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Short Position Paper - SPP-bioeconomy

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European workshop on bioeconomy. June 28-29th, 2017, Paris

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Position paper

Short version

INRA and Irstea have hosted a european workshop on Bioeconomy on June 28 and 29th, 2017 in Paris. The large audience participation gathered participants coming from European countries (AT, BE, DL, FIN, FR, IT, IRL, LTU, NL, SP, UK) and also Burkina Faso , Canada, Gambia, Georgia, Guinea, Morocco, Russia, USA, Colombia.

A total of 320 people, including a wide range of stakeholders (from research to economic spheres) and disciplines (for research), attended the 28 presentations and three roundtables that took place over two days. The need for new tools and partnerships and the necessary involvement of new stakeholders were also highlighted. A youth panel was associated all along the meeting. The knowledges gained during these two days give an ideal opportunity to publish a position paper to provide new ideas and research directions to stimulate further advancement of Bioeconomy. This position paper aims at mapping bioeconomy related issues : R&D related recommendations have been identified.

The goal is to design sustainable and resilient bioeconomy within the planet boundaries. Three different levels are considered: the demand side of citizen-consumers, the supply side and the crossing of vertical and horizontal fluxes of biomass, energy and informations. The first scale of study is EU; interactions with other countries throughout the world should bring cross-learnings regarding development path and pedoclimatic potential.

This system approach will benefit from foresight and forward looking studies as research tools for setting the scene, raising contextualized research questions and generating

strategic research agendas, checking the consistency of scientific knowledge, enhancing the links with policy-makers, and finally benefiting from the coupling of qualitative scenarios and of quantitative modeling at various scales.

Five key conclusions have been identified.

1 / The first conclusion is the change of approach induced to overcome the disciplinary and economic sectors (branches) boundaries and thus to construct a systemic approach at the expense of the traditional sectors. The orientations of diets, the development of biorefineries, cascading uses and the closure of cycles bring interconnections between the actors and partly enroll them in the circular economy. New economic opportunities emerge with the evolution of the notion of waste. Agro-ecology is also illustrative of this change, where cropping and livestock systems would have to gain from relying on associations and succession of cultures beyond the markets carried by the sectors. The flexibility of the downstream sector in the face of the expected variability of resources requires revisiting the processes and relations between the actors. Faced with all these challenges, a consensus was reached on the need for integration and upstream-downstream synergy, food-energy-chemistry, food-farming-agriculture.

The first corollary is the need to open the training to these intellectual postures which require a great creativity and reactivity and thus an ability to adapt to very changing stakes and environments.

The second corollary is the need to reinforce the coherence between public policies, which are more or less concerned by biomass (food, CAP, energy, climate, trade, city), which can be supported by research.

Major core issues on the demand side concerns sustainability and the changes in diet, biobased chemicals and bioenergies

- healthy diet, with quantity and type of food (eg. the share of animal products in the diet)
- Complementarities (substitution) of the different uses of harvested biomass (sugars, lipids, proteins)
- Share of bioenergies in the renewable energy
- Low impact chemicals, with an extension of the panel of available chemicals regarding new regulations Reach, VOC...
- collecting, gathering, sharing data/ connecting all actors for prior informed choices,

This research will benefit from studies concerning:

- the shift from consumer-focused policies to citizen-driven policies (global behaviors, health, regulations, taxes...) and how to orientate present bioeconomy towards sustainable options,
- the respective roles of the market and regulations in changing consumer choices,
- the impacts of inequalities in access to a balanced diet –quantitatively and qualitatively– affect the relationship with sustainability of bioeconomy system,
- ICT, data and data-science with connected agriculture and industry (for data concerning environmental aspects, health and safety aspects (e.g. bio-sensors), availability of data via e.g. web interfaces).

2 / The second conclusion concerns the numerous technological and organizational levers to accompany the actors on the paths of the transitions. Digital agriculture, green and white biotechnologies will make the system more efficient. Infrastructure networking, mastery, reliability and data sharing are ways to take advantage of European complementarities. Current developments are not based on a single technological leverage, but mobilize actors, in a logic of response to market needs. Success, however, rests on the support of all stakeholders. Living labs are an expected solution to facilitate the appropriation of innovations, their experimental assembly and the identification of possible negative effects. Ecological transitions will thus be affordable by identifying societal expectations and behaviors.

Major core issues in crossing 'vertical' and 'horizontal' fluxes are:

- Managing cooperation between players along each value chain, for improved resilience, in the framework of stressors : climate- price – governance
- improving innovation communities beyond process/product innovation to service, organization,
- Reducing the losses along the food chains, from production down to consumption and waste management, part of circular economy
- developing cascade uses, bioenergy being the last step, part of circular economy
- linking flux of nutrients in plants with their fates in animals and finally foods,
- closing loops for N and P, part of circular economy
- Mastering the new uses of biomass (energy, chemistry, materials), technological levers with green (quality-driven) and industrial (synthetic biology) biotechnologies,

This research will benefit from studies concerning :

- predictive biology, bringing together "high throughput" knowledge and modelling to better understand living systems, from the level of the gene to the population, considering future conditions (effects of global and local environmental changes),
- agroecology ('Ecological intensification' as a means to increase production and preserve the environment, including a socio-economic perspective),
- trade, while controlling and reducing volatility, and increasing the revenue of small farmers through the development of local agriculture.

3 / These bio-economic systems are complex. Their understanding requires creating representations and modeling to evaluate the ex-ante effects of technological or organizational choices. Modeling allows for the testing of contrasting scenarios and the prioritization of research questions. Models are no longer the final stage of research, but the first one to guide the work.

4 / Implementation of bioeconomic policies leads to an interest in the scale of application. Territories identifiable by their pedoclimatic, topographical, and land features are then the point of focus to follow developments. And the diversity of territories leads to the absence of generic solutions. Forests combine non-market ecosystem functions and biomass production functions with bioenergy and material purposes. Mobilization remains a limiting factor in the exploitation of biomass. The European-wide approach is effective in bringing together research communities. However, this European approach identifies potentially contrasting regions. Different bioeconomic schemes are conceivable in Europe. This

differentiation is also necessary with developing countries that can adopt original trajectories.

5 / Sustainability assessment is the final highlight of this workshop. As much as the economic pillar is currently well-equipped, the social and environmental pillars still require methodological work. Ecosystem services represent a major challenge in the choice of human activities inserted in natural systems and the evaluation of environmental assets, resources and externalities. Their accurate characterization, the acquisition of relevant data and their sharing, their consideration in public policies, their financial returns are necessary for society to adhere to bioeconomic development patterns.

Presentations and additional informations are available in the workshop website:
<https://colloque.inra.fr/bioeconomy2017/>

