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Interdisciplinary Circular Economy Conference
November 30 - December 3, 2020 | Freiburg, Germany

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

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INRAE

Unité Mixte de Recherche MOISA Marchés Organisations Institutions Stratégies d'Acteurs

UMR iAte Agropolymer engineering & emerging technologies

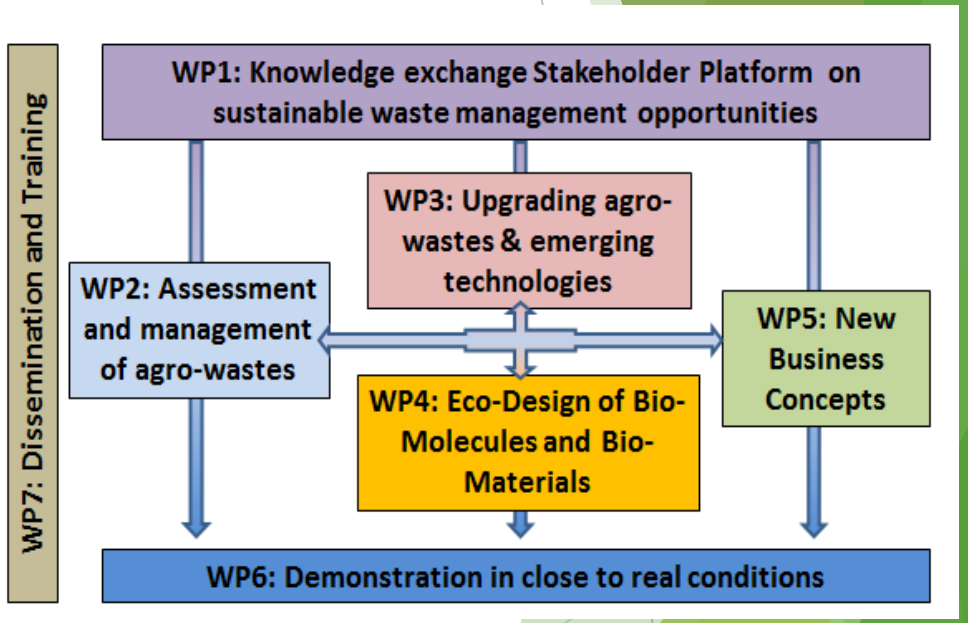
EU H2020 Project NoAW (No Agricultural Waste)

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*



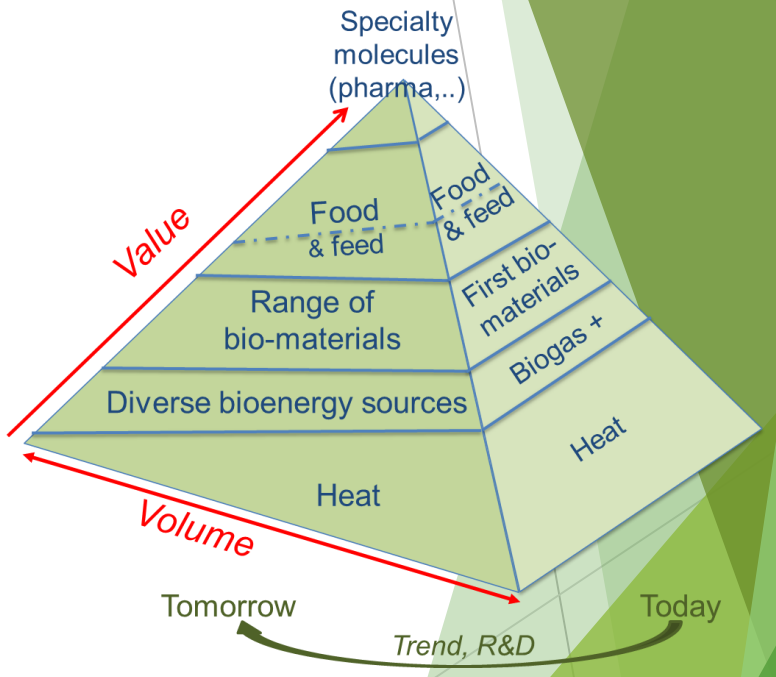
http://noaw2020.eu/

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

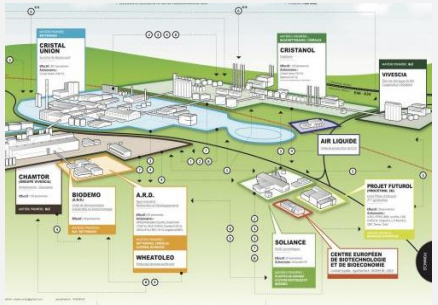
Start-up company

- 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, evolvement 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

3e Rencontres Régionales de l'Economie Circulaire

- 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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