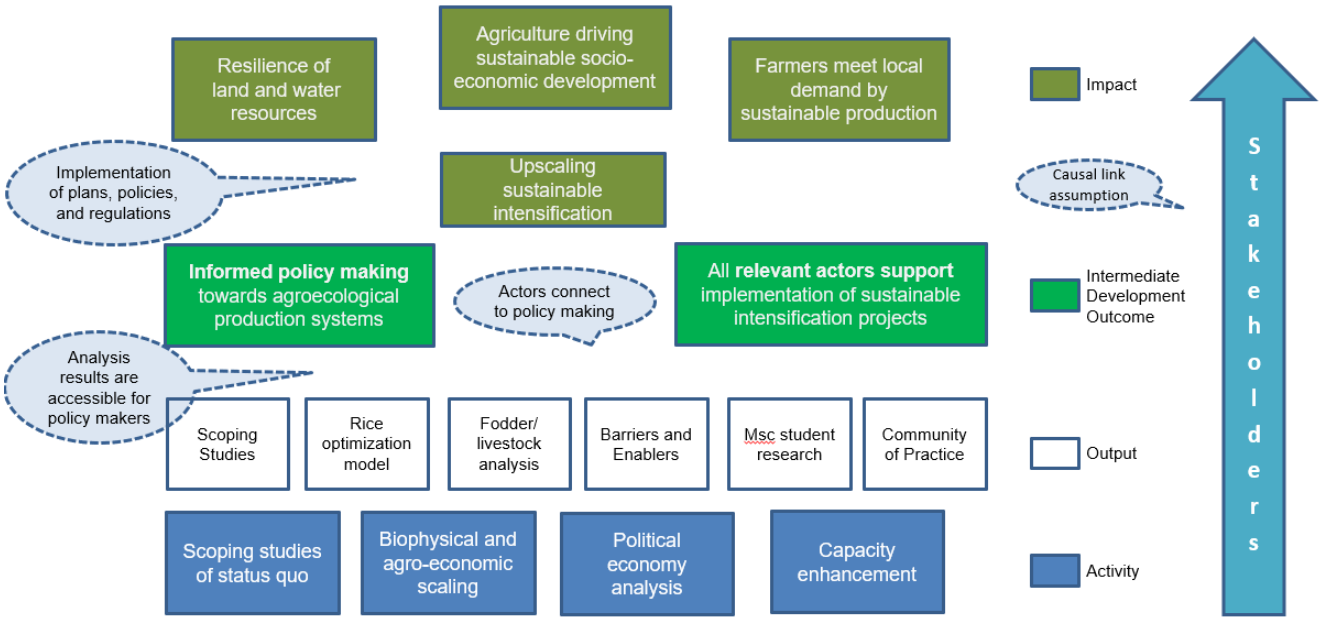
Activities were structured around i) local expert analysis documented in scoping studies; ii) biophysical agro-economic scaling simulation; iii) political economy analysis, and iv) capacity enhancement. Key outputs include two scoping studies, one for rice and one for livestock/fodder systems conducted by local researchers. Research know-how of the consortium produced several modelling tools and analysis results for upscaling rice and fodder production systems. Further, the political economy analysis identified barriers and enablers for upscaling sustainable land and water management practices. A dedicated gender analysis focused on institutional aspects of gender mainstreaming in scaling sustainable land and water management.

Throughout the scaleWAYS project, stakeholder consultations informed the research modelling and analysis, providing local knowledge and advice on key issues to be dealt with. Key outputs of capacity enhancement were a Community of Practice and student research of 11 MsC students in East Africa.

The scaleWAYS policy oversight is based on the Partnership MoU signed between the LVBC and IIASA after approval by the Sectoral Council of Ministers for the Lake Victoria Basin (LVB-SECOM). Making analysis results accessible tor policy makers (green boxes), achieved in ScaleWAYS through the convening power of the LVBC. The LVBC can benefit from formal procedures to access experts and stakeholders in all EAC countries. This has, for example, proved effective in ensuring the participation of a wide range of experts in the webinars. Policy oversight is formalized through the Joint Regional Project Steering Committee (Joint-RPSC) of LVBC Projects and Programmes. The LVBC reports scaleWAYS progress to the Joint-RPSC and the LVB-SECOM, while they provide policy oversight for ScaleWAYS research and activities.

Through this process ScaleWAYS aims to increase the resilience of land and water resources and enable farmers to satisfy (at least) local demand using sustainable production systems. In this way, agriculture can contribute to sustainable economic development and the well-being of people in East Africa.

Figure 1. Theory of Change (ToC) for the ScaleWAYS project



Workshop arrangements

The geopolitical situation in 2022, with resulting energy price spikes and high inflation, led to a reluctance to plan a physical stakeholder workshop in East Africa, and a virtual setting was chosen as the preferred option.

The final scaleWAYS workshop was convened on **18 January 2023** and presented key finding of the integrated biophysical and political economy analysis for upscaling rice and fodder production systems. The objective was to co-develop and agree with participants on strategic opportunities for sustainable upscaling in the extended Lake Victoria basin. Please refer to Annex 1 for the Workshop invitation.

Objectives and agenda

The key objective is to co-develop and agree with participants on strategic opportunities for sustainable upscaling in the eLVB. To this end, scaleWAYS researcher will present key findings of the integrated biophysical and political economy analysis for upscaling sustainable rice and fodder production systems. These results are being discussed with local experts in two break-out rooms, one for rice and one for fodder/livestock systems. Further, the ScaleWAYS final workshop presents an excellent opportunity to recognize valuable student research by awarding certificates.

The expected outputs are to i) identify strategic opportunities for upscaling sustainable agriculture in the eLVB; ii) identify knowledge gaps and further research needs; and iii) strengthen the network of experts for sustainable land and water management.

The workshop was moderated by Paul Kariuki from the LVBC. The workshop started with a welcome introduction from the leading executive of the LVBC and a brief 'setting the scene' introduction. The bulk of time was used for discussions in the two breakout rooms. After a plenary discussion, students were awarded certificates for their research. Finally, concluding, next steps and closing remarks were delivered by LVBC and IIASA ScaleWAYs lead. Please refer to the invitation for the workshop in Annex 1 for details of the Agenda.

Invitation process and participants

To ensure maximum participation and inputs from a diverse audience as much as possible, a hybrid invitation process comprising formal and direct invitation was adopted. The direct invitation was mainly for the core scaleWAYS project partners and stakeholders' groups including the Community of Practice (CoP) members, the ScaleWAYS master's Students grants recipients and their supervisors, relevant staff and/or researchers of scaleWAYS project partners institutions including LVBC, ICRISAT and IIASA.

The primary participants who are also the scaleWAYS project primary beneficiaries from the EAC members countries of Burundi, Kenya, Rwanda, Tanzania and Uganda were formally invited to participate in the workshop through the formal EAC/LVBC diplomatic channels. This was done vide letter ref *PP/scaleWAYS/004/22* dated 13th December 2022 addressed to the Permanent / Principal Secretaries for Ministries responsible for EAC affairs in the five EAC Partner States. Subsequently, each country nominated varying numbers of relevant participants

from their respective line ministries and agencies responsible for the subject matters including environment, water resources, agriculture and livestock.

Participants

The workshop was well attended by a diverse group of fifty (50) participants drawn from research institutions, academia, practitioners from livestock and fodder sectors as well as social-economists and gender specialists from the region and beyond, the Community of Practice (CoP), the project supported-MSc research grants students and some of their supervisors. The attendees also included official Partner States nominees from all the five EAC member countries. Also participating in the workshop were staff of the scaleWAYS project partner institutions of IIASA, LVBC and ICRISAT.

Welcome and introduction

The convening the 50 participants opened with a message from the EAC-LVBC Secretariat, followed by a few slides introducing the ScaleWAYS team and project activities.

Message from EAC-LVBC Secretariat

(a) Message of Deputy Executive Secretary

The Executive Secretary of Lake Victoria Basin Commission (LVBC) Dr. Masinde Kahitire Bwire was invited as the Chief Guest of the scaleWAYS final workshop. However, due to some other conflicting engagements, He sent the Deputy Executive Secretary of the Commission Eng. Coletha Ruhamya to represent him.

Eng. Ruhamya subsequently welcomed the participants to the workshop. She recognized and appreciated the presence of the chairperson of the session as per EAC rules of procedures for technical meetings, Mr. Deo Bukeyeneza from the Ministry of Agriculture, Livestock and Environment, in the Republic of Burundi, the heads of delegations from all the five EAC Partner States of Burundi, Kenya, Rwanda, Tanzania and Uganda; the Partner States delegates; the representatives of scaleWAYS partner institutions of IIASA and ICRISAT, and LVBC; the Task Team Leader of the ScaleWAYS project Dr. Sylvia TRAMBEREND; and Scientists, Researchers and Practitioners from the region and beyond; Master's Students and their Supervisors.

The Deputy Executive Secretary noted that it was a great pleasure and honour for her to address the virtual ScaleWAYS workshop on *Scaling Sustainable Land and Water Management in East Africa*. She observed that the workshop was aimed at sharing key findings of the integrated biophysical and political economy analysis for upscaling sustainable rice and fodder production systems in the region. This is geared at facilitating knowledge co-generation and agreement on strategic opportunities for sustainable upscaling of these two agricultural production systems in the extended Lake Victoria Basin (eLVB).

Eng. Coletha Ruhamya appreciated the fact that the workshop would also be used to recognize and appreciate the valuable inputs of the master students who benefited from scaleWAYS research grants facility by awarding them certificates of recognition. She noted that this token of appreciation for these diligent students would go a long way in motivating these young researchers to make even bigger contribution to the body of knowledge

for the benefit of the basin and East Africa in general. She thanked and commended the students for achieving this critical milestone in their academic journey and appreciated their supervisors for effectively guiding the young scholars. Eng. Ruhamya also thanked all the researchers from IIASA, ICRISAT and LVBC for diligently executing research and capacity building activities of the project which culminated in the timely delivery of the research outputs that were to be deliberated in the workshop.

The Deputy Executive Secretary told the workshop that, the ScaleWAYS project had been a very unique and special project for LVBC. Its research for development approach, had been instrumental in generating the much-needed evidence, data and information to effectively guide not only policy dialogue but more importantly the strategic planning and programming for the shared Lake Victoria Basin. She also indicated that, the scaleWAYS project had been instrumental in strengthening the capacity of not only the commission but that of researchers and practitioners in the region by facilitating knowledge and experience sharing under the Community of Practice (CoP) platform for the EAC region and beyond.

Eng. Ruhamya noted that the other benefits that the commission and the region had derived from the sacleWAYS project include included among others:

i. ***The mutual technical partnership framework with IIASA and ICRISAT*** that now allows LVBC to tap into the diverse and rich experience as well as research and modelling tools and other analytical capacity of these two institutions. She extended the Commission's appreciation to both IIASA and ICRISAT for this kind gesture;
ii. ***The Support and Capacity Strengthening of Young Scholars*** in Eastern Africa Universities through the MSc Research Grants Initiative. This she noted was a major step to preparing the next generation of researchers and scientist for the region;
iii. ***Opportunity for LVBC to tap into and Leverage on the project's analytical assessments and studies,*** that were presented to inform the basin's strategy and policy initiatives for Lake Victoria Basin and East Africa in General;
iv. ***Developing the Virtual Repository and Knowledge Sharing Platforms*** that includes; (a) knowledge web-portals, (b) reinforcing LVBC's capacity for virtual engagements; (c.) organizing the knowledge sharing and learning webinars for Researchers & Practitioners which not only facilitated know exchange but more importantly knowledge co-generation; (d) availing analytical tools at the commission's disposal among other valuable initiatives;
v. Augmenting the LVBC Staffing and Capacity Strengthening through the project focal person who alongside coordinating the project also supports LVBC in strategic programming on Environment and Natural Resources Management, climate change, projects development and resource mobilization among others;

The Deputy Executive Secretary provided assurance and reiterated the commitment of LVBC to put in place measures to not only sustain the capacity building measures that had been initiated by the scaleWAYS project but more importantly in integrating the scaleWAYS analytical outputs, knowledge portals and tools into its knowledge management strategies and ensure it they are used in all its programming, strategy and policy initiatives.

While echoing the overall objective of the workshop. Eng. Coletha reiterated that the researchers from project partners institutions of IIASA and ICRISAT would use the opportunity and presence of the diverse audience to share and gather additional inputs from them to improve the results of their respective analytical work. She therefore encouraged the participants to intensely engage and provide the much-needed inputs to ensure that the final results and project outputs meets the expectations, development priorities and aspirations of the EAC Partner States and the targeted communities in the basin.

She expressed confidence that through the workshop deliberations, the stakeholders would be able to among others: (i) identify strategic opportunities for upscaling sustainable agriculture in the basin; (ii) identify knowledge gaps and further research needs; and (iii) strengthen the network of experts for sustainable land and water management. She echoed the adage that "*knowledge is much more powerful when shared"* and encouraged participants to share intensely and give optimal inputs to the outputs that were to be presented.

The Deputy Executive Secretary concluded her remarks by appreciating the commitment of the distinguished delegates present for finding time out of their busy schedule to attend the workshop. She also extended her appreciation to all the Partner States for nominating the highly qualified and experienced delegates to participate in the workshop and for their continued support for the scaleWAYS project and LVBC in general.

She concluded her remarks and wished the participant fruitful deliberations.

(b) Opening Remarks from the EAC-LVBC Session Chairperson

Mr. Deo Bukeyeneza, from the Ministry of Agriculture, Livestock and Environment, Republic of Burundi as the Chairperson of the session welcomed the delegates to the final scaleWAYS workshop. He noted that it was an honour for him to officially open the workshop and thanked the convenors and all people involved in the planning of the workshop.

The Chairperson emphasized the that the purpose of the workshop was to present and deliberate on the findings of the integrated biophysical and political economy analysis for upscaling sustainable rice and fodder production systems. Specifically, the Chair noted that it provided an opportunity for all the participants present and representing diverse category of stakeholders to co-develop and agree on strategic opportunities for sustainable upscaling of these two (2) productions systems and in a nutshell the sustainable land and water management in the eLVB.

Mr. Bukeyeneza commended the project team and appreciated the key achievements of the scaleWAYS project that included but not limited to: the establishment of the Community of Practice as a forum to facilitate cross-learning, collaboration and knowledge exchange; successful research support extended to eleven (11) MSc students; quality analytical outputs that are and will continue to inform policy and strategies of LVBC now and into the future; scoping study that has provided LVBC and other scholars with a reliable stock take of prevailing context on rice and fodder production systems; institutional capacity strengthening of LVBC; and quality research materials that are being used by LVBC to design new regional projects and programs.

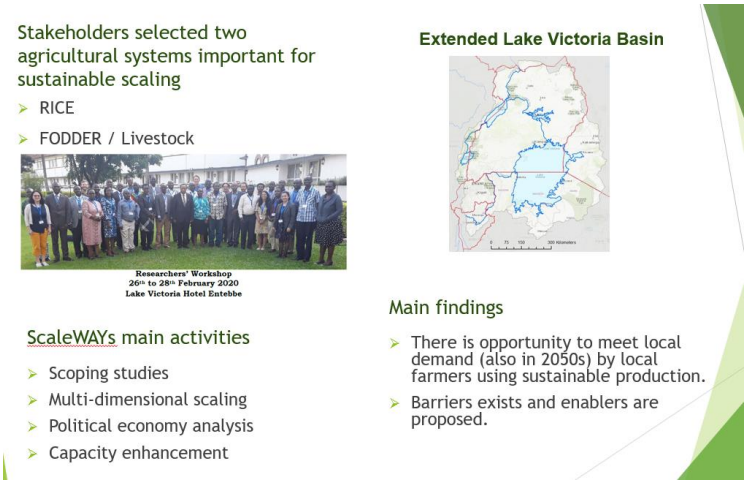
The Chairperson shared the request of the member countries interest and commitment to the upscaling of the scaleWAYS project and asked the project partners of IIASA, LVBC Secretariat and ICRISAT to dedicate time, resources and intellectual input and design a follow-on project.

He concluded his remarks and officially opened the scaleWAYS project final workshop.

Setting the scene

A brief 'Setting the scene' aimed to prepare participants before moving to the breakout rooms for discussion.

Sylvia Tramberend pointed out that the stakeholders had selected the two agricultural systems to study sustainable upscaling opportunities in the extended Lake Victoria Basin. This was agreed in a workshop in March 2020, still in a physical setting, just before the start of the pandemic.



Two main findings were presented to stimulate subsequent discussions in the breakout groups. The ScaleWAYS analysis shows that there are opportunities for local farmers to meet the local demand for the eLVB by local farmers exist today and, in the future, (2050s), also in line with key sustainability principles. However, there are barriers to upscaling exist and enablers are proposed to overcome them. Finally, to emphasize the important role of stakeholders, the ToC was presented to the workshop participants (see Figure 1 above).

Up-scaling RICE production

Efforts to upscale sustainable rice intensification in East Africa must consider both economic and ecological, or biophysical, dimensions as well as socio-political networks that govern the system. Models for sustainable rice intensification show that future rice demand can indeed be met utilising only current cropland, thus avoiding increase in production by area expansion but rather achieving needed outputs by intensified practices. Irrigation emerged as an important aspect for production as well as climate change adaptation for the region. Additionally, models highlight the importance of regional trade and cooperation.

The political economy analysis however indicates a need for improving and expanding extension services for knowledge dissemination as well as the need for locally specific research on sustainable land management practices. Mirroring the quantitative model results of regional trade, the political economy analysis also observed a need for improved market structures and a facilitation of market access amongst small-holder farmers.

The slides presented by Jenan Irshaid to introduce the break-out session are shown in Annex 2.

Discussion

Following the presentation of results, experts on the rice production system in the LVB were asked for their feedback and input on the topics addressed.
Answering the question regarding aspects the ScaleWAYS analysis has missed experts mentioned:

- Extension services: Efforts and investments have been made to improve extension services in recent years. Yet this is insufficient. Therefore, knowledge is needed on what type of extension services are required to move forward with modernization and new technologies.
- While subsidies can be applied to different purposes, such as mechanization and inputs, and various levels, experts argue that subsidies should be focused on inputs.
- Experts also argued for continued and improved mechanization as a means of increasing financial capacities in rural areas
- Land consolidation and crop specialization in wetlands can offer several opportunities. Through the resulting availability of safe water, the transmission of water borne diseases is minimized, thus benefiting public health. For this purpose, the appropriate infrastructure is needed. This may include the construction of new and improved dams, water harvesting and storage systems.
- Adequate investment is needed for the development and accessibility of seed varieties and seed systems.

Main messages

Given the interesting and important feedback and insights experts offered at the beginning of the discussion they were asked for suggestions on what the LVBC could do to accomplish or enable the aspects through implementation or policy measures.

- Experts emphasize that the majority of policy options facilitating intensified sustainable rice production is already known. However, discussions are needed to question and understand why these measures are not being taken up. Furthermore, it was highlighted that LVBC as a powerful actor in the region, has the capacities to create and influence policy actors.
- Moving away from nation-state focused interventions, experts argued for a transboundary and regional engagement strategy for policy actors including selected regional representatives.
- The LVBC should also make use of its power as a cross-regional organization to establish standards in production and resource use as well as monitor compliance.

Up-scaling Fodder / livestock production

To improve upon their research and assemble and generate knowledge form the community, researchers from ICRISAT and IIASA presented the results of their studies and asked for feedback. The studies investigate important aspects of upscaling of fodder production for livestock in the extended Lake Victoria Basin. Two studies were presented: a political economy analysis, focusing on barriers and enablers for the sustainable intensification of livestock forage systems in the region, and an upscaling simulation, comparing potential production of fodder crops in a sustainable intensification scenario to projected future demand for feed. An overview of the methodology and the key results were briefly introduced to workshop participants. These were the basis for the subsequent discussion on further potential issues in the livestock fodder sector. The presentation material is included in Annex 3 of this report.

Discussion

The key results concerning challenges and opportunities in the fodder livestock sector were largely confirmed by the workshop participants. However, several additions and minor concerns emerged in the discussion following the ICRISAT/IIASA presentation. The most important themes were calls for a more detailed representation of water resources, technical and knowledge-related barriers to adoption, trade related issues and organization of farmers for better collaboration in the livestock sector.

- Results of the modelling exercise should be based on considerations of water resources. This is as a result of the current challenge of new livestock keeping technologies triggering changes in water use and pollution. Water pollution is therefore among the areas that should be reflected in planning of livestock production.
- At institutional level, there is a discrepancy between the targets of the ministries of water and agriculture. While the agricultural side is concerned with production planning it does not focus on the subsequent infrastructural needs to mitigate water pollution by livestock which is a priority of the ministry of water. There needs to be coordination between the two sectors.
- Irrigation of fodder crops could be considered. Irrigating fodder crops has the advantage of a higher resistance of the production system in times of shocks incurred by droughts. Lack of mechanization needed for silage and hay making is an impediment to the efficiency of sustainable intensification of fodder systems and conservation techniques. For example, technological issues are a challenge to

livestock farmers in Burundi who aim to comply with the recently introduced zero-grazing policy in the country. Beyond lacking capital equipment of farmers to meet the needs required to efficiently harvest and conserve hay and fodder crops, these investment needs could also require farmers to decrease the number of animals they keep. In turn livelihoods of farmers are impacted and adaptation from pastoral to sedentary livelihoods could be facing barriers. Knowledge dissemination as a strategy to tackle these technical issues is recommended.

- Aflatoxin management is a key element of sustainable fodder systems which also requires appropriate capital and knowledge and could subsequently raise productivity and quality in the livestock sector.
- An important result of the quantitative study conducted by IIASA is that trade inside countries or within the region could facilitate efficient production by allocating it in the most productive regions. The experts in this workshop concluded that trade is indeed a crucial element of ensuring sufficient supply meeting local demand. However, they noted that standards and tariffs imposed in the East African Community could be hindering the trade of livestock products. Instead, they proposed to increase production of livestock where it is already prominently featured by trading and transporting fodder to these livestock production regions. Here, protocols are less strict and could be followed more easily.
- To increase the needed adoption of fodder crops among farmers, social dynamics and organizational aspects were suggested by workshop participants. In many rural communities the inclusion of elders into decision making processes and dissemination of knowledge is crucial. Still, women and youth should appropriately be targeted even when using these channels for dissemination. A second method suggested in the workshop for increasing adoption and facilitating investments is the continued support to farmer organizations such as cooperatives. The collective purchase of machinery could for example help overcome prohibitively high investment costs for machinery for fodder conservation.
- Finally, beyond these key areas the discussants recommended taking into account hides and skins, as well as manure production from livestock. While this is not a key aspect of the fodder production research at the core of ScaleWAYS, it is still important to consider in integrated strategies for livestock production.

Main messages

The main messages provided by the political economy analysis of the ScaleWAYS team included barriers to scaling livestock forage systems:

- Low adoption of forage technologies by farmers
- Insecure **land tenure** system;
- Farmer **mindset**;
- Limited access to **financial services** especially for women and youth and market constraints;
- Limited technical **knowledge**
- Lack of access (physical and financial) to **quality seed**
- **Forage species** are susceptible to soil types, precipitation, general weather conditions, pests and climate change.
- Inadequate resources (financial and operational e.g. extension services)

- **Small farm sizes** → farmers unable to adequately produce forage for their livestock→ feed balance deficit.
- Inadequate exchange of **regional insights and data**

And opportunities in the sector:

- Develop regionally supported national investment strategies to help ecological forage intensification.
- Blend livestock forage production in the credit landscape and land use planning across the Lake Victoria Basin
- Strengthen national forage seed systems, private sector and community-based seed multiplication.
- Develop a regional strategy to exchange germplasm and forage seeds and adapt phytosanitary regulations regionally.
- Develop plans for impact investment supporting forage value chains led by women and youth.
- Work with universities and research organizations to design circular forage economies using crop residues and biomass.
- Systematic knowledge transfer/exchange and capacity development at local, national and regional level - multistakeholder collaboration (farmers, extension agents, students, research, NGO, private sector etc.)
- Investment into research and development (seed varieties, cost – benefit analyses etc.)

In a condensed format, the key messages from the upscaling simulation included:

- **Seasonality** creates demand for fodder crops even in regions where grazing is currently sufficient
- Fodder crops are needed and can be **conserved** to meet demand after accounting for pasture
- **Regional differences** in stocking rates and thus fodder demand
- **Meeting seasonal demand** with fodder crops is possible
- … but requires local **adjustment and monitoring of stocking rates**
- … and will function best if integrated with some form of **trade of livestock products**
- Expansion of grazing possible in some areas
- On eLVB level, fodder crops are well suited to produce sufficient livestock

Beyond this, the discussion provided additional key messages:

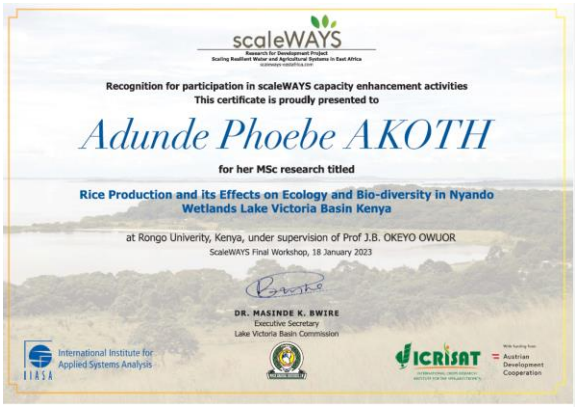
- Water resources are key for livestock production systems
- Market structure is an important aspect to be improved upon for efficient fodder production and allocation
- Trade of fodder preferential to trade of livestock products
- Organization of farmers (e.g., cooperatives) is necessary for market access, common resources for mechanization, common input procurement
- Knowledge dissemination can take various forms but is urgently needed
- Production systems as a whole need to be considered when planning locally

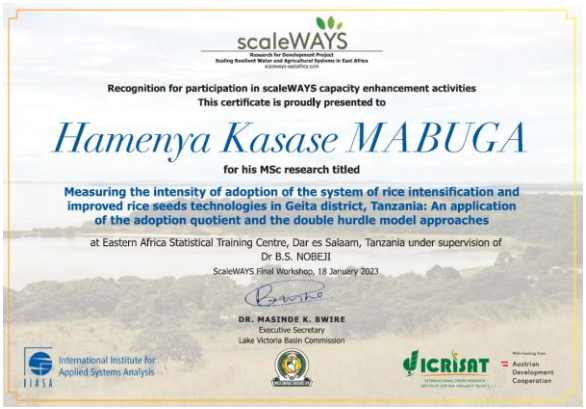
Certificates for MsC students

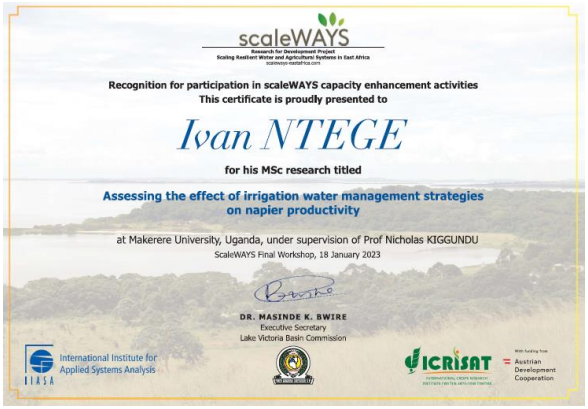
Participation of Master students in an international research for development project can be a competitive advantage for their future career activities. To facilitate proof of participation and to recognize their valuable contribution, ScaleWAYS has awarded the students with certificates signed by the Executive Secretary of the LVBC.

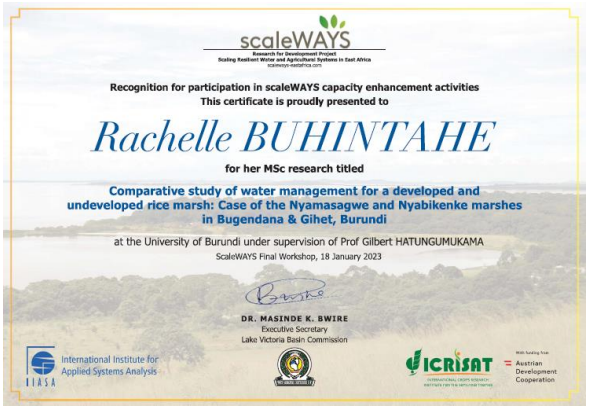
Paul Yillia, the main contact person for the MSc students, presented the certificates. Almost all of them were able to attend the final workshop. The figure below shows examples of the certificates.

It should be noted that, in addition to completing the Master theses, a few of the students have already published key results in international journals. The core ScaleWAYS team is very proud of the achievements of all MSc students.









Next steps and outlook

Based on the feedback and inputs received from the workshop participants, the workshop agreed on the following steps as the way forward.

First, the project work package researchers will incorporate the comments provided and finalize their respective detailed reports and policy briefs / working papers as appropriate. Second, a Workshop report will be compiled, published and distributed before the next LVBC-SECOM meeting. Third, project reports including research papers and policy briefs will be uploaded to the ScaleWAYS website[1] and disseminated. In East Africa the main dissemination channel is through the CoP. To date, the CoP includes 54 members across the 5 EAC member countries, and the LVBC will develop a concept on how to ensure the future growth and sustainability of the CoP.

Finally, the ScaleWAYS team is discussing a possible follow-up project in the context of 'Sustainable Land and Water Management'. projected climate change suggest that the frequency and severity of extreme weather events will increase, and with it the impact on climate-sensitive sectors, particularly agriculture and water resources. This points to the importance of strategies for coping with extreme climate events, especially droughts and floods. To this end, a focus on extreme climate events is being discussed. Building on the experience of ScaleWAYS and the network established with the CoP, such a research for development project could aim to develop research-based recommendations for planning for, coping with and mitigating the adverse impacts of extreme climate events in East Africa. Stakeholders will help to identify specific regional and local needs. Capacity building will play a central role, among others also through involvement of universities in East Africa.

[1] https://www.scaleways-eastafrica.com/

Annex

Annex 1. Workshop invitation

scaleWAYS Final Workshop

Partners	International Institute for Applied Systems Analysis (IIASA) Lake Victoria Basin Commission (LVBC) International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Contact Person	Dr. Paul Kariuki (LVBC); Email: kariuki@lvbcom.org ; Tel.: +254 721 357171 Dr. Paul T. Yillia (IIASA); Email: yillia@iiasa.ac.at; Tel.: +436604876567 (WhatsApp)
Title	**Scaling sustainable land and water management in East Africa**
Description	scaleWAYS is a research for development project that investigates agricultural, water and environmental management practices to enhance the resilience of land and water resources and improve human wellbeing and ecosystems in the extended Lake Victoria Basin (eLVB) in view of increasing food demand and climate change. Local stakeholders have identified rice and fodder/livestock production systems for testing the integrated scaling simulation framework to achieve sustainable production systems. The simulation framework we develop combines biophysical crop suitability analysis, governance analysis, and agro-economic optimization. The biophysical suitability analysis at high spatial resolution identifies suitable areas for resilient agricultural management. Together with food demand projections we develop multi-dimensional upscaling simulations using accounting frameworks and optimization to identify strategic opportunities in the eLVB. However, such opportunities can only be realized when political-economy aspects are conducive to implementation. Therefore, governance and cultural aspects including gender are analysed using interviews with local experts to uncover enablers and obstacles for increasing sustainable rice and fodder production. ScaleWAYS seeks to identify strategic opportunities for scaling resilient agricultural practices.

Context of the Workshop	The webinar workshop is organized within the research for development project scaleWAYS (Scaling Resilient Water and Agriculture Management Systems) and its Community of Practice (scaleWAYS-East Africa). scaleWAYS is jointly being implemented by IIASA, LVBC and ICRISAT with financial support from the Austrian Development Cooperation.
Objectives of the webinar	The webinar will present key findings of the integrated biophysical and political economy analysis for upscaling sustainable rice and fodder production systems. The objective is to co-develop and agree with participants on strategic opportunities for sustainable upscaling in the eLVB. We also recognize valuable student research by awarding certificates.
Target audience	scaleWAYS-East Africa Community of Practice, national research organizations and universities including ScaleWAYS master students and their supervisors, NGOs and other organizations working in the countries of the Lake Victoria Basin (Burundi, Kenya, Rwanda, Tanzania, Uganda)
Date	**18 January 2023, 10:00 – 11:45 (CET)** **ZOOM -** https://iiasa.zoom.us/j/94273192453
Detailed Program	Moderation: Paul Kariuki (LVBC) 10:00 – 10:05: ***Welcome*** and opening remarks - Dr. Masinde K. Bwire (CEO, LVBC) 10:05 – 10:10: ***Setting the stage*** - Sylvia Tramberend (IIASA) on behalf of the ScaleWAYS team 10:10- 11:00*:* ***Breakout rooms*** ***Room: RICE opportunities*** - Facilitation: Jenan Irshaid (IIASA) & Michael Hauser (ICRISAT) ***Room FODDER/LIVESTOCK opportunities*** - Facilitation: Immaculate Edel (ICRISAT) & Julian Joseph (IIASA) 11:00 - 11:15*:* ***Plenary discussion*** 11:15 - 11:35*:* ***Awarding certificates for student research*** 11:35 – 11:45: ***Concluding***, next steps and closing remarks
Expected outputs	• Identify strategic opportunities for upscaling sustainable agriculture in the eLVB • Identify knowledge gaps and further research needs • Strengthen network of experts for sustainable land and water management

Annex 2. Presentation: RICE breakout group

Below is the introductory presentation to the RICE breakout group. In addition, the recording of the break-out groups session is available upon request.

Opportunities in rice production

- Current and future rice demand in the 2050s can thereby be met using only current cropland.
- targeted irrigation is an important adaptation strategy towards coping with increases in climate variability
- Regional trade can play an important role for the optimal use of highly productive areas

Policy Recommendations

- Localized assessment of rice production systems
- Extension services for sustainable intensification of rice production
- Support a conducive environment for trade of rice in East Africa
- Assess the needs for irrigation to establish resilient rice supply chains and promote irrigated rice production accordingly

Opportunities in the rice sector

- Increased and improved network of extension services facilitating knowledge dissemination and capacity building
- Locally specific research on sustainable land management practices i.e. intercropping etc.
- Improved accessibility of resources and infrastructure, and increased resilience through cooperatives
- Improved market structures and market access
- Gender inclusion and female empowerment through creation and improvement of new value chains

Policy recommendations

- Increase support and enable the establishment of cooperatives
- Knowledge production and dissemination
- Policy integration across policy fields and levels
- Inclusive decision making
- Increase gender equality and women's empowerment
- Compensation for ecosystem services
- Revised taxation and subsidy schemes

Thank you for your attention!

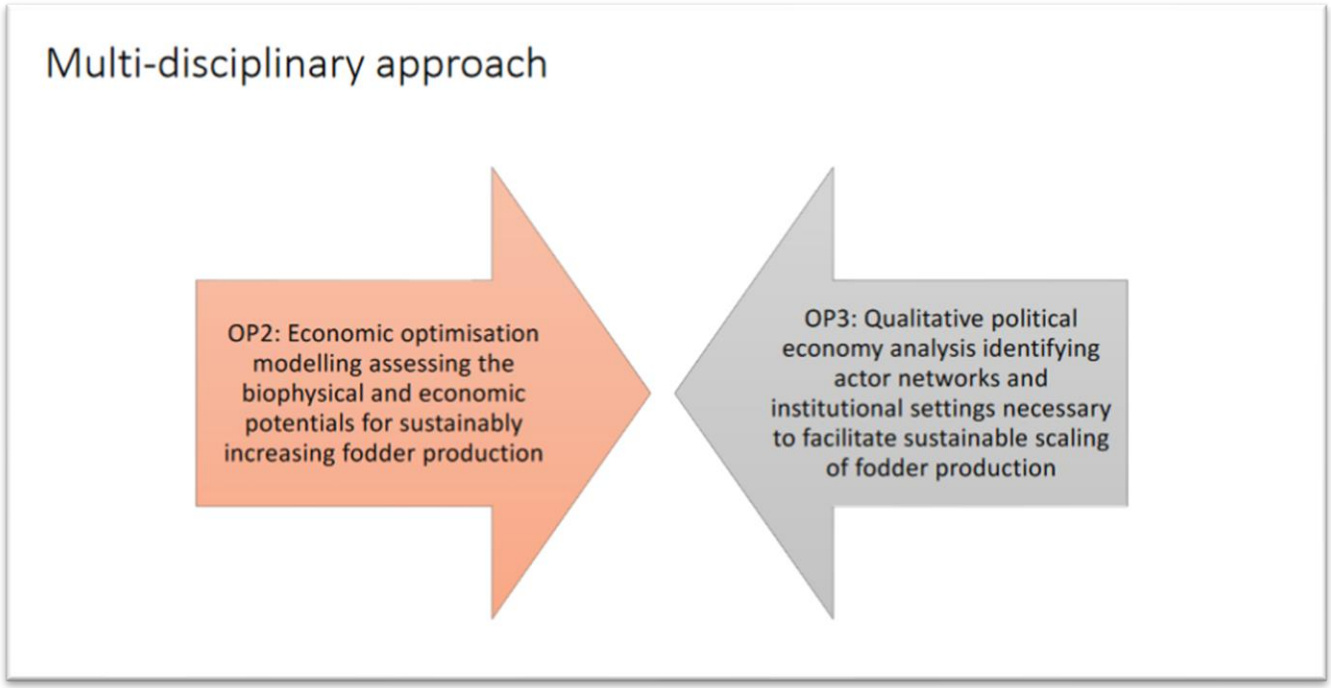
Discussion prompts

Which opportunity or policy recommendations are the most important in your opinion?

Which opportunities can be considered low hanging fruit?

Which opportunities or policy recommendations are difficult to pursue? Why?

Annex 3. Presentation: FODDER/LIVESTOCK breakout group



Drivers of livestock forage demand

01 Global share of African urban population projected to grow from 36% percent in 2010 to 60% by 2050.

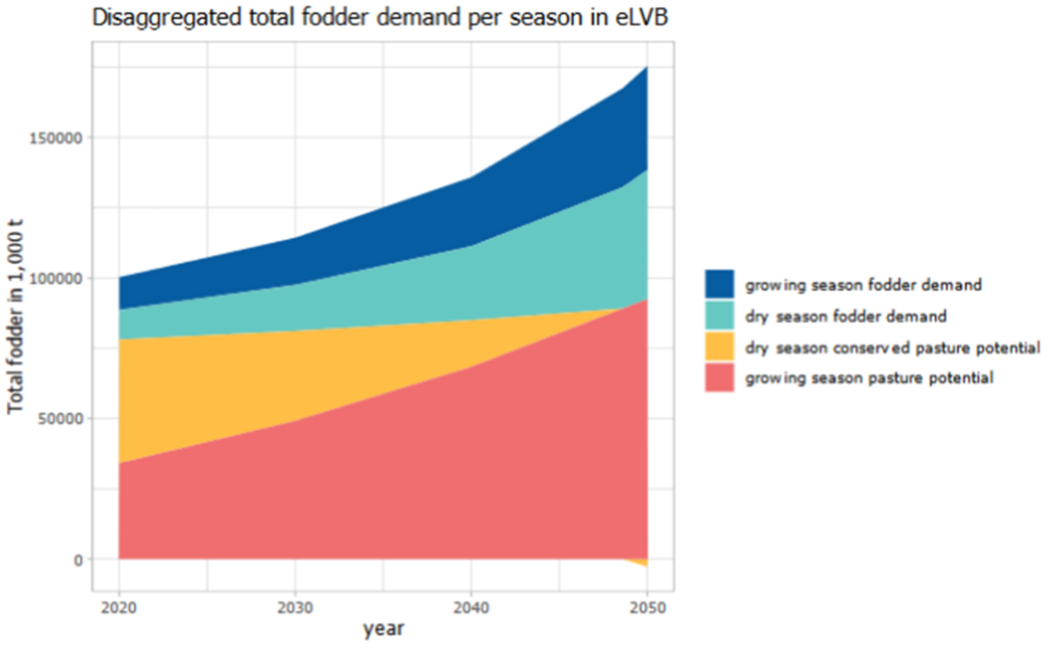
02 Human population in African cities will likely double between now and 2050.

03 The EAC regional economic bloc is considered one of the fastest growing economies in the world; GDP growth rate of 6%

04 With rising incomes, consumer food preferences shift towards livestock derived food products

Given the EAC member states' aspiration to achieve national meat and milk targets by 2030, the forage demand is likely to increase exponentially

Projected fodder demand composition over time



Insights from crop model and livestock demand projections

- **Seasonality** creates demand for fodder crops even in regions where grazing is currently sufficient
- Fodder crops are needed and can be **conserved** to meet demand after accounting for pasture
- **Regional differences** in stocking rates and thus fodder demand
- **Meeting seasonal demand** with fodder crops is possible
- … but requires local **adjustment and monitoring of stocking rates**
- … and will function best if integrated with some form of **trade of livestock products**
- On eLVB level, fodder crops are well suited to produce sufficient livestock

Barriers to scaling livestock forage systems in the eLVB

- Low adoption of forage technologies by farmers
  - Insecure **land tenure** system;
  - Farmer **mindset**;
  - Limited access to **financial services and decision-making opportunities** especially for women and youth and market constraints;
- Limited technical **knowledge**
- **Forage species** are susceptible to soil types, precipitation, general weather conditions, pests and climate change.
- Lack of access (physical and financial) to **quality seed**
- Inadequate resources (financial and operational e.g extension services)
- **Small farm sizes** → farmers unable to adequately produce forage for their livestock→ feed balance deficit.
- Inadequate exchange of **regional insights and data**

Recommendations

1. Develop regionally supported national investment strategies for ecological forage intensification (carbon markets)
2. Blend livestock forage production in land use planning across the Lake Victoria Basin.
3. Strengthen national forage seed systems, private sector and community-based seed multiplication.
4. Develop a regional strategy to exchange germplasm and forage seeds and adapt phytosanitary regulations regionally.
5. Explore further industrial livestock feed and concentrated supplements to increase livestock health and mitigate aflatoxin contamination
6. Work with universities and research organisations to design circular forage economies using crop residues and biomass.
7. Develop master plan for systematic knowledge transfer and capacity development at local, national and regional level - multistakeholder collaboration (farmers, extension agents, students, research, NGO, private sector etc.)
8. Develop plans for impact investment supporting forage value chains led by women and youth; inclusion in decision making.