



“I simply saw no alternative”

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Topics: Organisation & Staff

Chemical engineer Tove Larsen made an impact at Eawag over the course of 24 years. Besides being the first woman to hold a managerial position at Eawag in the field of urban water management, she was also initiator and head of the Novaquatis cross-cutting project, group leader and member of the Eawag Directorate. Her areas of responsibility have included urine source separation, the Blue Diversion toilet, the Water Hub and Wings. Now Tove Larsen has retired.

What drew you to Eawag?

That was a long time ago. In 1999, I was a senior assistant at the Chair of Urban Water Management and lecturer in wastewater treatment technology at ETH Zurich. During my time at ETH, I had worked intensively on the topic of sustainable development in urban water management, including in discussions with colleagues at Eawag. I looked into various topics and finally decided to pursue the idea of urine source separation.

I officially joined Eawag in 1999. The Directorate wanted to initiate a cross-cutting project on sustainable urban water management and offered me the job. I already had some previous experience with such projects as I had been on the project management committee for the research focus since 1993. This was a precursor to the cross-cutting projects. Looking back, Eawag's openness to breaking new ground was remarkable. Especially the director at the time, Alexander Zehnder, and the two deputy directors believed in my ideas, even though they were quite unconventional. I was offered an exciting position, which then turned into a

permanent position.

And then came Novaquatis?

That's right. Novaquatis was one of Eawag's first cross-cutting projects in which we spent six years taking a transdisciplinary approach to urine source separation or NoMix technology as a new element of wastewater treatment. Our goal was, and still is, to better protect bodies of water from nutrient inputs and micropollutants and to close nutrient cycles. Novaquatis has demonstrated that NoMix technology is an excellent alternative to centralised nutrient elimination, but has also highlighted the many difficulties involved in implementing these ideas in practice.

Perhaps the most important factor in our success was that we took a holistic view of the issues and involved colleagues from a wide range of disciplines in the project, including social and natural sciences and engineering. We also worked closely with the sanitation industry and local authorities. Today, the involvement of all important stakeholder groups is standard, but 20 years ago this was not nearly as well established.

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Do you have any further personal highlights to share?

There are quite a few. First and foremost, I would like to mention the Bill & Melinda Gates Foundation's Reinvent the Toilet Challenge, which enabled us to develop the Blue Diversion toilet, including the water wall, in collaboration with colleagues from the Sanitation and Water for Development as well as Process Engineering departments from 2011. This became the Autarky toilet in 2014 under the leadership of Kai Udert.

The project once again underscored how crucial it is for different disciplines to work together and for stakeholders to be involved. The involvement of Harald Gründl from EOOS Design transformed the individual disciplinary contributions from Eawag into a coherent whole that could actually be tested in Uganda and Kenya. The two projects, Novaquatis and Blue Diversion, ultimately resulted in a new generation of toilets in series production, which are being used at various locations. Such radical innovations need staying power, the right partners and, above all, an employer with a lot of patience. We haven't reached our goal yet.

Looking back, I was able to introduce some new topics to Eawag, which were then taken up by colleagues and are now an integral part of the portfolio. One example is the Water Hub in the NEST building of Empa and Eawag, where the developments of the Process Engineering department are used and where we share our experience and knowledge in practice and with industry. In the Water Hub, you can experience in person how wastewater flows are separated directly at the source and treated in the building itself. Another, perhaps more indirect example is the inter- and transdisciplinary research programme Wings (Water and Sanitation Innovations for Non-Grid Solutions), which, among other things, addressed the question of how water supply and wastewater disposal can be carried out flexibly and in a resource-efficient manner in rapidly expanding cities.

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How did you come to be so focused on urine source separation from such an early stage?

I wasn't at all. But I was interested in how we can develop sustainable urban water management that doesn't just work for privileged countries that can afford the facilities and infrastructure. I simply didn't see any alternative to urine source separation.

It has been clear for decades that as the world's population grows and the climate changes, we need to be more conscious of how we use our resources. Water and bodies of water are some of our most valuable resources. Supplying cities with water and protecting bodies of water from wastewater is a complex task that has been slowly and steadily perfected since the beginning of the 20th century. I was and still am of the opinion that our urban water management only works in stable, water-rich and reasonably prosperous societies. I am also firmly convinced that only by separating wastewater at source can we simplify wastewater treatment in such a way that it can also be decentralised and quickly implemented everywhere. In addition, resources can be recovered more easily from the individual parts of the wastewater. For instance, fertiliser from urine, water from grey water and energy from solids.

Switzerland would be a good place to perfect urine separation. Instead of expanding wastewater treatment plants to reduce nitrogen flows into European coastal areas, such a development would have a much greater impact worldwide. I also anticipate that it would be cheaper for Switzerland in the longer term, although new technologies are always more expensive initially.

What has characterised working at Eawag for you?

For me, Eawag was a good place to do research, because failure was allowed; this is extremely vital when carrying out innovative projects. If you are not permitted to fail, you do what works and avoid the big leaps. Moreover, there are many different disciplines at Eawag that work together to have a real impact. It is difficult to find such a network elsewhere. There are also professional support departments that are very important for all of us.

What are the next steps? Do you have any plans?

I'm really looking forward to the time off when I'll finally have the opportunity to do all the things I've wanted to do for a long time. Escaping the high fog in the mountains, visiting Italian museums out of season, tending to my garden (even if it rains every weekend), and so much more. My long-term goal is to read the Icelandic sagas in the original language. I have always been drawn to Nordic literature and I find such medieval literature to be particularly compelling. So, the first thing I'll do is learn Icelandic, which is pretty close to Old Norse. It is possible to learn Icelandic online and at Migros, but for Old Norse I'd have to go to university. That would also be very exciting, but I want to enjoy a few years of freedom first. After all, I've been tied to school and semester holidays for long enough.

About Tove Larsen

Tove Larsen holds a doctorate in chemical engineering and has been a senior scientist and later group leader in the Urban Water Management department in Eawag since 1999.

After her postdoc at ETH Zurich, Tove Larsen joined Eawag, where she initiated and led several transdisciplinary projects on innovative technology developments in the field of urban water management. Her main interests are resource-conserving wastewater management and transdisciplinary research. In 2008, she won the prestigious “swiss-academies award for transdisciplinary research” for her Novaquatis project and her visionary, innovative and integrative approach in the field of urban water management. In 2014, she won two innovation awards from the International Water Association (IWA) for her Blue Diversion project.

During her career, she also spent eight years as a lecturer in environmental engineering at ETH Zurich and one year as a visiting professor at the Technical University of Denmark (DTU), where she was appointed titular professor in 2017. From 2020 to 2022, she was a lecturer at ETH Zurich in the Department of Architecture.

As a member of Eawag’s Directorate, she has represented the area of environmental engineering and thus supported Eawag’s endeavours to practically implement innovative technologies.

Cover picture: Tove Larsen (Photo: Peter Penicka, Eawag)

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