SCALE UP
community-driven
bioeconomy development

WS1 Training Programme Protocol

Proceedings of the training sessions in WS1: Improved Nutrient Recycling in the Bioeconomy

Session #2
4 April 2024

CLOSING THE LOOP: NUTRIENT RECYCLING VALUE CHAINS AND OPTIMIZING LOGISTICS

The second session "Closing the loop: nutrient recycling value chains and optimizing logistics" from the WS1, took place on the 4th of April 2024 from 9:30 am to 12:00 pm CET and welcomed around 65 participants. The agenda included two presentations and a video, starting with an introduction to the SCALE-UP project by Frans Feil from BTG/BEON. Lucile Sever from the European Biogas Association discussed the anaerobic digestion of manure and agricultural residues and its role in EU-biogas production and nutrient recycling. Then, a video showcased circular solutions for biowaste, focusing on the production and application of biofertilizers from manure through anaerobic digestion at Groot Zevert in the Netherlands. Furthermore, Francisco Corona Encinas from CARTIF Technology Center presented production routes for alternative fertilizers from agricultural residues. Following a short break, participants engaged in breakout rooms moderated in their respective languages to discuss regional needs and challenges. The session concluded with a feedback on the key outcomes and questions from the breakout rooms, along with concluding remarks on how to move forward.

BREAK-OUT ROOMS

1. Digestion of manure and agricultural residues can play an important role in the recycling of nutrients. What is your experience with anaerobic digestion and the use of digestate products? What is the situation in your region?

INTERNATIONAL

Among the international participants of the group, there is experience in using digestate as biofertilizer ranging from “I know about it”, to “I am a full expert”. In the Netherlands, an increasing amount of manure is digested and subsequently upgraded to valuable fertilizer products. The main driver is the large amount of manure in the country. There is a threat of “overnutrification” of the countryside. Digestate needs to be processed to export and valuable nutrients to places where there is shortage. Several digestate processing plants have been built to take N and P out and to convert these streams in fertilizers that could replace synthetic fertilizer. A lot of research is being done on so-called RENURE (recovered nitrogen from manure). In the Netherlands, most new biogas plants are dealing with manure only. In Germany and France other organic residues are also used to raise the biogas production. Maize consumption is however, going down.

SPAIN

Anaerobic digestion plays a crucial role in the recycling of nutrients in the bioeconomy, particularly in regions like Andalusia, which is dedicated to agriculture and has a strong bio-energy sector. The region has a significant presence of olive groves, fruit and vegetable production, and horticulture, providing abundant biomass resources for anaerobic digestion. The process involves the breakdown of organic matter by microorganisms in the absence of oxygen, producing biogas as a byproduct. This biogas can be used as an energy source, reducing the reliance on fossil fuels and contributing to a more sustainable energy mix.

In Andalusia, the challenge lies in the logistics of managing and transporting biomass resources for anaerobic digestion. To address this, systems are being developed using mathematical

models and artificial intelligence, such as the BIOTRANSFORM project, which aims to optimize the logistics of biomass collection and transport.

Co-digestion, the process of combining different organic materials in the anaerobic digestion process, is also emphasized, particularly the co-digestion of cow manure and olive mill solid waste (alperujo).

Decentralized production of biogas, closer to the source of the biomass, is another approach to reduce transportation costs and carbon footprint.

For producers, the recycling of nutrients can be an additional income source, and in some cases, it may even lead to the development of professional profiles in waste management.

Portable recycling plants are also seen as a solution to increase flexibility and efficiency in terms of optimizing nutrients in the almazaras (olive oil production units) and logistics.

NORTH MACEDONIA

In the Strumica region, the experience with anaerobic digestion and the utilization of digestate products is relatively limited, primarily utilized for personal purposes rather than for wider distribution. While there are a few instances of anaerobic digestion employed with poultry manure in the country, it remains somewhat underutilized.

The current situation underscores a need for increased collaboration and networking with local farmers to enhance the anaerobic digestion process. This includes improving understanding of its benefits, optimizing operational practices, and exploring the potential for increased production and demand for digestate products. By fostering greater cooperation within the agricultural community, there's an opportunity to leverage anaerobic digestion more effectively as a means of nutrient recycling and sustainable agricultural practices in the region.

POLAND

The participants shared their experiences related to the digestion of manure and agricultural residues. The general consensus was that anaerobic digestion is an effective way of recycling nutrients. However, specific experiences varied, as some farmers already used anaerobic digestion while others had limited exposure to it. The challenges highlighted included initial investment costs, technical expertise, and regulatory barriers. Adoption of anaerobic digestion in the Mazovia region is still limited compared to traditional waste management methods. Nonetheless, there is a growing interest and awareness among farmers in the region.

SWEDEN

Anaerobic digestion and the utilization of digestate products have been experienced in terms of their significance in nutrient recycling. In the region, attention has been given to the role of anaerobic digestion in managing agricultural residues and manure. A regional approach to biogas production and nutrient recycling has been indicated through collaboration with neighboring countries such as Sweden, Finland, and Norway, through a new project, Boost Nordic Biogas, suggesting potential wider adoption.

AUSTRIA

During the discussion in the Austrian break out group, it became apparent, that the biggest struggle is related to the regulatory framework, which lacks flexibility to allow for true

collaboration. Several legislative concerns were raised, that all limit the ability to truly engage the full potential of nutrient recycling in Austria. At the same time, the logistical effort related to enabling digestate products is currently rather high in Austria. At the same time, it is currently easier, to stay within one's own system to avoid the question of transportation entirely. Therefore, the current focus is on building individual storage systems.

In addition, it was mentioned that research is rather limited and very focused on "never change a running system". This is also partially caused by the costs new technologies and processes would incur. Currently, the willingness to pay higher prices for more innovative technologies is not there, so while research might have alternate options, they aren't yet being used in practice.

2. What did you learn from the presentations and what do you see as the best options to promote anaerobic digestion and the use of digestate products in your region or country?

INTERNATIONAL

The video showed excellent prospects for digestate processing resulting in valuable replacements for synthetic fertilizer. Testing on crop production showed good results. Experts from the Netherlands know, however, that achieving the results at Groot Zevert, was not easy. Financially it is still a challenge. Business cases are poor. The technical difficulties were also stressed in the CARTIF-presentation. This was good. Frustrating is the long time it needs for Brussels to get at an approval for RENURE. The EBA-presentation made, however, the negotiation process better understandable. The EBA-presentation was very good. It was noted that in the USA, compared to the EU, there seems to be a much better valuation of nutrients in the anaerobic digestion sector.

SPAIN

The presentations provided valuable insights into the regulatory framework for anaerobic digestion at the European level and detailed case studies of various anaerobic digestion and composting processes. The importance of co-digestion, particularly the combination of cow manure and olive mill solid waste, was highlighted to improve the efficiency of the anaerobic digestion process. Decentralized production of biogas was also emphasized as a means to reduce transportation costs and carbon footprint.

The speakers in the Spanish break-out session, also discussed the importance of logistics and infrastructure for the efficient production and use of digestate products, as well as the need for a comprehensive approach involving the cooperation of multiple players in the value chain. The use of mathematical models and artificial intelligence was mentioned as a tool to optimize the logistics of biomass collection and transport.

NORTH MACEDONIA

The presentations were very interesting for the participants, highlighting the need to promote anaerobic digestion and digestate product usage. Establishing a learning center for training and knowledge exchange is crucial. Additionally, integrating biogas modules into existing infrastructure like the wastewater treatment station in Strumica and utilizing biogas from old landfills are practical strategies for sustainable resource management and energy generation.

POLAND

During the meeting, the participants shared their insights on the presentations and identified key strategies for promoting their cause. Here are some of the key learnings that were identified during the discussion:

It was noted that education and outreach programs aimed at farmers and other stakeholders are important in promoting the cause. Policy incentives and subsidies can also play a crucial role in facilitating adoption. Participants agreed that collaborative efforts between the government, businesses, and NGOs are essential in achieving the desired results.

Based on these learnings, the following options were identified as the best strategies for promoting the cause in the region or country:

1. Establishing demonstration projects to showcase the benefits and feasibility of the cause.
2. Providing financial incentives or grants for infrastructure development.
3. Developing educational programs to raise awareness and build capacity.

SWEDEN

The presentations have highlighted the importance of collaboration, research, and technology in promoting anaerobic digestion and the utilization of digestate products. The promotion of adoption could be encouraged by success stories highlighting economic viability. Enhancement of awareness and adoption of these practices could be facilitated through regional platforms for knowledge sharing and collaboration, ensuring widespread implementation.

AUSTRIA

Overall, the Austrian participants were quite impressed with what they were able to learn during the presentations. When asked how the new learnings could be applied locally, unfortunately they felt like the Austrian market in general was not ready for such approaches and innovations. In Austria, it is very common for agricultural holdings to keep risk and involvement with others low by staying within their own system and going through the whole process – but only in their one single-farm system. The complexity and risk of cooperation together with the lack of a legal framework to support such collaborative efforts has resulted in little efforts to change this system, as there is currently simply no incentive to take on such complicated and risk-bearing endeavours.

3. Production of alternative fertilizers requires the cooperation of many players. The full chain is important. What could the role of the regional platforms? How can they stimulate the production of bio-fertilizers?

INTERNATIONAL

A regional platform can facilitate knowledge transfer by organising meetings, putting information on the internet and discussing issues with local authorities. Dedicated expert groups could be formed to develop know-how together. Also with special attention to ecological boundaries (special task force). Some components in the digestate can be used for air-cleaning. This is special item for further exploration.

SPAIN

Regional platforms, such as the one initiated by the SCALE-UP project in Andalusia, are crucial for fostering collaboration between various stakeholders in the bioeconomy, including producers, researchers, and policymakers. These platforms can facilitate the development of new strategies, innovations, and logistical solutions to optimize nutrient recycling and the production of bio-fertilizers. By bringing together different perspectives and expertise, these platforms can help identify challenges and opportunities in the bioeconomy and develop sustainable solutions to address them.

NORTH MACEDONIA

The role of the regional platforms in stimulating the production of bio-fertilizers is significant. Immense benefit is derived from networking and knowledge sharing facilitated by these platforms. The good practices presented serve to stimulate the replication of sustainable bio-fertilizers. However, it is acknowledged that some of the technologies presented are new to us, requiring further research before practical implementation. Enhanced knowhow and peer-to-peer experience sharing are needed, exemplified by the collaborative efforts demonstrated by manufacturers such as the one from Spain. Through the expertise and experiences shared via regional platforms, the production of bio-fertilizers can be effectively stimulated, contributing to the advancement of sustainable agricultural practices in our region.

POLAND

Participants of the discussion stressed the importance of collaboration throughout the entire bio-fertilizer production chain. Regional platforms can play a crucial role in enabling this collaboration. The regional platforms can provide a platform for knowledge exchange and networking among stakeholders. They can facilitate partnerships between farmers, researchers, businesses, and policymakers and offer technical assistance and training programs. Support from local governments may be required to support the cause through training programs and promotion to local entities.

Specific strategies can help stimulate bio-fertilizer production, such as developing certification standards and quality assurance mechanisms, establishing supply chain partnerships to ensure consistent feedstock availability, and advocating for supportive policies and regulations at the regional and national levels.

SWEDEN

Regional platforms assume a critical role in stimulating the production of bio-fertilizers by serving as hubs for knowledge exchange, collaboration, and coordination among stakeholders. Partnerships between biogas producers, farmers, policymakers, and other players in the value chain can be facilitated. Support for research, innovation, and infrastructure development through funding and incentives can further stimulate bio-fertilizer production. Additionally, sharing best practices, regulations, and market insights can align efforts and promote sustainable nutrient recycling practices across the region.

AUSTRIA

A regional platform could be massively beneficial in aiding with cooperation, something that is currently still lacking in Austria. As of right now, there is no real incentive to collaborate and all

attempts rely on the willingness to try something new of a few innovative heads. A regional platform as the driver of such innovations could also be the missing link to policy makers, as this is another aspect of the current situation in Austria where support and an overall sense of community is lacking.

Cross-regional conclusions/learnings

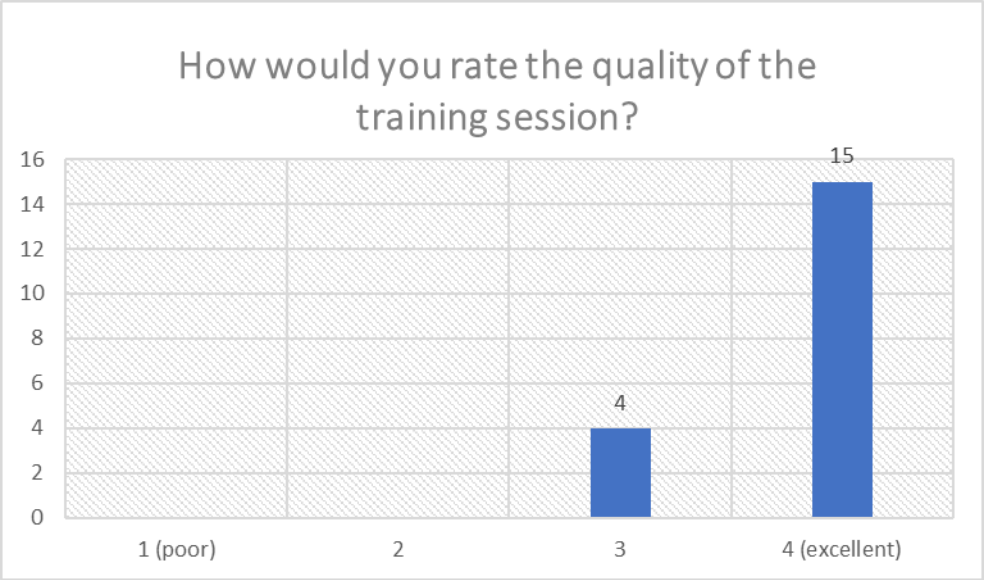
Common challenges in nutrient recycling through anaerobic digestion are European legislation and technical hurdles. The EU strongly stresses the need for high quality fertilizers and protection of soil and water resources. This conflicts sometimes with nutrient recovery and fertilizer applications. Manure remains a difficult and costly feedstock for processing making recycling options more expensive that synthetic fertilizers. Regional platforms could play an important role in sharing information and lowering costs of production.

Participant feedback

At the end of the training session, the participants were asked to fill in a short survey to evaluate the training session. In the end, 19 participants responded to the survey, of which 7 from Spain, 6 from Macedonia, 2 from Poland, and one from France and one from Austria. Additionally, 2 participants from the Netherlands answered the English survey. This gave the following results:

1.1 Quality

The participants were asked to rate the quality of the training session on a scale from 1 (poor) to 4 (excellent). 15 out of 19 participants answered this question with a 4, meaning they found the training session to be of excellent quality. 4 participants answered this question with a 3.



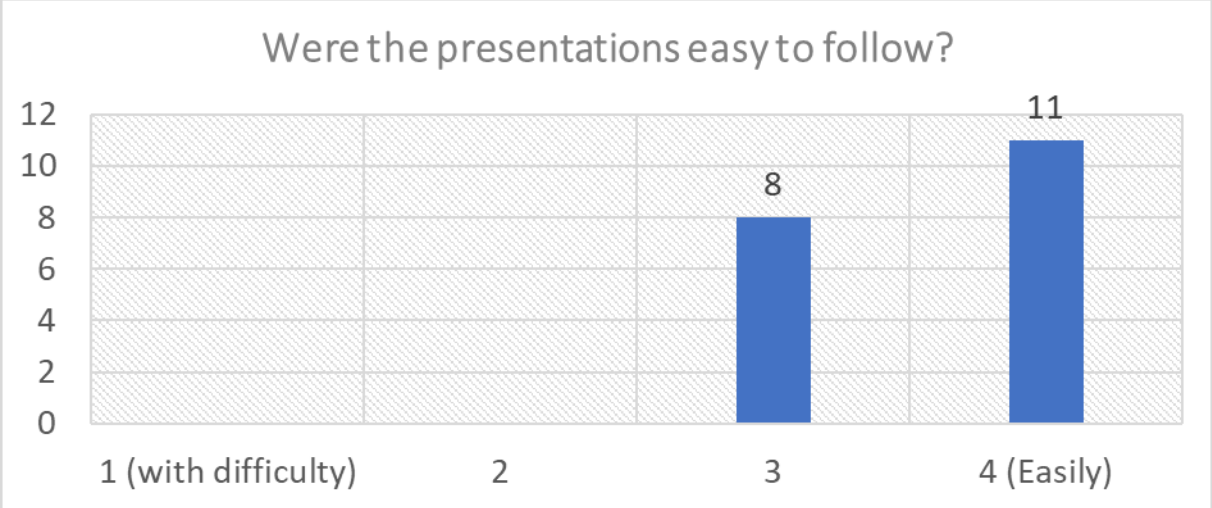
The participants were then asked what went well during the session. The participants complemented the moderation, the content, the use of practical examples and that they liked the video. Additionally, the participants mentioned that they found the presentations to be smooth and within the time frame. They also mentioned that they liked the format in which the speakers give a general overview of the subject and it is discussed in more detail in the breakout rooms.

Next, the participants were asked what could have gone better. Participants mentioned that they liked the introductory polls and that they would have liked to see more of them on the presentation topics. A few of the Spanish participants mentioned issues with the simultaneous translation.

When asked how the second session compared to the first, the participants mentioned that they found both to be equally interesting but that this session had better time management.

1.2 Understandability

The participants were also asked whether the presentations were easy to follow. They were asked to rate this on a scale from 1(with difficulty) to 4 (easily). Out of the 19 responses, 11 were a score of 4 (easily) and 8 people gave it a score of 3. There was one comment on that while the presentations were interesting and quite general, they were still difficult to follow for a person with little experience on the subject.



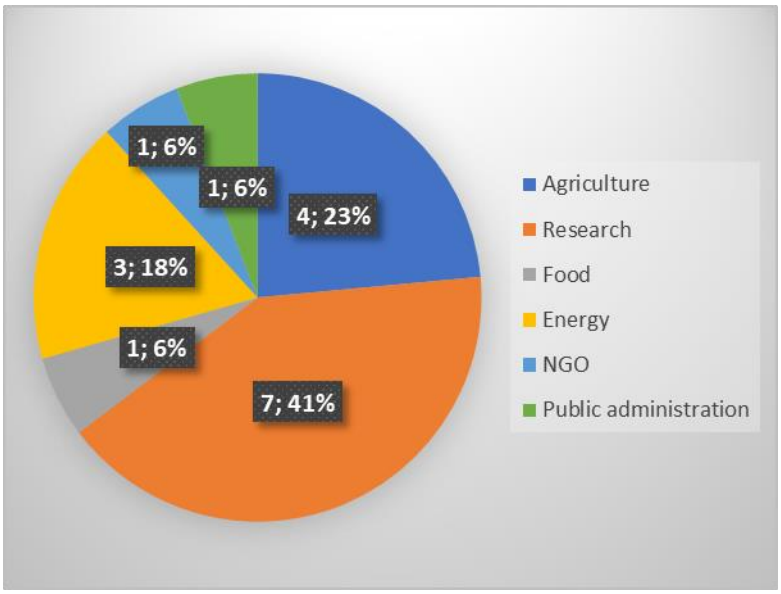
1.3 Topics

When asked which topic was most interesting, we received the following answers:

- Anaerobic digestion and fertilizers
- Biodigesters and digestate concentration
- Policy and the general returning issue with laws and legislations that seem to be a problem everywhere
- Both the presentations

1.4 Field of occupation

The survey concluded with an optional question regarding the participant's field of occupation. The participants came from different areas: 7 from research, 4 from agriculture, 3 from energy, and one from food, public administration, and an NGO.



Participants:

If you wish to get in touch with one of the participants from this session, please contact someone in the SCALE-EP consortium.

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