BBioNets
Boosting the adoption of Bio-Based Technologies

Cross-Fertilisation Meetings
Bio-Based Practices on Farms & Forests

Accelerating "Bio-Based Practices on Farms and Forests"

Key Takeaways

CFM No5 "Circular Approaches in Olive Groves"

26 February 2026 | Online | 11:00 CET

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The fifth BBioNets Cross-Fertilisation Meeting explored how circular bioeconomy approaches can be implemented within the olive value chain, addressing both environmental challenges and opportunities for biomass valorisation. The session brought together experts from Greece, Italy and Spain who presented practical solutions ranging from systemic redesign of olive oil production processes to farm-level circular practices and the extraction of high-value compounds from olive by-products.

In Greece, the American Farm School presented the Cradle-to-Cradle approach as a framework to redesign olive oil production systems. The presentation showed how by-products such as vegetation water and olive husk can be integrated into circular pathways, including polyphenol extraction, biofuel production, pellet manufacturing and nutrient recovery.

From Italy, APRE presented practical circular solutions developed within the thERBN project. A case study from Tuscany showed how co-silage of olive pomace and brewers' spent grain can reduce feed costs while maintaining livestock productivity. Additionally, vermicomposting of olive pruning residues combined with grape pomace demonstrated improvements in soil structure, water retention capacity and long-term soil fertility.

From Spain, CIDAF presented research on the valorisation of olive leaves as a source of bioactive compounds such as oleuropein and hydroxytyrosol, highlighting their potential applications in nutraceuticals and functional foods and plant biostimulants.

Overall, the meeting highlighted that the olive sector generates significant quantities of biomass residues which, if properly managed, can become valuable resources within circular bioeconomy systems. Discussions emphasised the need to combine technological innovation, practical farm-level solutions and stronger cooperation across the value chain to move towards near-zero-waste production models in Mediterranean olive-growing regions.

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Circular Economy in the Olive Sector Based on the Cradle-to-Cradle Approach

Presenter: ***Ilias Kalfas*** *- American Farm School (Greece)*

- **The Cradle-to-Cradle (C2C) Framework:** The Cradle-to-Cradle approach proposes a systemic redesign of olive oil production systems where by-products are not treated as waste but are integrated into new value chains. The objective is to design production processes in which every output has a predefined second use, eliminating the concept of waste generation.
- **Technical and Biological Cycles:** Within this model, materials are integrated into two complementary cycles: the technical cycle, where materials re-enter industrial processes, and the biological cycle, where nutrients safely return to the soil. Composting was described as the last option, applied only when no further technical valorisation is possible.
- **Towards a near-zero-waste olive value chain:** Through examples such as polyphenol extraction, pellet production for bioenergy, biodiesel generation from used oil, and nutrient and water recovery, the presentation demonstrated how the olive value chain can be restructured to minimise waste and create new value streams, highlighting that the circular economy requires a systemic transformation of production chains and stronger industrial symbiosis models.

Circular Approaches in Olive Groves — Discussion points extracted from Greek case

- The shift towards a circular economy in the olive oil sector responds to the need to overcome the linear "take-make-dispose" model, one of the most polluting in the food industry, by adopting a closed-loop approach where every by-product has a defined useful life.
- Olive oil processing residues (vegetation water and solid husks) represent a source of high-value raw materials, from polyphenols and biofuels to compost and bioplastics, demonstrating that systemic sustainability and economic profitability are compatible goals.
- Specializing circular bio-economy frameworks within the Mediterranean region is highly viable, as crops such as grapes, citrus fruits, tree nuts, and tomatoes generate by-product-rich streams of bioactive compounds that can be integrated into well-established circular value chains.
- The technologies required for this transition, including hydrocoloid extraction, energy co-generation, and biorefineries, have reached sufficient maturity for industrial-scale implementation, opening new markets in animal feed, construction, and sustainable packaging.

From Waste to Resources: Valorisation of Agri-food By-products Between Animal Husbandry and Soil Fertility

Presenter: ***Paola Cassiano*** *- APRE (Italy)*

- **Identification of needs in the primary sector:** The presentation focused on urgent needs identified in the agricultural sector through the thERBN Project, highlighting the need for practical circular solutions to improve the management and valorisation of agri-food by-products, particularly those generated in olive production systems.
- **Co-silage as a practical circular solution:** A case study from Tuscany presented a co-silage process combining olive pomace and brewers' spent grain to produce livestock feed, allowing farms to replace up to 30% of commercial feed and reduce feed costs by approximately 27–30% without affecting milk production or animal performance, although replication may be limited by factors such as lack of technical knowledge, weak cooperation networks and regulatory or logistical barriers related to transporting by-products between farms.

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- **Vermicomposting for soil fertility and farm resilience:** A second circular solution involved vermicomposting olive pruning residues together with grape pomace, using earthworms to convert these materials into high-value organic fertiliser, which improved soil structure, increased water retention capacity, enhanced plant vitality and reduced dependence on chemical fertilisers, contributing to both environmental sustainability and the long-term resilience of agricultural systems.

Circular Approaches in Olive Groves — Discussion points extracted from Italian case

- The pilot farm benefited from having both olive milling and livestock production within the same holding, which facilitated the integration and direct use of by-products within the farm system.
- Broader replication of these circular practices may be limited by several barriers, including limited technical knowledge among farmers, insufficient cooperation networks between sectors, and regulatory and logistical constraints related to transporting agricultural by-products between farms.
- Regulatory complexity and administrative procedures can restrict the reuse of by-products when they are classified as waste, while cultural perceptions still lead many actors to consider pruning residues or olive pomace as waste rather than valuable resources.

Olive Leaves as a Potent Source of Bioactive Compounds

Presenter: ***Inmaculada Moscoso*** **-** CIDAF *(Spain)*

- **Valorisation of olive leaves as a bio-based resource:** The presentation focused on the potential of olive leaves, traditionally considered a low-value by-product, as a valuable biomass source for obtaining high-value bioactive compounds.
- **Research developments from European projects:** Results from the INTESOLIVE, ECOBIOLIVO and BIOREVALEAF projects were presented, highlighting advances in the extraction, characterisation and microencapsulation of compounds such as oleuropein and hydroxytyrosol.
- **Potential applications in nutraceutical and functional food sectors:** The research demonstrated that olive leaves contain significant concentrations of polyphenols with promising health-related properties, supported by in vitro studies, animal models and human nutritional intervention trials showing potential positive effects on lipid metabolism regulation.

Circular Approaches in Olive Groves — Discussion points extracted from Spanish case

- Barriers to scaling up extraction technologies: One of the main challenges identified was the high cost associated with advanced extraction technologies, which limits the transition of olive leaf valorisation processes from laboratory research to pre-industrial or industrial implementation.
- Need for technological optimisation: Successful scaling requires continuous optimisation of extraction processes, as efficiency can vary depending on agronomic conditions, biomass characteristics and the type of equipment available.
- Promising market opportunities: The nutraceutical sector was identified as the most immediate and promising market for olive leaf bioactive compounds, particularly due to the growing demand for natural ingredients with health-promoting properties.
- Emerging agricultural applications: Beyond nutraceuticals, further opportunities exist in developing plant biostimulants and biofertilisers derived from olive leaf extracts, which could support more

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Download the presentations **Watch the recording**

What are Cross-Fertilisation Meetings?

BBioNets' **Cross-Fertilisation Meetings** are essential events designed to connect the project's regional **Forest and Agriculture Networks (FANs)**. While each FAN addresses unique **regional realities and specific challenges**, there is significant common ground regarding biomass availability, exploitation potential, and shared needs. By networking across borders, the project aims to collectively increase the impact of local work significantly.

These meetings were designed to help participants:

- **Share Difficulties**: Exchange common challenges and concerns regarding the application and scaling of **Bio-Based Technologies (BBTs)**.
- **Discover Opportunities**: Outline new breakthroughs, emerging technologies, and potential market opportunities across regions.
- **Promote Knowledge**: Capture, validate, and widely promote practical knowledge created by national EIP-AGRI Operational Groups (OGs).
- **Forge Collaborations**: Facilitate bilateral and multilateral collaboration opportunities among FANs and OGs.

The Six-Part Series: Topics and Schedule

1. **Innovations in Nutrient Recovery:** 11 December 2025
2. **Innovative Hemp Practices:** 15 January 2026
3. **Sustainable Sheep Wool Processing:** 29 January 2026
4. **Efficient Woody Biomass Utilisation:** 12 February 2026
5. **Circular Approaches in Olive Groves:** 26 February 2026
6. **Opportunities in Green Biorefineries:** 23 April 2026

BBioNets Project Identity	
Full Project Title	**BBioNets** – Creation and promotion of Forest and Agriculture Networks to boost Bio-Based Technologies adoption and Value Chain development (GA No 101133904)
Start – end date	1/11/2023 – 31/10/2026 (36 months)
Coordinator	Ms. Carmen Girón Domínguez, Munster Technological University carmen.dominguez@mtu.ie
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Consortium	MTU Ollscoil Teicneolaíochta na Mumhan Munster Technological University; Teagasc Agriculture and Food Development Authority; IUNG Institute of Soil Science and Plant Cultivation State Research Institute; crea Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria; CTA; American Farm School Thessaloniki; TEPRO; FOCUS STC; Bio East Hub CR
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