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# What kind of business model innovation for a circular bio-economy?

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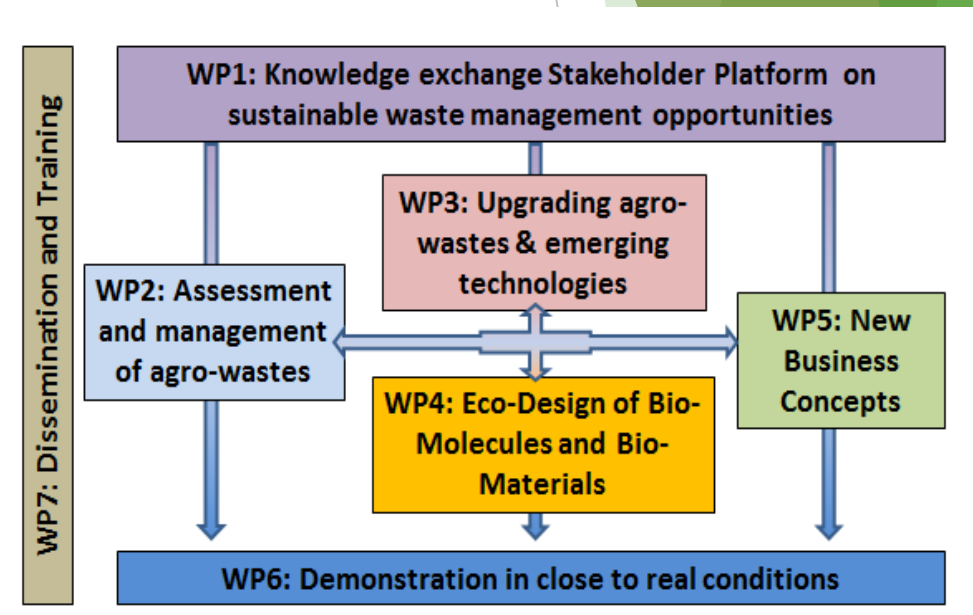
# EU H2020 Project NoAW (No Agricultural Waste)

*Innovative approaches to turn agricultural waste into ecological and economic assets*



The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688338.

- NoAW (2016-2020): a EU-financed project involving 32 international partners, coordinated by INRAE (France)
- NoAW develops **a circular economy approach** applicable to agricultural wastes on a territorial and seasonal basis
- NoAW investigates the potential of **agro-waste and by-products** to be converted into a portfolio of eco-efficient products: bio-energy, bio-fertilizers, bio-packaging and bio-molecules
- WP5: *New business concepts for a cross-sector valorization of agro-waste and by-products*

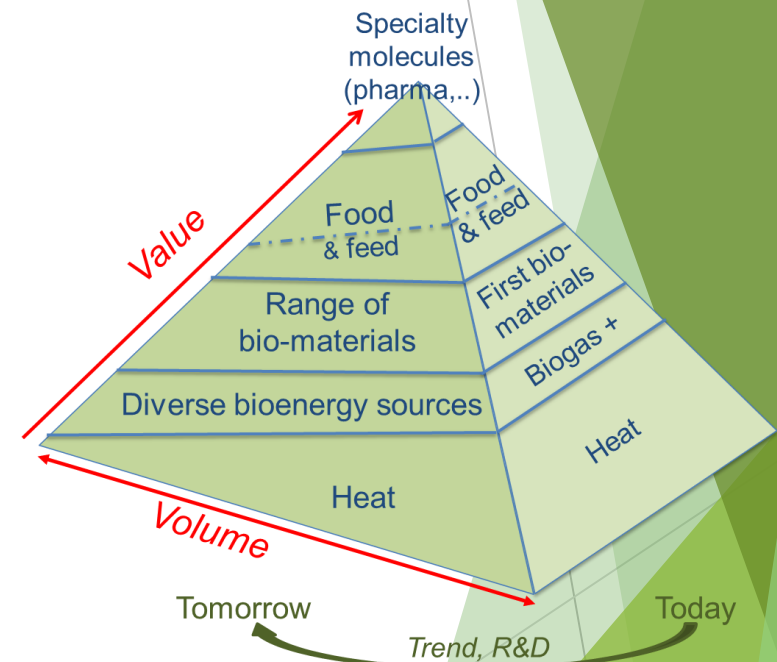


<http://noaw2020.eu/>

# Valorizing agricultural waste and by-products

- Agricultural waste and by-products = plant or animal residues that are not (or not further) processed into food or feed (OECD 1997)
- Estimated amount of agro-waste annually: 998 million tons (Obi et al. 2016)
- Different valorisation opportunities in alternative sectors leading to new products and applications, with a lower or higher value, depending on volume (Rood et al. 2017)
- Challenging because of heterogeneity of resources, changes in volumes and quality over time
- Here, circular business models are meant to find innovative management and marketing solutions for adding value to agricultural waste and by-products

**Figure:** Value pyramid for biomass valorisation



**Source:** Donner, Gohier, De Vries (2020)

# Business model innovation

- Business Model: “the rationale of how an organization creates, delivers and captures value” (Osterwalder & Pigneur; 2011)
- Business model innovation (BMI) needed due to market liberalisation, increased competition and changing socio-economic conditions (Taran et al., 2015), thus as response to internal and external triggers and incentives (Foss & Saebi, 2017; Geissdoerfer et al., 2018).
- BMI consists of changing a business model by creating, diversifying, acquiring or transforming it (Pieroni et al., 2019).
- BMI can concern different business model elements or the BM itself – going beyond process, product, or organizational innovation, as entire reconfiguration of the business model, and as a source of disruption and changing the logic of entire industries (Massa & Tucci, 2014).
- BMI in the context of circular economy is a recent field of research (Bocken et al., 2019; Pieroni et al., 2019; Lopez et al., 2019) > new term ‘Circular Business Models’

# Research question and methodology

How do business models innovate in order to contribute to the transition to a circular bio-economy via agro-waste and by-product valorisation?

- 8 cases from France, Germany, Italy and the Netherlands studied in the NOAW project
- Cases from project-partner countries
- Represent different types of business models
- Companies valorizing agro-waste and by-products

Semi-structured interviews, literature (scientific, websites...) and on-site visits for each case.

Data analysed according to the type of initiative, resources and transformation processes, value propositions, key partners, customers, strategic approaches and types of business model innovation.

# Results

## Biogas Plant



- From farm to modern biogas company
- New product: dried fertilizer
- Partnership with eco-village (heat) and planned with e-car sharing (electricity)
- Technological + social innovation

## Start-up company



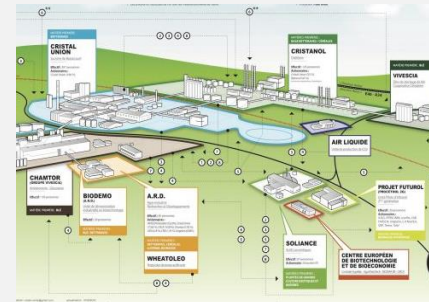
- From university spin-off moving to a consulting firm
- Combined biogas and PHA production (within a large cooperative setting)
- Eco-design approach, innovative technology

## Agribusiness Park



- From selling ground & logistics to an innovative eco-park (agribusiness park)
- Innovative partnerships with exchange of resources (datacenter heat used for greenhouses)
- Organisational innovation type

## Biorefinery



- Initially sugar factory & distillery, reconfiguration to biorefinery
- Maximization of value added via cascading approach
- Technological innovation platform, collaboration of different actors

# Results

## Agricultural Cooperative



- Originally distillery cooperative, evolution to a specialized firm for valorisation of wine co-products
- Product diversification to a large portfolio going from low to high added value via new technologies
- Technological innovation type

## Food-Energy Park



- From a farm with biogas and herb drying company to an integrated food-energy park
- Technology development hub, (e.g. algae and humus projects)
- Public-private cooperation with partly shared infrastructure

## Association



- Aims to create cross-sector synergies among local actors for cereal by-product valorisation (intermediator)
- Husks valorised for eco-insulation and decoration (former use: heating or animal litter)
- Organisational, technological BMI

## Association



- Cooperative platform for local sustainable development via a circular economy approach
- Meetings & thematic workshops on circular economy, eco-conception, waste prevention and valorisation...
- Social, organisational innovation, linking different clusters



# Results

- Two main ways how business models in the agricultural sector innovate in order to valorise waste and by-products.

## 1. Innovate the *business model itself*:

- (i) completely new start-ups (associations or limited liability companies), with a direct focus on agro-waste and by-product valorisation
- (ii) business reconfigurations and evolutions from rather classical farm or food processing activities to specialised companies (linear chains) or integrated business parks (circular)

## 2. Adapt single *business model elements*:

- (i) Striving for new or higher value-added products, applications or ingredients
- (ii) Combine new value propositions (product, service and/or technology platforms)
- (iii) Create new partnerships and cooperation
- (iv) Reach new customers or distribution channels

# Conclusion

- ▶ Business models in the agricultural domain are obliged to innovate themselves towards new configurations in order to close material loops, reach jointly a competitive advantage and switch to a circular economy
- ▶ Technological innovation types are dominant and often precede organisational and social innovations, but a combined approach is also often observed
- ▶ Interesting cases of BMI exist, but real disruptive technological or organisational innovations are still rare and then, they do not always reach a marketable scale and/or are not economically viable
- What would be needed in order to facilitate BMI towards a circular bio-economy? (policies, subsidies, changing consumer behaviour, different market conditions...?)

**Thank you very much for your attention!**

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