

AQUADACTICS: LEARN TODAY, APPLY TOMORROW

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Abstract: *The Trade mission accompanying MP Rutte in his visit to President Zuma of South Africa in November 2015 hosted a huge number of institutions and companies of which the majority were water organizations. The Netherlands has several cooperation agreements in water on business level as well as department level. Doing business and exchanging experiences were the two main topics. However the topic of capacitating, capacity building skills shortage often passed the floor. AquaDactics, a South African NPC, is launched during this trade mission. AquaDactics trains trainers and supplies practical curricula to enable local professionals and local academies to improve the level of experiential knowledge of the water staff. Local trainers, localized programmes strengthened the participant to learn today and to apply tomorrow.*

Kew words: Water challenges, Water demand, Dutch learning, AquaDactics

Introduction

The challenges facing the South African water institutions are overwhelming though, with millions of South Africans who have either no access to basic water supply, access to water that does not meet the basic services standard or coping with periods of droughts or flooding. While there has been much analysis of the actual situation in the water sector, along with regulatory frameworks and quality systems, much of the analyses remain dispersed and fragmented. Policies do not result in taking actions. Initiatives like assessments, green and blue drop regulations etcetera start as a crash action and usually die before the initiatives are implemented fully and showresult.

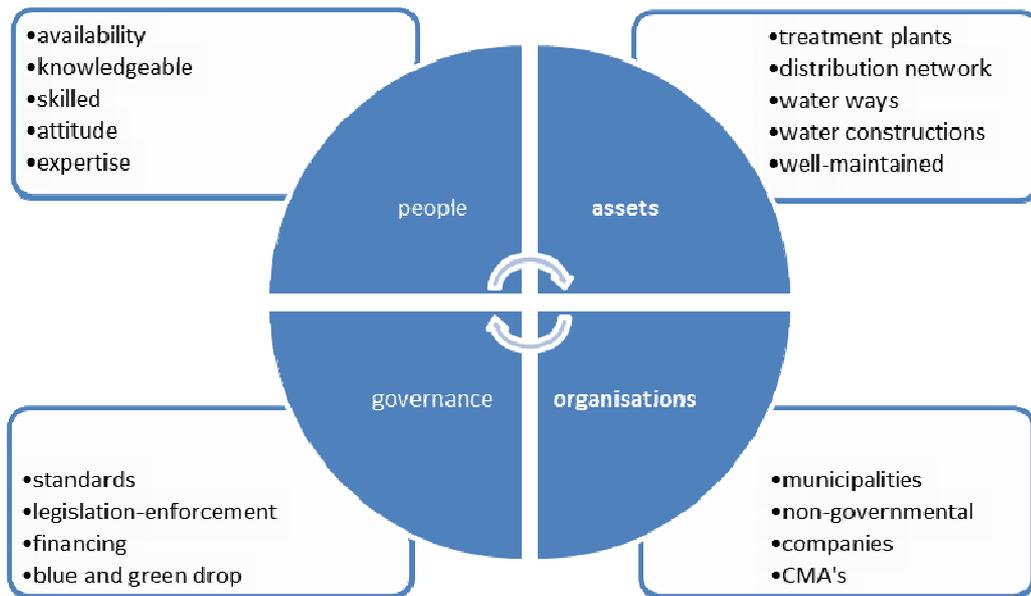
Currently there are 35.000 staff employed in the South African water sector with a number of vacancies at the 'Technicians and Trade Workers' level, resulting in increased workload for those who are employed. The technical workforce is getting close to retirement age with not enough qualified replacements. Although there are no figures readily available and lack of compliance with regulatory provisions like green and blue drop imply that the sector is not as effective as it could be. An overview of research in the education and training challenges in the water sector is described in the report Improving Water Education and Training skills iWETs [4]. There is a mismatch between qualifications and job requirements. Furthermore, due to regulations municipalities do not employ staff that is not qualified according the standards.

How to Fulfill Water Demands

Water is a key factor in the development of a prosperous economy, a healthy society and a sustainable natural environment. This implies constant availability of healthy drinking water, collection and treatment of waste water (sanitation) and finally water management to fulfill agricultural (horticultural) and environmental water requirements. These demands are fulfilled by four interconnected elements (see figure 1)

1. A suitable and well-maintained infrastructure of assets (water resource management, drinking water treatment plants, distribution networks, sewerage systems, waste water treatment plants, etc.);
2. Professional governmental and non-governmental organizations being responsible for the delivery and regulation of water services to an appropriate level;
3. An overall-governing structure which provides adequate and suitable policies on water, public health and people empowerment. These policies contain water standards, appropriate legislation, enforcement, education and deal with the financial aspects;
4. A number of knowledgeable and skilled water professionals, who successfully completed water qualifications on vocational levels.

Figure 1: Four interconnected elements to fulfil water demands (4)



The actual situation of poor service delivery in water arises from a complex set of circumstances of which an important element seems to be the governance and the technical skills levels of the staff responsible for the operation and maintenance of treatment plants.

Innovations and Implementation

Engineers are educated to design and develop. When problems arise, the first actions will be analyses and research. The trigger to do research on innovations is to lower costs and improve the output in the daily operational practice and routines. The South African water sector, ever being front runner in treatment, is willing to implement new technologies. But is the daily practice ready to implement these innovations? All of the four interconnected elements have to be fulfilled equally to create a fertile environment for innovations to flourish. An important factor is in the change of the daily practice and routines. However the hypothesis was that a well-balanced attention between assets, organisations, governing and people is required, the cases have shown that the attention for the people is a usp for the success of the innovation. Assets and governance have shown to be enabling elements and the people are the limiting factors. How can we change elements to improve the ground for innovations.

Skilled Work Force

The water sector is a relatively small sector and there are no dedicated water and sanitation qualifications at vocational levels. The generic qualifications that offer some

water-related modules do not produce graduates that are readily taken up in the water sector. The provision of young water professionals who are able to innovate and keep abreast of changes brought by new technologies will accelerate the implementation of these technologies. However only a few universities and Further Education and Training colleges offer qualifications that are able to provide the country with such young water professionals. Besides the existing vacancies a brain-drain is expected within the municipalities, due to the retirement of highly experienced people. The short term challenge for the sector, is to train and re-skill employees to increase performance. The figure indicates an average water institution. Especially the investment to train the grassroots level on operating and maintenance is a challenge of big numbers. A severe investment of the actual and retiring workforce is needed to train enough operators to reduce the scarce skills gap.



Learning from the Dutch

What is the main difference with the Dutch situation?

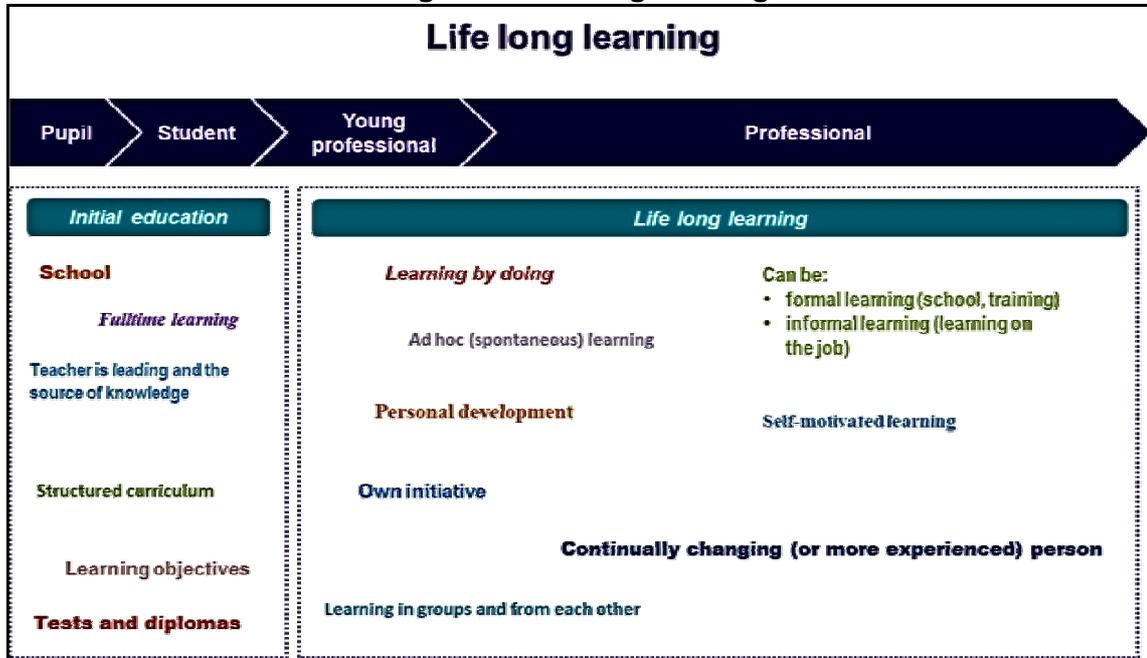
Everybody knows the story of the water supply history when, after the Middle Ages, the Amsterdam population, including babies and youth drank beer instead of water: the water was too polluted. The awareness of pollution and the political need for a solution has grown since the nineteenth century. The policy of water supply and watermanagement resulted in the Clean Water Act of 1970, when the pollution of the rivers was visible by dead fish. Waste water treatment plants were built and water treatment and distribution systems were expanded. Some universities started a division of water treatment and the association of water engineers was aware of the important role of operation and maintenance. They immediately started to train the operators and superintendants. Until today really dedicated education at vocational level lacks. In fact the water sector is a relatively small industrial sector with specific know how and requirements. The idea of exchanging experiential knowledge resulted in the establishment of an independent not for profit company Wateropleidingen that organises the programs and assures quality of the programs and the diplomas.

Continued Professional Development and Lifelong Learning

Water professionals determine and contribute to the quality of the economy, public health, empowerment and society in this respect. Assetmanagement emphasises to the hardware: the treatment plants and the organization as the emphasizes on the software, the human and capacity aspects are of equal importance. The days are long gone when initial qualifications and certification were seen as final preparation for a career. Today diplomas can be regarded as a platform on which further or continued professional development

must be built. Ideally everyone starts with an education, broad fundamental basic knowledge and skills as per the NQF. On completion, the education career is rewarded with a diploma, or with a degree. However nobody reaches his/her pensionable age without continuously learning by doing, training, mentoring, experiencing or just by making mistakes. Water professionals have to incorporate innovations and new technologies, so a system of lifelong learning has to be developed, implemented and maintained.

Figure 2: Life long learning



All over the world professionals continuously improve their skills and knowledge to stay up to date. Innovation, automation, communication and digital working procedures are main reasons that the work at the present time will change from what it was previously and from what it will look like in the future. In this respect, the water sector follows movements in society. However, water is a common commodity and not a booming business. The water sector is a relatively small sector, and the number of water educational opportunities does not meet the demand, especially for operational level.

Vision of Aquadactics for Training Design and Support

The sector skills plans of SouthAfrica and onther assessments show a scarcity in the actual operating and maintenance skills. Well knowledgeable and well skilled staff is the main prerequisite to operate and maintain assets sustainably. Further investments are foreseen in the water provision and the proper sanitation for all. Parallel to the capital investments for water (supply, wastewater and management), the development of the skillset for operation and maintenance of these precious assets needs to be addressed. There will be an increasing need for practical, well organised, quality training. AquaDactics will contribute in saving, structuring, sharing and spreading the experiential knowledge to improve the performance needed at grass roots level. Effective sharing of best practices will be best achieved by stimulating training “for professionals, by professionals”.

AquaDactics designs and supports the development of practical curricula of water skills. The trainers are trained and supported by dedicated curricula. The practical knowledge is saved, stored, structured and selected. Modern teaching methods to exchange are added. Water skills development tools are designed and developed for everybody who wants to be, is, or was employed within the water sector. New customised and practical training programs will be based on pedagogical and didactical knowledge. The experienced and passionate water professionals are coached to develop their trainer

skills. A wide range of courses is available and courses are already customised and dedicated to South Africa. AquaDactics is a local NPO (Not for Profit Organization). As a start up, AquaDactics is a virtual, cost efficient organization without office, equipment and staff. We are backed and actively supported by the World Water Academy (in Dutch Wateropleidingen), who has a long-lasting experience in The Netherlands.

A Training of Trainers was delivered to 20 professionals of EtheKwini Water and Sanitation June 2015. The Training of Trainers was new for the participants. The interactivity of the training created a lively and open atmosphere and a lot of exchange of know how between the participants took place. Besides learning from the trainer they shared a lot of their own knowledge and experiences. For instance more understanding has grown between the engineers and the superintendents. The participants expressed that they have learned a lot in giving structure, enthusiasm, motivation, practical and inspiration. They liked the applicability of the training and that they felt motivated to continue this form of learning. They all expressed that they want to have more trainings like this.

Some quotes of the participants about the Training of Trainers:

- *'I learned so many things and different methods of presenting the lessons. How to involve the audience and I learned different styles of teaching and training'*
- *'Constructive criticism from everyone to learn and improve'*
- *'Gives me strength and power'*
- *'Made me an effective trainer'*
- *'The course was very good. Especially the trainers, they were superstars'*
- *'I found the course interesting and would like to have more trainings like that'*

The Way Forward

The topic of capacitating, capacity building and skills shortage often passes the floor in meeting South African water professionals. The human factor on grass root level is often regarded as being a limiting factor. The knowledge is available, however the mechanism of exchanging the experiential knowledge and know how to a wider audience often lacks. The education of colleges and universities is very important in providing a firm fundament, but the dedicated and experiential knowledge is so specific that lifelong learning is crucial. AquaDactics, a South African NPC, intends to fill in this gap as an accredited organisation. AquaDactics trains trainers and supplies practical curricula to enable local professionals and local academies to improve the level of experiential knowledge of the water staff. Practical courses will be co-developed in water treatment, wastewater treatment and watermanagement, dedicated to the local situation and made available in licensing constructions.

AquaDactics will succeed if the policy of developing the water staff is put into action. The awareness that innovation may accelerate if operation and maintenance is effective and efficient. In addition, this important task will raise the interest in working in the water sector. The approach requires a long term vision in investing in staff and in enabling knowledgeable engineers to spend time in being trainer. As stated before, a professional trainer will make the difference in lifelong learning: motivating and inspiring their peers in learning today, applying tomorrow.

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