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TOWARDS WATER – SMART CIRCULAR ECONOMY BUILDING A CASE IN ORGANIC FARMING

Being the most important shared resource across all supply chains, water remains the largest untapped waste. Current imbalance in water sector, together with often occurring scarcity, influences our economic, social and environmental goals. With current trends, global demand for water will exceed viable resources by 40 % by 2030 [1].

The European Commission suggest a high interest in maximising water reuse within Europe as an alternative source of water supply. Recognising that water scarcity and drought events will be more frequent in the future, utilising alternative freshwater supplies through targeted water reuse programmes can indeed be a viable option. Considering the benefits of this practice, reusing local water supplies should be an integral part of a circular economy since it increases water supply resilience against extreme events, offers opportunities to recover resources (water, but also energy, nutrients and heat from waste streams), releases water quality pressure on receiving streams [2].

With only 1 % of global agricultural land in organic production, and with its multiple sustainability benefits, organic agriculture can contribute a larger share in feeding the world. The recent studies show that comparing with conventional farming, organic farming is more profitable and environmentally friendly, delivers equally or more nutritious foods that contain less (or no) pesticide residues, providing greater ecosystem services and social benefits [3].

The World of Organic Agriculture Report [4] demonstrates fast growth of organic products market with the following trends:

– Consumer demand is increasing globally, reflected in the significant market growth up to 81.6 billion US dollars in 2015 and 11 % growth in the United States, the world's largest organic market.

– North America generates the most organic product sales together with Europe (90 %), where Germany is the largest market with 8 620 million euros of retail sales.

– At the same time, only 14 % of organic producers are located in Europe covering 25 % of world organic agriculture land, while Asian and Oceanian countries continue dominating.

Despite the dynamic market growth, current trends indicate that production in Europe is not moving at the same speed, which presents several challenges for the future development of organic in Europe. Thus, in contrast to the development of organic farms (+3%), the number of organic processors increased considerably in 2015 (+12%). This demonstrates that organic farmers in Europe lag behind the growth of the organic market, limiting loading of processing capacities and increasing cost of products due to long supply chains. There is a risk that the growing demand will be met by imports and European farmers and processors may not benefit [5].

In contrast to the global and European organic trends, East European countries such as Ukraine, being an EU-associated agrarian country with short supply chains to Europe, demonstrates enormous decrease of organic farming activities. Decrease of organic agricultural land in 2014–2015 was –2.4%, continuing negative trend since 2000, and there was no data about areas under conversion in 2015. At the same time, number of organic exporters decreased by –45% in 2015. Having a documented potential of lands for organic farming at 2 000 000 hectares, this country utilized only 410 550 hectares.

The reasons for such enormous incoherence can be figured out from the global barriers analysis in organic agriculture [3]:

– drawbacks in existing policies;

– lack of information and knowledge;

– weak infrastructure, inappropriate for certification requirements;

– misperceptions and cultural biases.

In practice, farmers have a strong misperception that organic farming is more demanding, while produces lower season yields compared with conventional agriculture and requires more land than conventional agriculture to yield the same amount of food.

Another example, is that in Eastern European countries small and medium farms do not aim at conversion to organic farming because of (i) limited water sources that can meet the requirements for irrigation in organic agriculture at affordable cost; (ii) unstable quantity and quality of yields due to low efficiency of open irrigation during drought events; (iii) season fluctuations affecting stability of supplies.

With these obstacles, it is important to focus on creating an enabling environment for innovative and more sustainable organic farming systems, targeting simultaneous performance improvement by Production, Environment, Economics and Wellbeing indicators. Such environment must engage scientists and farmers in research and development decision-making.

Current technological development creates favourable conditions for a circular economy oriented innovation, which can improve farmer knowledge and capacity through integration of use and recovery of water, resources and energy in organic farming. Such innovation can be co-created from 4 components:

I. Source-separated decentralized wastewater management, aiming to generate source streams for components II and III as well as decrease global greenhouse gas emission by excluding conventional wastewater transportation.

II. Grey wastewater treatment and reuse in drip irrigation, providing cost-efficient water source and effective drought-sustainable irrigation approach, securing products quality.

III. Black wastewater treatment and reuse for direct fertilization with simultaneous utilization of organic farming wastes.

IV. Recovery of wastewater heat and utilization in soil heating, enabling stable seasoning and increasing number of yields.

Literature sources

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