



European Forum on Forward Looking Activities – EFFLA

Policy Brief N° 3

European Bioeconomy Challenges: Food security, Sustainable Agriculture and Forestry, Marine and Maritime and Inland Water Research

Challenge(s)

Food security and sustainable agriculture have always been linked in Forward-looking activities. Since the recent food riots (of 2007-2008), issues such as diets' composition and (economic) access to food have frequently been on the political agenda of the EU and its Member States. Notwithstanding this, relevant literature, and especially works pointing out at concrete steps to facilitate or develop the bio-economy, are still scarce (eg EFFLA is aware of only one major study on the food industrial system). Moreover, Marine, Maritime and Inland water research is also scarcely taken into account in Foresight.

Availability of natural resources is bound to become a major challenge for our societies in the years to come. In particular, sufficient food supply for the growing population is globally challenging the existing systems to renew themselves and the industries to produce significantly more with higher sustainability.

Sensible management of natural resources and global cooperation may provide an opportunity to identify sustainable solutions, although one needs be aware that partial optimization does not lead to sustainable solutions, especially not in the long run.

Bio-economy, as a term, is a quite new and therefore not widely recognized. It offers a more holistic perspective between sectors like agriculture, fisheries, food- and bioprocess production, and maintenance of waste and bioenergy production. How to translate this in research and innovation is still a major question.

Emerging Challenges which might be disruptive to the H2020 research plan

- Social aspects (e.g people's behavior, given that individual consumer choices tends to become trends),
- Climate change and its impact on food production (expanding plant and animal diseases),
- Growth in the use of biofuels worldwide, as well as competition for food production resources,
- Emerging technologies and production methods (GMO and nanotechnologies, new fertilizers, pesticides, artificial food, urban farming),
- Geopolitics of food – food crises have direct impact on global food prices and food security,
- Demographic changes like the ageing of the population and the urbanization. Increase in lifestyle diseases and growing costs of public health services in European countries.

Adjustments needed to the priorities listed in H2020

The Global Context is not enough present. Even though the research and innovation activities of H2020 will be mainly done for European purposes, the challenges themselves and most probably the solutions too, will be highly global. Sustainable, long-term solutions are achieved only by adopting a systemic approach to the global dimension. One example: there seems to be a trend that western diet patterns (which are meat oriented) are spread globally among the rising economies. This means a global pressure towards the whole food production system. The topic “Healthy diet”, well established in Horizon 2020, could be enlarged to “healthy and sustainable diet” as to make the link with the issue of food production and consumer behaviour.

Leave the possibility for new approaches more open. The renewal of agro-systems towards sustainable, and effective, food production is a huge global challenge where a solid contribution of social sciences is evidently needed. There are three main ways to reach a comprehensive vision of sustainable agriculture¹. H2020 shows a real need to engage with research in this direction. However, the Specific Programme points out at only minor improvements of old and traditional methods (e.g. plant breeding,), rather than potentially breakthrough directions. As a result, we see no real room for new ways of doing or conceiving things, new concepts or new solutions.

Issues missing in H2020

A Systemic, solution oriented approach. If Horizon 2020 is to address the systemic nature of the Grand Societal Challenges, the approach of the third pillar should be solution oriented. This requires research-assisted definition of the challenge, the social context and its internal and external linkages, underlying characteristics, trends, drivers and barriers.

Europe has a vision and strategy for sustainable economic growth (Europe 2020). Based on the FLAs in the field of food security, agriculture and bio-economy it has been possible to design

¹ (i) An organic agriculture relying on non-chemical inputs and on non-genetically modified crops, (ii) a “large-scale ecological precision agriculture” which is a combination of precision agriculture and ecological engineering techniques and which could emerge thanks to innovations in bio-monitoring, imaging sciences (mapping, tracking) and genetics, or (iii) an “ecologically intensified agriculture” encompassing the practices of agro-ecology, and precision agriculture, and some genetic innovations. The latter due to advances in the understanding of the functioning of socio-ecosystems.

several scenarios on Europe's possible futures (see the background paper for this report). The variables listed in the scenarios on food security, agriculture and bio-economy (such like main drivers, R&D inputs, research orientation, industrial orientation etc.) support the view that a systemic approach should be used in active "future making", even though none of these specific scenarios may be considered as optimal in a European perspective.

FLAs exercises must be carried out systematically and be constantly adjusted (both during the definition of a strategy and the implementation phase). Literature of the FLAs is not complete and this deficiency is particularly visible when dealing with bio-economy. FLAs exercises must be implemented systematically and adjusted all the way through the strategy process and implementation phase of bio-economy related activities.

Social sciences views. Systemic transitions, needed for example in changes in agro-systems, need strong investments in both social and natural sciences in co-operation and not as separate research and innovation activities of various disciplines. The acceptability of new approaches needs wide engagement with contribution of social sciences and consumer research.

More holistic life cycle approaches are needed, including:

- Consumer preference, acceptance, and needs,
- Minimal energy consumption,
- Engineering of desired product attributes,
- Mathematical models for process design, selection of proper process parameters and optimal operation of processes,
- Links with the other Grand Challenges.

Practical policy recommendations

- The implementation of the existing Bio-economy strategy (partly done in Horizon 2020) should be solution oriented,
- Research and innovation actions have to be well integrated into other policy actions developing bio-economy possibilities. Demonstrations and pilots may implement theory into practice – a key element, which is often lacking in research programs and frameworks,
- The acceptability of new approaches (such as GM plants) needs wide engagement based on a solid contribution of the social sciences and consumer research,
- A strong systemic perspective is needed on the emerging bio-economy.