BBW ForWerts online workshop Dec 1st & 2nd 2020

Valorisation of regional bioeconomical potentials

This workshop addressed the valorisation of region-specific primary products and side streams, exploring bio-based value chains with respect to economic feasibility and sustainability. Impulse lectures presented two exemplary case studies, i.e.

i) the potentials of bioeconomy in the Alpine space, with speakers from the initiative **AlpBioEco** (*Potentials of bioeconomy in the Alpine Space along value chains of vegetable extracts and foods*); and

ii) innovative biorefinery concepts based on the **Bio^{GeCo}Refineries** initiative (*Valorisation of regional agricultural and agro-industrial residues using modular biorefineries towards SDGs-based bioeconomies in Germany and Colombia*).

Following these impulse lectures, workshop participants developed concepts for value chains, based on agricultural side streams or food waste streams, and elaborated corresponding business models.

Speakers

AlpBioEco	Prof. Oliver Som, Management Center Innsbruck; Anna Bäuerle, Project Coordinator EU Interreg Project "AlpBioEco"
Bio^{GeCo}Refineries	Natalia Matiz, University of Stuttgart); Prof. Carlos Cardona, National University of Colombia; PhD students, Work Group Cardona, National University of Colombia

Summary

AlpBioEco - In an inspiring introductory lecture, **Oliver Som** presented a conceptual approach towards developing eco-innovative business models in bioeconomy. First, the concepts behind "innovation" and "business model" were explained. Business models have to provide answers to the following key questions: *What is offered? How is revenue created? Who is the target customer? How is value created?*

In the next step, Oliver Som demonstrated that in most cases the **business model innovation** is a recombination of existing business model patterns such as *Razor & Blade*, *Freemium*, Peer-to-Peer, or *Subscription*. Thereafter, the **process of value creation** was explained as a complex architecture of activities, starting from *research & development*, *design & construction*, continuing with *production & manufacturing,* and finally leading to *marketing & sales.* Here it was demonstrated how different companies either cover the entire suite of activities or focus their business model only on single aspects (e.g. *marketing & sales*). The lecture then shifted the perspective towards the **societal embedding of innovative business models**. The role of mega-trends such as fashion, technology and societal values was addressed, with the emerging role of SDGs as an important driver.

Having provided the general framework for business model innovation, Oliver Som completed his presentation with demonstrating a **tool box for provoking innovation**. Starting with the concept of **design thinking**, he explained in detail the workshop design chosen for the AlpBioEco initiative. Furthermore, he addressed the complex challenges originating from societal framing factors such as **p**olitics, **e**conomic boundaries, **s**ocio-cultural and **t**echnological factors ("**PEST analysis**") and how these factors impact on any innovative business model. At the end of his introductory lecture, he gave some recommendations on how to encourage new ("wild") ideas, explained the ideation technique, introduced the "**Persona concept**" and demonstrated several **canvas types** (consumer trend canvas, empathy map canvas, business model canvas) as practical structuring tools.

In the following lecture, **Anna Bäuerle** provided detailed insight into the **AlpBioEco project**. AlpBioEco being EU-funded, she started with positioning the project in the EU bioeconomy strategy, pointing out the great potential for new "green" jobs in rural and coastal areas. Thus the focus of AlpBioEco was set on **bioeconomical potentials in value chains of plant extracts and foods**. Project partners were from France, Germany, Italy, Austria and Slovenia. Overarching project goals were i) to strengthen regional value chains, ii) to contribute to high quality use of residual materials, iii) to raise awareness about bioeconomy, and iv) to establish collaborations.

AlpBioEco was co-financed by the European Regional Development Fund (ERDF, 85%) and additional German national funding (BMI).

The project was divided into **4 phases**: It started with an analysis of selected bioeconomic value chains (apples, walnuts & herbs), continued with the development of innovative bioeconomic business concepts, followed by pilot studies, and finally developed economic and political guidelines for the trans-regional adaptability of project outcomes. **Phase 1** was implemented via 22 open innovation workshops in the 5 partner countries, yielding more than 400 ideas for products and services and 26 business model concepts. **Phase 2** followed with product development and further innovation workshops. **Phase 3** continued with development and verification of the feasibility of 6+1 selected eco-innovative business model concepts in collaboration with local companies, focusing on the chosen topics, i.e. apple, walnut & herbs. Here, Anna Bäuerle presented selected examples, explaining in detail the work and progress for the walnut value chain, based on the different starting materials, i.e. walnut foliage, kernels and wooden shells, resulting in an amazingly complex product spectrum and different modes of value creation. **Phase 4** (still in progress) aimed at developing regional policy implementation guidelines, via organizing Regional Advisory Boards.

Bio^{GeCo}Refineries – The two following lectures provided a summary and update of the current status of the **BioGeCo initiative** (Natalia Matiz) and an overview on current **biorefinery concepts** in Colombia (Carlos Cardona).

The BBW ForWerts graduate student **Natalia Matiz**, who in 2019 had been successful with her initial BMBF-funded networking project under the title **Bioeconomy in Germany and Colombia: New value chains in the context of the UN SDGs**(**BioGeCo),** presented the current status and future plans towards realizing biorefineries in both countries (**Bio^{GeCo}Refineries,** new project proposal, in review). The German-Colombian consortium BioGeCo had been built on face-to-face contacts during a workshop in Cali (November 2019) and initiated a binational interdisciplinary research network, where first concrete steps were taken towards developing joint projects. In particular, the inclusion of the productive sector had provided a valuable experience for the young academic researchers. Natalia presented first results from a successful collaboration between researchers at the **University of Stuttgart** and the **International Center for Tropical Agriculture (CIAT)**, addressing the potential of the livestock sector in the bioeconomy.

In his lecture ***Biorefineries for Residue Valorization in Colombia at different Scales***, **Carlos Cardona** introduced the work of his research group on **Chemical, Catalytic and**

Biotechnological Processes within the **Institute of Biotechnology and Agribusiness** at the **Manizales Campus** of the **Universidad National de Colombia**. After providing a general overview of research activities, he addressed the potential of residue valorization in Colombia, including agricultural residues (palm oil, plantain, coffee, sugarcane, rice, fruits), residues from forest and forage (sawmills, woody residues, switch grass, pruning residues) and from animal waste (manure from poultry, cattle and pork). Following these overviews, Cardona presented detailed analysis of several case studies, based on conceptual design (methodology based on hierarchy, sequencing and integration concepts) and optimization (methodology using superstructure schemes and mathematical modeling). Examples of designed biorefineries included those based on sugarcane, orange peel waste, avocado, crude palm oil, sugarcane bagasse, or coffee cut stems. To examine the potential sustainability of such biorefineries, specific methodologies have been applied to perform mass and energy evaluation, economic, environmental and social impact assessment. At the end of his lecture, Carlos Cardona presented an impressive summary of funded research projects (previous and current); further details were provided in additional short presentations given by PhD students from Cardona's group. He concluded his presentation with an optimistic outlook towards the future of biorefineries, stressing the importance of knowledge exchange and expertise between both countries. While in Germany motivation for bioeconomy solutions is often rooted in concerns about environment and climate change, the major driving force in a developing country like Colombia is to increase life quality in rural areas and the generation of jobs with better incomes.

However, although societal and economic boundary conditions are different in both countries, synergies of collaboration are obvious.

For the following **interactive group work**, participants were divided into 4 groups. The goal was to use the information provided by the impulse lectures on **AlpBioEco** and **Bio^{GeCo}Refineries** to

i) develop innovative concepts for the valorization of regional bioeconomical potentials, while
ii) focusing on **wishes, needs and motivations of a defined consumer clientele (*Persona*).**

Group 1 developed a futuristic concept with the following punch line: ***Shoe soles that allow you to walk on water, based on the water strider, using bioplastic made from potato peels***. This group started from the wish/dream how exciting it would be to be able to walk on water like a water strider. While at first sight physical constraints would seem to contradict this option, participants described in their canvas the entire sequence from *Persona* definition to consumer motivation and marketing strategies. Conversely, the technological solution, i.e. how these shoe soles should be produced and how the physical constraints could be overcome was not addressed in detail. While this futuristic concept appeared unrealistic, the claim of ***shoes allowing you to walk on water*** might well serve as a perfect marketing slogan.

Group 2 chose a more realistic approach, choosing cat-loving consumers as *Persona* and proposing the development of **Customized Superfood for Cats**. Young female consumers living as singles and focusing their emotional life on their cat were defined as the targeted customer segment. Here, the products (customized superfood) would be healthy (i.e. low fat) "wet" bio-food, delivered in biodegradable package (e.g. bio-plastic): customized "bio-packaged bio-food". While again technological details of implementation could not be developed in the short time frame, the basic concept and its clearly defined customer segment appeared highly convincing.

Group 3 chose parents (age group 30-50) as *Persona*, with academic education and high income, i.e. parents that like cooking, buy local, are worried about the environment, and aspire a "sustainable" life style. For this target group it was proposed to develop nut **flours** made through grinding fresh **press cakes.** These flours would be gluten-free and could be diversified by integrating different regionally produced press cakes. The product slogan would be "***From***

press cake to birthday cake". It was proposed to develop product prototypes from macadamia press cake, including not only macadamia flour, but also macadamia spread, pasta and nutella. While participants acknowledged that these products already exist, it was suggested to develop a platform in which the customer can choose his own baking mix gradients.

Group 4 proposed **apple pomace as starting material for producing bioplastics**. Target groups (*Persona*) were CEOs of innovative companies in the fruit sector wishing to invest in biodegradable packaging of their fruit products, but on the other side also end users, i.e. consumers with medium and high income, who wish to support a more sustainable life style and are prepared to pay for extra costs. Fruit-producing companies could use residues/wastes from their production on-site and establish themselves technologies for bioplastic production to be used for packaging their fruit products or, alternatively, choose to partner with companies active in the bioplastic sector.

At the end of the workshop, the four groups pitched their proposals and entered into an intense discussion about the various challenges encountered when developing technologically feasible innovations in bioeconomy. The participants realized the important role of the consumer segments to be addressed (*Persona*) and the necessity to explore their wishes, needs and values as a prerequisite for developing convincing innovative business models.