

Minutes of the World Café Session at the DEMEAU Final Consortium Meeting

Partner: Ecologic Institute, FHNW, KWR, IWW, KWB

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1. Technological and non-technological innovation

Hosts: Ulf Stein and Evelyn Lukat (Ecologic Institute)

Guiding questions:

- How did DEMEAU transform existing technologies and previous results into innovative findings and technologies?
- To what extent did this transformation improve the utilisation of these existing technologies and previous results studies?
- How did DEMEAU empower the different stakeholder groups to innovate?

Given the long development processes in live science big innovation boost could not be expected. However, DEMEAU contributed with small but still very relevant contributions to the innovation in the water and waste water treatment sector. As a major achievement, not only various technologies have been improved, but also the interaction between these technologies when applied together has been studied. As a result, new knowledge was disseminated and could be incrementally improved in both, national and international undertakings. Especially, the new legal situation in Switzerland, offers a unique window of opportunity for innovation uptake. Existing knowledge gaps for each technology can be detailed. Hence, the DEMEAU project contributed to both, technological and non-technological innovation. The project enhanced technologies and other research findings that were developed in former projects (e.g. Techneau) in several ways.

Technological innovation can be assigned to either products, or processes.

For **AOT**, the project contributed to the further development of the technology. Several associated technologies were boosted by the project's research. One example is the oxidation reactor that was developed by Van Remmen. Without the project's support, the SME would not have been able to invest in its idea and develop the well functioning reactor, neither could it have been applied in the production of drinking water in a water utility. Also, the reactor could be optimized for specific compounds. Another example is the implementation of sensor technology that was formerly only applied in waste water treatment. Sigrist was able to adapt their technology now also to drinking water production.

Energy efficiency could be improved. One important finding is that tweaking the profile of a system in order to reduce environmental impact often goes hand in hand with increased energy consumption.

The **LIBD** technology was studied by using new types of lasers.

DEMEAU supported **Bioassays** as it provided the environment to apply the technology with most of the other DEMEAU technologies and be used for testing their treatment efficiency. Bioassays could therefore show their variable applicability.

The DEMEAU project also provided the basis for **non technological innovation**, especially in form of improved frameworks, life cycle and barrier & drivers studies. An important aspect of innovation is the possibility to test technologies in a different environment. DEMEAU provided this possibility to utilities and SMEs as it lowered the risk for the trial. In this way, some technologies that are well established in one water sector could be applied in the other sector (e.g. ANCS or analytical tools for AOT from waste water were applied in drinking water).

Especially, for the well established **MAR** technique, DEMEAU demonstrated the potential for a further application in other EU countries as a cost efficient and especially environmentally beneficial technique. The database on existing MAR sites in Europe is an important building block for further expansion of this technology.

With regards to **HCMF**, the project could prove that the ecological impact of this type of filtration is beneficial in comparison to polymeric membranes through the LCA analysis. This can support the spreading of the technology in Europe. Full scale implementation of ultrafiltration is a necessary requisite for market expansion.

DEMEAU created many innovative communication messages. The results of the **LCA and LCC analysis**, the actual costs of water treatment become more transparent. This could potentially be used to create awareness of the importance of clean water to the consumers. Bioassays are an important means to communicate risks of water pollution to the broader public.

During the project, several barriers to innovation were also uncovered. Regulation (for Bioassays and MAR) and political incentives (for the fourth treatment step or energy efficient water treatment) are currently lacking. Therefore, it could be useful to integrate regulators and policy makers closer into the project cycle. With the current level of involvement, no relevant changes in regulation are likely to be achieved.

Economics clearly can be another barrier to innovation. With the funding of the project, several innovations could be achieved whereas the lack of financial resources led to ceasing projects e.g. in Spain (MAR).

DEMEAU is a good example of a successful project with a truly interdisciplinary and transdisciplinary character. Especially the involvement of water utilities can be seen as a positive example.

2. Decrease environmental impact

Hosts: Thomas Gross (FHNW) and Christian Remy (KWB)

Guiding questions:

- How did DEMEAU contribute to reach a more energy and resource efficient Europe?
- What needs to be done to reach more energy and resource efficiency? And how can DEMEAU's outcomes contribute to this?
- How can the development of new standards and regulations contribute to utilise DEMEAU's outcomes for a decreased environmental impact?

Some aspects of Demeau tackled the optimization of resource efficiency:

- Technical innovations in terms of resource efficiency (e.g. UV units at Dunea, optimal control system for ozone dosage in wastewater treatment)
- ANCS for resource efficient plant operation
- Optimizing/applying MAR can replace the addition of some technological treatment steps (thus saving resources)

Importance of highlighting also the environmental benefits due to removal of emerging contaminants

- Most of the technologies are an add-on to existing plants, so they appear as an increase in resource use
- There is a trade-off between the removal of emerging contaminants vs. the usage of additional energy and other resources (pumping, steel and concrete installations etc.)

Other points mentioned:

- Stricter regulations are perceived as the main incentive for the new technologies
- On an individual level, asking utilities about emerging contaminants and their actions can help creating a more pro-active environment
- Participants perceived that European policy makers are difficult to access via EU projects
- Disconnection between research and policy
- Nice innovations are not taken up
- One participant stated that policy should be forced to take up research results

- Regulations should use the outcome regarding the balancing of local benefits and resource use in decision making processes
- It's not a question if we came up with good approaches, but rather if they are taken up

Focus of DEMEAU is on improving water quality (discharge to surface water, drinking water production) to decrease negative environmental impacts arising from emerging contaminants which are used in society. Given this task, DEMEAU tried to **reduce/minimize energy and resource demand for additional water treatment** by optimising innovative technologies (e.g. AOP) and promoting low-energy options (e.g. MAR).

DEMEAU tried to **reduce existing uncertainties in monitoring of environmental impacts** due to the multitude of emerging contaminants and their transformation products by promoting the use of effect-based analytics (bioassays), thus improving risk management options and regulatory means.

For uptake of DEMEAU technologies to reduce negative effects of emerging pollutants on the environment, **regulatory standards have to be defined for emerging contaminants** in national and EU laws to establish target values for water quality of WWTP effluent, surface water, and drinking water in the long-term.

3. Creation of new markets

Host: Kristina Wencki (IWW)

Guiding questions:

- How did DEMEAU contribute to the application and use of innovative environmental technologies and methodologies?
- How did DEMEAU contribute to the development of new standards and regulations?
- To what extent did DEMEAU promote a climate of entrepreneurship and job creation among the different stakeholder groups?

DEMEAU indirectly contributes to the creation of new markets because creating new markets is intrinsic to research. That is why research projects, as DEMEAU, promote the:

- creation of new regulation,
- broadening existing markets, and
- stimulation of existing markets.

How did DEMEAU contribute to the application and use of innovative environmental technologies and methodologies?

DEMEAU is about “demonstration”. Gaining experience in the application of new technologies, spreading knowledge and operationalizing innovative solutions is indispensable for selling products. By performing several assessments the benefits of the different technologies are highlighted. Based on the dissemination of positive results of this testing the attention of potential customers and regulators can be caught. Besides the mentioned “special atmosphere” within DEMEAU, helps promoting existing technologies and pushing them a step further in their development to the market. At least, in some cases the fact that the technology is funded by EU proves that it’s a promising one.

How did DEMEAU contribute to the development of new standards and regulations?

DEMEAU contributes to the change in regulations in a very limited way. For example, the innovation on bioassays may help policy makers to define standards, improve public trust and create a market for producers of bioassays. If there will be a regulation that forces the application of this new technology the market application of the technology will be ensured. But in general the effects of the DEMEAU project in this area are seen very critical due to the limited attention by administration.

To what extent did DEMEAU promote a climate of entrepreneurship and job creation among the different stakeholder groups?

With its very special setting of the consortium, incl. research institutions as well as operator, DEMEAU supports the building of communities and the spreading of knowledge from the researchers’ point of view. On the other hand, researchers can profit from the exchange with operators by getting inspirations and critical feedback. For technology suppliers, this collaboration offers the opportunity to present their technologies, gain experience in their application and finalize existing ideas of modification. Besides, cooperating with partners from across Europe might give them the chance to broaden their market to other European countries. Nevertheless, participating in research projects may also have negative effects on supplier companies just as losses due to the financial constraints of European funding for market-oriented companies. From the utilities point of view, the benefit of the DEMEAU project can be to reach some sort of “pioneering role” with being the first to implement a technology out of which smaller consultancy tasks may result.

But although the benefits of DEMEAU regarding the creation of new markets were clearly marked now, the participants of the group highlighted that it’s a long way to the market and the question of defining potential market for the DEMEAU technologies is still to be answered.

4. Creation of new markets

Host: Miranda Pieron (KWR)

Guiding questions:

- How did DEMEAU contribute to a better transfer of knowledge between the different stakeholder groups?
- To what extent did DEMEAU promote public trust of environmental technologies?
- To what extent did DEMEAU improve uptake of innovative environmental technologies?

The most valuable ‘asset’ of DEMEAU is the fact that technologies are actually demonstrated; they work in practice!

This speeds up the learning process

- This facilitates building of trust (of all stakeholders) in the technology and its application
- It makes it possible to share learnings across (European) countries (“if Germany does it successfully under these circumstances, we should give it a try too”)
- This facilitates knowledge transfer: creating awareness and educating others about the respective technologies becomes a lot easier when there is a success story to ‘show’.
- It makes decision-makers at utilities (and in governments) acknowledge that the technologies work.

The project was perceived as a platform for stakeholders to meet each other. Especially the involved utilities and technology developers indicate that they have met other stakeholders which they would never have met without DEMEAU.

- This increases learning from other cases/countries (e.g. for AOP: Dunea-EAWAG)
- This increases the network through which messages are spread, eventually leading to more/easier implementation and awareness creation.

Valuable activities have been mentioned: concrete deliverables such as the MAR catalogue with all cases from which one could learn, but also the utility events where people with a policy perspective were present. Activities were labeled as ‘valued’ when they facilitated knowledge transfer from scientists/researchers to policy makers, utilities or the public.

For successful implementation of these technologies it is of major importance that policy makers/regulations increase the pressure for water utilities to better clean their water...

- By first (or in parallel) making the general public aware of the micropollutant problem so that they know how they themselves contribute to this problem by using ‘wrong’ products at home or buying products that are produced with much undesired pollution. When the public makes a big point of this the authorities will follow. It would create an atmosphere in which it is ‘not done’ to use polluting products or as a water utility not to pay attention to these emerging substances.

- Increasing the regulatory pressure will cause water utilities to work harder on innovation/solving the problem.
- Providing funding for demonstration projects/good examples might be a tool to promote the required innovation (although it's the same public money), because it lowers the threshold for utilities to adopt the technologies, which again serves as demonstration opportunity for other utilities.
- Up to now this wasn't really achieved within the DEMEAU project according to the feelings of the people in the discussions (also because this is a long process).
- In some countries the trust in water utilities might be 'too high' (such as in NL), which causes that policy makers think that everything is arranged for and stop to think critically about what needs to be done to keep the world healthy on the longer term.

It was mentioned that within the project dissemination of the results wasn't always a first priority;

- Scientists would rather first 'finish' their project and know everything before they start sharing (and risking that they need to admit that they still don't know certain things)
- It is often expected that someone else will disseminate, and that it isn't a task of the researcher.

About awareness creation:

- To transfer knowledge you need to have knowledge.
- DEMEAU mainly provided insights in what we still need to know (when we try these technologies in practice).
- The results could be used to create awareness on the challenges posed by micropollutants in water. Although the knowledge on the solutions is sometimes very context specific, or not yet 'ready' for transfer, the first thing that needs to happen is that society becomes aware of the challenges that could be addressed by the DEMEAU technologies.
- However, in practice it can be noticed that utilities are hesitant to communicate about the challenge of micropollutants, because it might induce fear among their customers, while they would rather tell the water users that 'everything is okay' and 'don't worry, we will arrange everything'. At least you need to be able to show how you're solving a water related problem if you're open about it.

A missed chance within DEMEAU is the challenge of implementation of the technologies in new markets. The cases were studied in depth, but none of the WA's explored in which other (European) countries these technologies could make a positive change.

DEMEAU still lacks powerful messages that can easily be shared through existing canals. The animation that was presented today was a good (first?) example of how this can be done. From the work areas the deliverables are not tailor-made for specific target groups (which will probably lead to the fact that no one will take note of the results).

- For example in TRUST, guides were developed for specific stakeholder groups, with only the information that is valuable for that specific group.
- In order to 'spread the news' personal communication is required, so no flyers or websites (too passive), but a personal email would already be better, inviting people for example to come to one of the demo-sites.
- Approach stakeholders from a 'problem-oriented' perspective: this is the problem we know you are dealing with, and this is what we learned about different components of the problem and potential solutions (cost related, how to communicate about it in a reputation enhancing way, improving water quality, etc.)

The developed knowledge in DEMEAU is very 'local'; it probably does not help policy makers on national or European level to make fitting regulations. The developed knowledge thus should be translated to a language that's understandable for them and connects to their 'worldviews'.

Opportunity: Make DEMEAU insights on micropollutants issues available for education/schools. Awareness starts there, with young people. Or make podcasts, animations, etc. Media that can reach the general public.

The DEMEAU knowledge is very complex; it's not one solution that always solves your problem. This makes it very easy to 'sell' it to stakeholders for which it might be relevant.

The topic of micropollutants competes with many other subjects that need the attention of policy makers and the public/society. Everyone is 'sending' and it's difficult for the receivers to decide where to put the focus and who to listen to. We need to keep this in mind.

DEMEAU did not really lead to 'uptake' of technologies; the cases were already there before the projects started, so the decisions were already made then. The project only leads to recommendations, based on insights that were generated in the 'practice' of the case studies.