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SYMBIOS PROJECT

From Conversations to Models: How SYMBIOS Closed WP2 and Opened the Door to the Digital Platform

Focus groups, surveys, a transnational meeting in Valencia and two sector models: the story of a year of research on industrial symbiosis in leather and agrifood

Every good model starts with listening. When Work Package 2 of SYMBIOS began, the partnership had a clear ambition, to model how industrial symbiosis works in the leather and agrifood sectors and which skills are needed to make it happen, but no shared picture of what companies and experts actually think, do and need. Almost a year later, WP2 is complete. This article retraces how we got here, from the first conversations to the two Industrial Symbiosis Models that now feed the development of the SYMBIOS platform.

It started with conversations

The journey began with focus groups, held online in the autumn of 2025 for both sectors. They brought industry, academia, sector associations and public institutions around the same table to discuss how industrial symbiosis is understood and practised, what holds it back and what could help. Participants agreed that industrial symbiosis is not a new idea, and that in leather it is built into the very nature of the sector, since hides are a by-product of the meat and dairy industries. They also converged on the main obstacles: regulatory uncertainty on what counts as waste or by-product, administrative burden, and the lack of tools to find reliable partners. These conversations shaped the questions of the needs analysis that followed, in which we carried out surveys and in-depth interviews with both companies and academic experts, combining the operational reality of businesses with the broader view of researchers.

What we found

The headline is encouraging: companies are not starting from zero. Both sectors already monitor, reuse and recover on a large scale inside their own walls. The challenge is turning these internal practices into stable collaboration between companies, and it is here that the two sectors show their differences. In leather, the interviews pointed to wet-blue shavings as the highest-volume and most economically critical by-product, with valorisation constrained mainly by how chromium-containing waste is classified, while chrome-free tanning and the consortium water-treatment systems of Tuscany emerged as templates to replicate. In agrifood, perishability, contamination risk and strict sanitary rules were identified as the strongest limits to reuse, and the costs of collection, testing and certification are often too high for the small quantities SMEs generate; several promising initiatives, such as the reuse of carbohydrate-rich whey, were discontinued when public funding ended. In both sectors, the same needs came up again and again: clearer and more harmonised regulation, standardised data sheets for by-products, digital tools for matching partners, and targeted training. For more information, you can read our article on the needs analysis, “Needs Analysis for the Leather and Agrifood Sectors” (<https://symbios-project.eu/news-2/>)



Meeting in Valencia

With the evidence on the table, the partners met in person in Valencia for a Transnational Project Meeting. After months of online work, sitting together made it possible to compare leather and agrifood results side by side, discuss what the data was telling us, and agree on how to turn it into models and into the platform. The meeting also reinforced the personal ties between research centres, universities, training bodies and business associations that make a five-country project like SYMBIOS work.

Two sectors, two models

The outcome of this work is two sector-specific models, delivered under WP2.6 with CISITA leading the modelling phase and all partners contributing, each made of two chapters. The first reconstructs the symbiotic mechanism: key concepts, the distinction between outputs, by-products and waste, resources, flows and constraints, the EU and national regulatory framework, cross-sector connections and benchmark cases. The second maps the knowledge and skills needed, by target group (young graduates, employed workers, managers, and unemployed or disadvantaged people), with an analysis of existing training offers, recommendations for VET providers and policy makers, and alignment with the EQF, ESCO and GreenComp frameworks.

The leather model is built on a simple fact: only 20–25% of a hide ends up as leather, so the sector lives on cascading use. The earlier a co-product is recovered, the higher its value, from food, pharmaceutical and cosmetic uses at the beamhouse stage down to construction materials for finished-leather residues. Its benchmarks include a chrome-free tannery in Portugal, plant-based tanning agents made from olive residues in Germany, Italian fertiliser producers and the Tuscan district. **The agrifood model** starts from the central design question of the sector, how to balance circularity and food safety. It maps by-product streams by subsector, from whey and brewer's spent grain to fruit pomace, and draws on the Kalundborg network, whey and spent-grain valorisation and the national cases collected in Spain, Italy and Slovenia, including tomato cutin for tinplate coating and keratin from poultry feathers.

The two models also meet: hides come from the food chain, and agrifood residues, such as olive leaves or grape pomace, are now being tested as tanning agents. Both models identify the leather–agrifood corridor as a natural next step for cross-sector matching.

What comes next: WP3

The models now give WP3 its content and direction. Under WP3, “Development & Testing of the SYMBIOS Digital Platform”, the partnership will build a platform with two sections. The Learning Section is a free and open MOOC, with a general module on industrial symbiosis and sector-specific sections for leather and agrifood. The Community Section is an open space where organisations can find best practices and contacts, and register the resources they offer and seek, answering directly the need for digital matching that emerged from the research. The partnership has also decided to add a Knowledge Hub to the platform, collecting all the materials gathered throughout the project. The beta version of the MOOC will be tested with stakeholders in each sector and revised according to their feedback, and final presentation events in each partner country will bring the validated platform to local companies, trainers and policymakers.

If you work in leather or agrifood, in training, or in policy, we would like to hear from you: your feedback will help shape the platform.

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