



# NEWSLETTER



Capacity Building to deliver competent human resources in integrated water resource management and aquaculture for equitable and sustainable livelihoods in Kenya's arid and semi-arid lands and beyond (NICHE/KEN/158).

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## Preface

By **Carel Jaspers**, director Q-Point



The project "Capacity Building to deliver competent human resources in integrated water resource management and aquaculture for equitable and

sustainable livelihoods in Kenya's arid and semi-arid lands and beyond (NICHE/KEN/158)", is implemented by SEKU university and the Q -Point consortium. In June 2016, SEKU staff members were trained at the Delft University of Technology on the latest approaches in hydrological modelling and also explore possibilities of applying hydrological modelling in research and teaching at SEKU. With new equipment and facilities in water technology and in aquaculture, the Centre of Excellence at SEKU became more visible. The fourth year, focus will be on applied research and short courses for farmers, extension workers and other interested stakeholders.

I hope you enjoy reading.

Carel Jaspers, director Q-Point

## Content

|   |    |
|---|----|
| • Preface   | 1  |
| • Capacity for hydrological modeling enhanced by the NICHE Project at SEKU  | 1  |
| • Workshop programme on the practical part of the aquaculture curriculum  | 3  |
| • Training value chain management - June 2016   | 6  |
| • Business plan for the establishment of training of excellent in integrated water resources management and aquaculture | 7  |
| • Centre of Excellence almost ready   | 8  |
| • Training workshop on hydrological modeling for SEKU staff at Delft University of Technology                           | 9  |
| • Familiarisation tour to Israel to learn the various approaches and technologies                                       | 10 |
| • Partners  | 11 |
| • Requesting organization   | 11 |
| • Donor   | 11 |
| • Colophon  | 11 |

## Capacity for hydrological modeling enhanced by the NICHE Project at SEKU

By **Dr. Johnson U. Kitheka**, new Director of the NICHE Project, and also the Dean of the School of Water Resources Science and Technology at the South Eastern Kenya University.



Simulation of hydrological processes including prediction of future behavior of river systems is important for water resources management.

However, expertise for hydrological modeling is limited in developing countries

such as Kenya. It is in this respect that the NICHE Project at the South Eastern Kenya University (Capacity Building to deliver competent human resources in integrated water resource management and aquaculture for equitable and sustainable livelihoods in Kenya's arid and

semi-arid lands and beyond), organized an intensive training workshop on hydrological modeling at Delft University of Technology. The main goal of the training workshop was to train SEKU staff members on the latest approaches in hydrological modeling and also explore possibilities of applying hydrological modeling in research and teaching at SEKU. The training was coordinated by Q-POINT in collaboration with the Faculty of Civil Engineering and Geosciences (CiTG) at the Delft University of Technology (TU Delft). The training was led by three resource persons, Prof. Mauritz Etsen, Prof. Markus Hrachowitz and Drs. Remko Rijzink of the Faculty of Engineering and Geosciences. The training was held in the period May 28th to 5th June 2016.



*Participants in the training session.*

Due to multi-disciplinary nature of most of the hydrological and water management research issues, deliberate effort was made to train a core team of experts at SEKU coming from different academic disciplines. Thus, participants came from four main Schools, namely the School of Water Resources Science and Technology, School of Pure and Applied Sciences and the School of Environment and Natural Resources. Most of the participants had little or no experience in hydrological modelling and were full of praises for the training. Many noted that the training completely changed their perceptions on

hydrological modeling. This can be attributed to the nature of training where more emphasis was placed on understanding key principles behind hydrological modelling.

Suffice to note that this is one of the many important training workshops that have been undertaken by the NICHE Project at SEKU this year. The training was not in vain since it made significant contribution in building the capacity at the SEKU for integration of hydrological modeling in the curricula and also in research. The workshop also enabled creation of partnership between Delft TU and SEKU for future hydrological studies in Kenya where different hydrological models could be applied. The hydrological approaches learnt during the training will also be integrated into the undergraduate and postgraduate programmes in hydrology and water resources management at the SEKU's School of Water Resources Science and Technology. There is also a possibility for joint modeling activities between Delft TU and the School of Water Resources Science and Technology. Envisaged future modeling research activities will focus mainly on semi-arid river basins in Eastern Kenya.



*Prof. Markus Hrachowitz delivering his lectures on modeling during the training.*

## Workshop programme on the practical part of the aquaculture curriculum

By Karin van de Braak, Aquaculture Health Specialist Sustainable Aquaculture Solutions (SAS)



On 24<sup>th</sup> - 27<sup>th</sup> May 2016 Nancy Nevejan and Karin van de Braak organized a workshop. The aim of their mission was preparations implementation curriculum with a focus on the

practical part of the Business plan for the 'Centre of Excellence' in IWRM and Aquaculture

### Context of Mission

In this mission, there was a focus on the practical work. During one week, practical trainings for the MSc students in Aquaculture were worked out together with the University staff. These trainings will be part of the newly developed curriculum. The practical work, protocols, equipment and facilities are the start of the Centre of Excellence in IWRM & Aquaculture. Another aim of this workshop was to prepare the draft of the Business Plan for the Centre of Excellence.

### Activities during the mission

- Elaboration of the practical exercises for implementation in the MSc curriculum on Aquaculture;
- Theoretical and practical trainings related to the curriculum on some selected topics; Aquaculture Production Systems & Engineering, Water Quality, Fish Health Management, Microbiology, Live Feed Production;
- Finalize the last draft of the Business Plan of the Centre of Excellence; Ponds, Indoor systems, Aquaculture equipment, Virtual Centre, Library, Contacts with other Universities and training centers, IWRM & Water etc;

### Results of the mission

#### Day 1

The mission started with consultative meetings on Monday 23<sup>rd</sup> May. In the morning, a meeting was held with Mr. Jason Hammond of Kamuthanga Farm in Machakos. During this meeting the activities for the visit on Wednesday by the SEKU staff were finalised. In the afternoon at SEKU, an update was given about the progress of the NICHE project regarding the integration between IWRM and Aquaculture with a focus on the water harvesting facilities and water quality research in preparation for aquaculture practices. A visit was made to the ponds of SEKU (cf pictures). Links were made between the activities within the curriculum and the CoE. In the evening, there was a meeting with the key decision makers on the requirements for implementation of the Curriculum of the School of Water. During this meeting, the workshop program was discussed and finalised.



*The four ponds at the SEKU campus.*



## Day 2

The workshop started with 18 participants, including University Lecturers, MSc Aquaculture students, researchers in aquaculture and County fisheries officers. After an introduction on the aims of the workshop and an update on the current status of the development of the MSc curriculum for Aquaculture, the participants introduced themselves and indicated their possible contribution for the coming week.

After group formation, the practical part of the curriculum was discussed, the protocols were prepared, activities were discussed and the formats for the practicum manuals set-up. The discussions continued in the afternoon and presentations followed for each group. At the end of the afternoon Nancy gave a presentation on Aquaculture Production Systems, Engineering and Water Quality. This was in preparation for the visit to Kamuthanga Farm the next day.



*Nancy gave a presentation on Aquaculture Production Systems, Engineering and Water Quality.*

Kamuthanga Farm is one of the Project Partners in the FoodTechAfrica Programme ([www.foodtechafrica.com](http://www.foodtechafrica.com)).

## Day 3

On Wednesday we visited Kamuthanga hatchery and farm. Here we got an explanation development of the far like

different system designs, water use, calculation of production capacity, energy use, efficiency, sustainability, production costs and benefits.



*Visit at Kamuthanga Farm with practical work on water quality and calculations on feed and production, based on recirculation systems.*

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## Day 4

On Tuesday the participants got an introduction on microbiology and practical exercise fish health analysis.



*Practical work on microbiology and fish health at SEKU as preparation for the practical part of the curriculum.*



## Day 5



*Discussions and presentation of the different groups of the Business Plan for the CoE.*



## Training value chain management - June 2016

By Olivia Ansenk, trainer Q-Point



A very inspiring visit to SEKU with a multi-disciplinary group of lecturers and stakeholders from the sector represented in the Aquaculture Value Chain

Management workshop. The diversity of the group contributed to interesting discussions throughout the training.



*Introduction and welcome by Prof. Ng'ang'a Zipporah Waithera, Deputy Vice Chancellor Academic Research And Student's Affairs.*

The purpose of the training was a ToT on a training module on the concept of value chains and the analysis of the aquaculture value chain in Kenya.

In short:

- Know what a value chain is;
- Know the basic concepts / definitions of a value chain;
- Know how to analyse the value chain;
- Know how to structure the value chain;
- Understand the opportunities and bottlenecks;
- Team working skills.

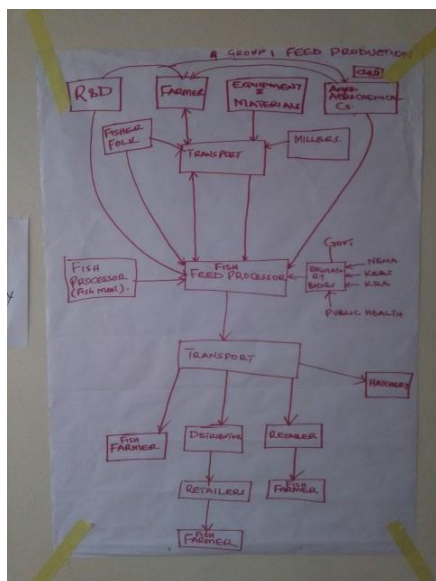
Different perspectives were shared and synergies in thinking were found between representatives from the sector (extensionists and fish farmers), the School of Business and Economics and the School of Water Resources Science and Technology. You could clearly see the

contributions of the different disciplines, the critical questions raised by the representatives from Business and Economics were very instrumental.

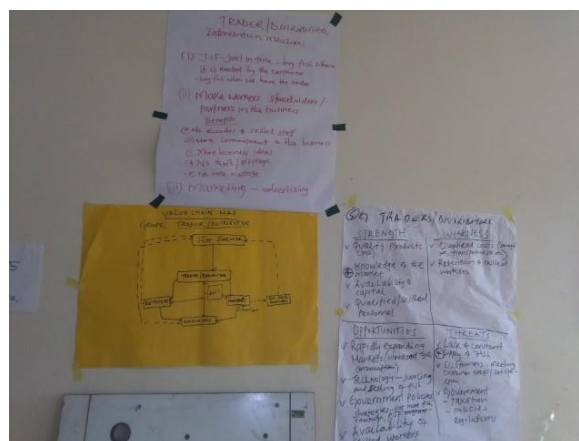


*Discussion in groups, making SWOT analyses.*

The importance of the diagnostic phase, whereby you try to find out as much as possible information on stakeholders, transactions, product transformations, product information, power relations, collaborations, to come to the best informed decision was seen as a critical learning point for the participants. The more complete the picture is the less chance of failure of your business idea/ plan. From the diagnostic phase we entered the change phase whereby we analysed the opportunities and came to various interesting improvement suggestions for value chain stakeholders. For example insects were raised as an interesting research topic whereby the sector and the University would like to collaborate and investigate the potential for fish feed. The training module was evaluated positively and will be used by SEKU. Also the school of Business and Economics showed an interest besides the School of Water Resources Science and Technology, they would like to mainstream the module to their program.



Feed map.



Group results, SWOT Analyses.

## Business plan for the establishment of training of excellent in integrated water resources management and aquaculture

By Mark Bos, trainer Q-Point



In the final week of October Olivia Ansenk and Mark Bos visited SEKU to develop a final business plan for the CoE. All laboratory equipment, water harvesting tools and

aquaculture facilities (Fish Pounds, RAS-system) provided by the project is expected to be operational by January 2017 which enables SEKU to merchandize the center.

During the workshop the participants were challenged to determine the most important stakeholders, the needs of these stakeholders and in which way SEKU/CoE is able to address the needs of these stakeholders with (short term) training programs, applied research , research and extension.



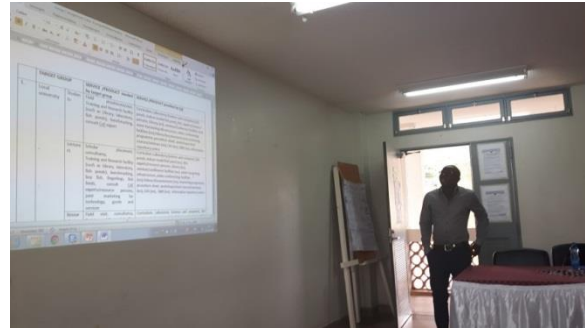
Mark and Olivia with the staff members of SEKU.

The workshop with 16 SEKU staff members resulted in a final business plan with all aspects of the CoE, such as client focus, services of the CoE, promotion and marketing and a financial plan to sustain the activities to be implemented within the CoE.





*Discussion in groups.*



*Presentation of group results.*

## Centre of Excellence almost ready



*The fish pounds.*



*Some basins need still to be placed.*



*Testing a new very cheap fish pound.*



*Connected water basin.*



*Large rain gutter for water harvesting.*



## Training workshop on hydrological modeling for SEKU staff at Delft University of Technology

By Maurits Ertsen, senior lecturer at Delft University of Technology



Within the NICHE Project at South Eastern Kenya University, colleagues from SEKU visited Water Resources at Civil Engineering and

Geosciences (CEG, Delft University of Technology) for a week between May 28th and 5th June 2016, to attend a workshop on hydrological modelling. The training was prepared and offered by Dr Markus Hrachowitz, assistant professor, and Ir. Remko Rijzink, PhD student.

**Participants were eager to learn and interaction between trainers and participants was very lively.**

The training was designed in such a way that participants were asked to develop their own model code, in this case using the modelling language R, which the participants could install on their laptops themselves from the website <https://www.r-project.org/>. R is a free software environment for statistical computing and graphics, usable at UNIX, Windows and MacOS. This training setup is different from many workshops with existing ready-made software packages on hydrology; it forces participants to consider both the (dominant) hydrological processes that are to be studied and modelled, the mathematical coding problem, and the question that needs to be answered. As such, the training setup focused on the basic questions every modeler has to answer.

The colleagues from SEKU came from different academic disciplines, including the School of Water Resources Science

and Technology, the School of Pure and Applied Sciences and the School of Environment and Natural Resources. With these different backgrounds, a good crossover of issues from the field of hydrology and water resources could be brought in at the training. Even though most of the participants had little or no experience in hydrological modelling on the level of the coding itself, the workshop went extremely well. Participants were eager to learn and interaction between trainers and participants was very lively.

An important aspect was that the participants were encouraged to contribute their own process understanding as on-site experts. In a joint effort, this experience-based knowledge was then "translated" into conceptual understanding and eventually coded as model components. The training seems to have changed some ideas on hydrological modelling with the Kenyan colleagues, due to the emphasis on understanding key principles of coding in hydrological modelling. After four days of intense training and modelling, a final discussion on the experiences in the training, ways to move forward, and option to expand the cooperation between Delft and SEKU were held.

**The training seems to have changed some ideas on hydrological modelling with the Kenyan colleagues, due to the emphasis on understanding key principles of coding in hydrological modelling.**

## Familiarisation tour to Israel to learn the various approaches and technologies

By Dr. Johnson U. Kitheka and Dr. Grace M. Mutia, SEKU



Israel is largely arid and despite this fact, it has made great strides in the recent part

with regard to water harvesting and agricultural development. It is on this basis that the NUFFIC NICHE Project organised a short familiarisation tour to Ben Gurion University of the Negev Desert.

The specific objectives of the mission were as follows:

- Study the water harvesting and water management technologies for ASALS that are being applied in Israel.
- Familiarise with the technologies and systems of integrating water harvesting with aquaculture in ASALS.
- Establish the extent to which Israel experiences in water harvesting and aquaculture can be replicated at SEKU.
- Networking with experts in various institutions in Israel. e. Explore potential for collaboration in the implementation in water harvesting and aquaculture research programmes at the school of Water Resources Science and Technology at SEKU.

During the visit the staff members were briefed on the major academic and research programmes that are undertaken at Ben Gurion University of the Negev at Beer Sheva. The staff members were also taken around in various faculties of the Ben Gurion University in Beer Sheva. There was a discussion on the several potential academic programmes that are offered at the university and which SEKU can learn greatly from Israel.

The main centres of Ben Gurion University that were visited are as follows:-

- Zuckerberg Institute of Water Research. The staff members learnt about on-going research on desalination of salty water. It was noted that 40% of the water supplied in Israel is actually from desalination. Israel leads in terms of research on the development of efficient membranes for reverse-osmosis desalination membrane filters.
- Bausterin Institute of Desert Research. The staff members toured various facilities for micro-algae and fish farming. The staff members were briefed on various applied aquaculture research being undertaken at the centre.

**The general goal of the mission was to learn the various approaches and technologies that are being applied in Israel, with a view to replicating the same at SEKU.**

### Follow-ups

Further follow-up discussions will be undertaken in order to explore ways in which Ben Gurion University can collaborate with SEKU on various research activities. The mission was considered important that it allowed the staff members to be familiar with the success of Israel in restoring ASALS. The ideas and knowledge acquired during the mission would be invaluable in the formulation of the Business Plan for the School of Water Resources Science and Technology Centre of Excellence. The staff members are grateful to the NUFFIC NICHE Project for sponsoring the mission to Israel.

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## Partners



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The Netherlands



**Delft University of Technology**  
The Netherlands



**Gent University**  
Belgium



**SAS Consultancy**  
The Netherlands



**Egerton University**  
Kenya

## Requesting organisation



**South Eastern University College**  
SEUCO Kenya

## Donor

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## Colophon

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