



Research Summary Sheet

Summary of Deliverable 5.3

Report on Business and marketing strategies

Context and Challenges

The valorization of agro-waste and co-products plays an essential role in the shift from a linear to a circular economy. This requires a change on system level, involving all actors of value chains in diverse economic sectors. On enterprise level, innovative business strategies and models are needed. They require reverse logistics, new visions of customer-supplier relationships, and new forms of organization at the crossroads of various value chains. These insights are important once valorizing bio-based polymers derived from agro-waste and by-products. Innovative approaches aim at generating alternatives to fossil-based intermediary or final products; various markets are targeted to understand their willingness to adopt such innovative alternatives.

The objectives of this research are (A) to identify and characterise different types of business strategies and models that create value from agricultural waste and by-products via cascading or closing loops, in order to get new conceptual and management insights of those circular business models and their value creation strategies and (B) to evaluate potential markets for three selected NoAW products identified by the consortium as the more relevant for a market study. The work is organised in two parts:

- *Part A. Development of a typology of business models*
- *Part B. Market study on NoAW products*

Results and applications

Part A. Development of a typology of business models

The 33 cases studied in task 5.1 of this project have been reviewed, out of which 6 cases been selected and 6 new cases added that convert agricultural waste and by-products into valuable products via a circular economy approach. These 12 cases have been studied in-depth with semi-structured interviews using a specifically developed interview guide. The majority of the cases have also been visited on-site. Data has been analysed according to the type of organisational structure, resources and transformation processes, value propositions, key partners, customers, strategic approaches and type of business model innovation. Additionally, nine interviews with experts from different product chains and sectors (wine, cereals, manure) have been performed to verify whether critical issues had not been overlooked.

Six types of circular business models have been identified: biogas plant, upcycling entrepreneurship, environmental biorefinery, agricultural cooperative, agropark and support structure. They differ in their way of



value creation strategy and/or in their organisational structure, but strongly depend on partnerships and their external boundary conditions.

Part B. Market study on NoAW products: The market study is based on a literature review and expert interviews among a large panel of bio-polymer experts from seven different European countries (France, Germany, Italy, Spain, Netherlands, Suisse, Poland). The target group comprises a wide range of biopolymer-, compound-, specialty chemicals- and additive- producers, research and development institutes and service companies (consultants, certification institutes, etc.). Potential markets and actors have been identified. NoAW product briefs have been developed to support the expert interviews.

2-round Delphi survey has been performed in order to analyse the markets. During the first round of interviews experts in three domains were interviewed.

(1) PHBV composites (10 experts) (2) PHBV (11 experts) (3) Epoxy prepolymer resins (10 experts)

During the second round some of the experts of the first round were interviewed again:

(1) PHBV composites (5 experts) (2) PHBV (4 experts) (3) Epoxy prepolymer resins (5 experts)

An analysis of websites and documents on the marketing strategies has been conducted in order to identify some good practices for remanufactured products.

A lot of interesting and promising applications were identified in which PHBV and PHBV composites can be used. Cost issues and specifications of the PHBV and PHBV composite will be crucial issues. For the epoxy resin, expert highlight uncertainty about some technical characteristics of the products, but they forecast a great development of markets in the future.

Evaluation of environmental impacts of these products and the competitive cost regarding fossil resources is considered critical for acceptance.

Another crucial issue will be the sourcing of the three NoAW products and volume and quality of the supply. The (first) existing initiatives are all very small compared to the demand of a typical buyer. A significant number of such initiatives must be started to make the product category relevant in the market; after that it is expected that prices will go down and the product category can further develop.

These insights have to be considered in task 5.2 in order to evaluate the production cost of these products and the relevant size of the production plants according to the available waste and the potential market.

So to resume it, most experts still lack knowledge about the innovative products and our NoAW solutions still need to be defined better. Our solutions are too small-scale today to trigger immediate market opportunities. But the market perspectives are very promising and the overall interest in the domain is big and growing.





Breakthroughs, benefits and added value

The diverse strategies and characteristics of circular business models for valorising agro-waste and by-products are shown, highlighting the potential of using biomass firstly for higher-added-value products, before exploiting finally unused products as an energy source. The here presented typology also serves facilitating decisions for managers to design appropriate economic models and market entry strategies.

Insights from both studies will be useful to develop the most appropriate business models in the context of the value chain up-scaled in WP6. NoAW processes fit in the generic strategies of first extracting high-value products, and afterwards utilizing residues for bio-energy and digestate. The scale sizes – as indicated by the market study – will, however, require larger scale size than common biogas plants.

Further information on NoAW project: <http://noaw2020.eu>

INRAE (Coordinator): Prof. Nathalie Gontard, e-mail: nathalie.gontard@inra.fr

INRAE: Mechthild Donner, e-mail: mechthild.donner@inrae.fr

ECOZEPT: Burkhard Schaer, e-mail: schaer@ecozept.com

