Available online at www.centmapress.org

INTERNATIONAL JOURNAL ON FOOD SYSTEM DYNAMICS

Proceedings in
System Dynamics and Innovation in Food Networks 2021

DOI: http://dx.doi.org/10.18461/pfsd.2021.2025

Erasmus+ EU FIELDS project: bioeconomy, digitalisation and sustainability skill needs designed with a multidisciplinary approach

Francesca Sanna[1, *], Remigio Berruto[1], Botta Giulia[1], Daniele Rossi[2], Luis Mayor[3], Line Friis Lindner[3], Christoph Knöbl[3], Patrizia Busato[1]

[1] *University of Turin, Department of Agricultural, Forestry and Food Sciences, Largo Braccini 2, Grugliasco, Torino, Italy*
[2] *Confederazione Generale dell'Agricoltura Italiana Confagricoltura, Corso Vittorio Emanuele II, 101, Roma*
[3] *ISEKI Food Association, c/o Department of Food Sciences and Technology, Muthgasse 18, 1190 Vienna, Austria*

**francesca.sanna@unito.it, remigio.berruto@unito.it, giulia.botta@unito.it, d.rossi@confagricoltura.it, luis.mayor@iseki-food.net, line@iseki-food.net, christoph@iseki-food.net, patrizia.busato@unito.it*

ABSTRACT

There are new challenges and opportunities for agriculture today, driven by the climate change, the greening of the products and processes, the reuse of side-stream products, the raised complexity of the chain and the increased availability of information.

To successfully address and react to these drivers, agriculture and forestry needs new business models and skills. The identification of existing and emerging skills needs in bio-economy, sustainability and digital technology is of paramount importance in order to develop a strategic approach to keep the European agricultural sector competitive and sustainable in the long term.

The FIELDS approach, starting from the current and future trends and skills needs, will lead to a sustainable European strategy to address these skill gaps. Since agriculture issues and opportunities differs a lot from country to country, the EU strategy will be customised to have a strategy for 7 countries. It will address country-specific actions, occupational profiles and training material to reflect the country needs while keeping EU quality standards (ESCO, EQAVET, and ECVET) to address the mobility of learners through Europe concretely. Complete training made of 4 modules available through the open learning platform: i) common skills and soft skills; ii) sustainability; iii) bioeconomy and iv) digitalisation.

Keywords: Sustainability; bioeconomy; digitalisation; skills need; agriculture, forestry

1. Introduction

In response to the new challenges and opportunities for today's agriculture, such as the climate change, the greening of the products and processes, the reuse of side-stream products, the raised complexity of the chain and the increased availability of information, the European Commission, through the ERASMUS+ programme, launched a series of actions to cope with these drivers. In particular, the Lot 3 - Sector Skills Alliances for implementing a new strategic approach (Blueprint) to sectoral cooperation on skills has to lead to systemic and structural impact on reducing skills shortages, gaps and mismatches, as well as ensuring appropriate quality and levels of skills to support growth, innovation and competitiveness in the sector. The sectoral skills strategy included a clear set of activities, milestones and well-defined outputs with the goal to match demand and supply of skills to support the overall sector specific growth strategy.

The Erasmus+ FIELDS (addressing the current and Future skIll needs for sustainability, digitalization, and the bio-Economy in agricuLture: European skills agenDa and Strategy) project is a specific blueprint project focus on:

- Bioeconomy, circular economy and bio-based products
- Agricultural sustainability, management of natural resources and climate action
- Digital technologies, digitalization, big data and artificial intelligence

Bioeconomy can be defined as those parts of the economy that use renewable biological resources from land and sea – such as crops, forests, fish, animals and microorganisms – to produce food, materials and energy (EC, 2011). It aims to ensure food security and increase the innovative use of resources in a competitive society in a manner friendly to the natural environment (EC, 2012).

According to Hayati et al. (2011), sustainable agriculture is a global, dynamic process-taking place in three dimensions (economic, environmental and social) and at five levels (field, farmstead, local community, national and international levels). More than 70 definitions of sustainable agriculture can be found in the literature. They reflect different priorities, diverse goals and specific values for specific stakeholders (Pretty, 1995).

Sustainable growth is a key objective of the EU, taking as its objective the continuous improvement of the quality of life and well-being of present and future generations, combining economic growth, environmental protection and social justice. Currently, the fundamental document defining the future of Europe is “A Strategy for Smart, Sustainable and Inclusive growth. EUROPE 2020” (EC, 2010).

Electronics, automation technology and the connection of machines to the Internet have massively changed the possibilities in agricultural production. The digitalization of the economy is the side effect of the automation of serial operations in agriculture and the introduction of management and control systems to regulate production processes based on modern technologies (Prankl, 2016). The quality of business planning and analysis depends on the availability of high-quality information. A farm management and information system (FMIS) can provide this information by enabling the central collection and storage of data from a wide variety of areas, as well as their linking and processing to information that is relevant for the execution of the activities on a farm (Salami and Ahmadi, 2010).

The FIELDS project started in 2020, involve 30 partners from 12 countries, last for 4 years and it is funded by the European Commission with 4 mil EUR.

The goal is to delivery human capital solutions to supply food systems and bioeconomy chains, through the establishment of an Agriculture and Forestry Sector Skill Alliance. It will be established during the project to build upon the regulatory frameworks and opportunities at EU and country level, while proposing concrete and practical initiatives to address skills challenges, in particular through offering modular training inside the project while guaranteeing mobility of workers within the agriculture, forestry and agri-food industry.

FIELDS project takes an innovative approach to analyse the skill needs, through focus groups, scenarios analysis and innovative curricula, including the state of the art on new methodologies. The focus groups aim at identifying skill needs and future trends in agriculture, forestry and related sectors, by collecting information and qualitative data about:

- Identified needs in agriculture and forestry. Needs will be classified into 4 main categories: sustainability, digitalisation, bio-economy and soft skills.
- Industry needs: extrapolate required skills in agriculture and forestry-based also on industry needs;
- Existing training in response to identified needs, and missing practice for the identified needs.
- Best methods to deliver training to each target group.

In line with the conference topic, “The food system’s dynamic interdependencies need a multidisciplinary view, research is required to cross the boundaries of traditional research lines”; the multi-stakeholder approach in the FIELDS project, with 30 partners from 12 countries (HEI, VET providers, agricultural and forestry sector representatives and agri-food industry), will allow tackling the complexity of the issues EU agriculture faces today. Some of these partners are umbrella organisation at EU level, to provide an

outlook at European strategy for agriculture, forestry and agri-food industry, and link to the educational tools and standards provided by the EU. Important support from COPA-COGECA will bring connection with stakeholders.

2. FIELDS Country and EU Focus Groups

From May to July 2020, 11 focus groups (FG) were conducted, nine of which at the national level and 2 at a pan-European level on EU policy and on forestry issues, respectively as listed in Table 1.

Table 1. List of Countries in which the focus groups have been conducted, the date and the FIELDS project partners involved, in bold the organising partner.

No.	Country	Date (2020)	Partners
1	Italy	8 June	**CONFAGRI**, UNITO
2	Ireland	27 May	**ICOS**, PA
3	Spain-Portugal	26 June	**FIAB**, UCLM, FENACORE, SCOOP, CONFAGRI-PT
4	Netherlands	23 June	**AERES**, WUR
5	Austria	18 May	**ISEKI**, LVA, JF-BLT, AP
6	Germany	10 June	**UHOH**
7	Greece	25 June	**EFB**, GAIA, SEVT, CERTH
8	France	15 June	**ANIA**, AC3A, ACTIA
9	Slovenia	1 July	GZS
10	EU-Policy	9 June	**FDE**, LLL-P, EfVET, ISEKI, Plant ETP, CEPI, COPA-COGECA
11	EU-Forestry	2 July	**CEPI**

Each of the focus groups were recruited to include at least five of the following stakeholder profiles:

1. Farmers
2. Cooperatives
3. Agri-food companies
4. Education providers
5. Advisors
6. Foresters
7. Forest industries
8. Other

A number of prerequisites had to be fulfilled for the purpose of identifying skills needs and future trends in agriculture, food industry, forestry and forest-based industry, by collecting information and qualitative data about:

- Identified needs in agriculture and forestry.
- Industry needs (extrapolate skills needed in agriculture and forestry-based also on industry needs).
- Existing training in response to identified needs, and missing training for the identified needs.
- Identified target groups for training and curricula definition.

- Best methods to deliver training to each target group.

To fulfil these requirements, a so-called skills lists were prepared on the main skills categories of sustainability, digitalisation, bioeconomy, soft skills and business-entrepreneurship skills

2.1. Methods: FG Conduction

FG Guidelines were prepared to plan, conduct and report the findings of the FG. From May to July 2020, 9 national focus groups plus two on forestry and policy issues were held and from May till end of September, partners collected and processed the data: Transcription of the audio file in English; Focus Group Report with executive summary; indexed the file; skills list file in with participants' selection and ranking of the 5 most important skills on each of the 5 skills lists; and the top 10 skills; Data processing file with all "Raw data" from the transcript corresponding to the questions, with summaries to the discussion questions, and with coded data to selected questions.

As a preliminary exercise previous to the focus group conduction, participants from all focus groups were requested to check the 5 skills lists, as explained earlier, each one related to different skills categories: sustainability, digitalisation, bioeconomy (sub-lists for the agriculture, food industry and forestry), soft skills and business-entrepreneurship skills.

During the focus groups, all participants were asked to present their top 10 rankings and each participant was requested to present his/her 3 most important skills in a reasoned manner.

2.2. Skill needs assessment,

2.2.1. Most important skills: regions/EU

In this paper, only results at European level are presented. Figure 1 shows the most selected skills at European level, as well as the share of selection by category. The most selected skill was *business planning /model and strategic management* followed by two skills related to communication: e*veryday usage of digital technology to communicate* and *communication* (both the same number of selections).

Figure 1 the most selected skills at European level

The trend towards business and entrepreneurship skills was already confirmed when the project partners developed the skills lists where it soon became apparent that it was necessary to treat these skills separately as one skill category and not subordinate to bioeconomy skills. Bioeconomy altogether count also 23% like sustainability. It is interesting to note that skills related to management/planning, sustainability, digitalization, and communication predominate in this list. When looking at the whole picture (Figure 2), there is not clear evidence on a predominant skills category among the selected skills.

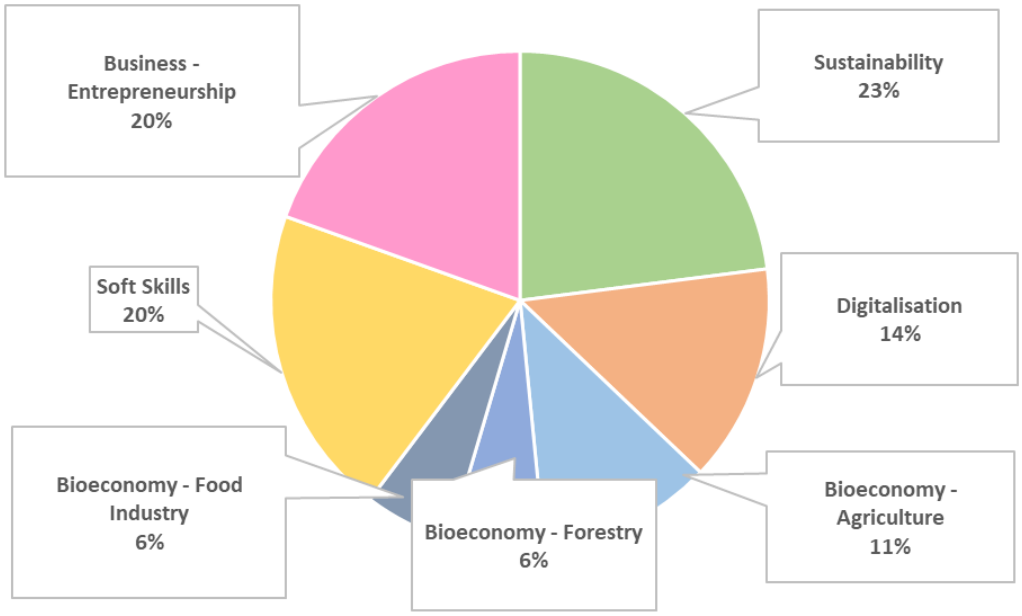

Figure 2 Distribution of skills among the categories

2.2.2. Most important skills: skill categories

In Figure 3 are shown the most important skills selected per category in each focus group and in Figure 4 for sectors. Brief summaries for the first three skills in each category are given below, including some relevant quotes.

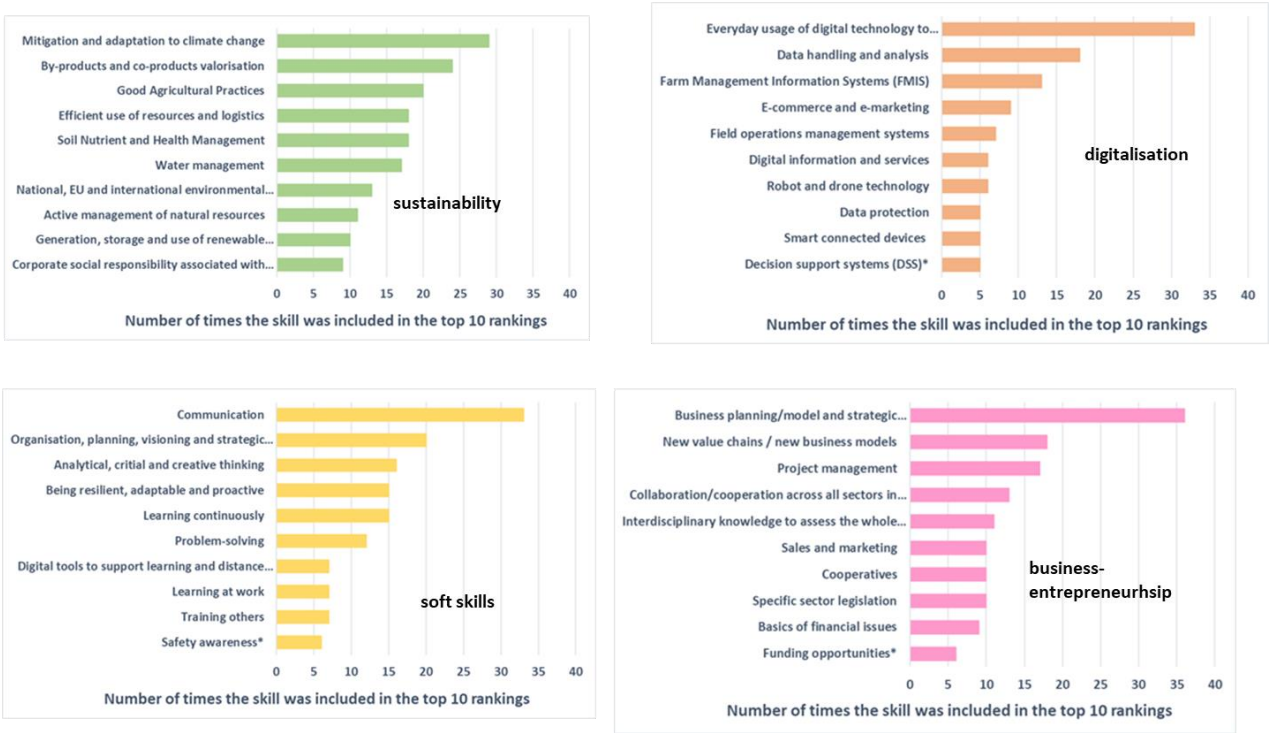

Figure 3. Most important skills selected per category in each focus group (sustainability, digitalisation, soft skills and business-entrepreneurship skills)

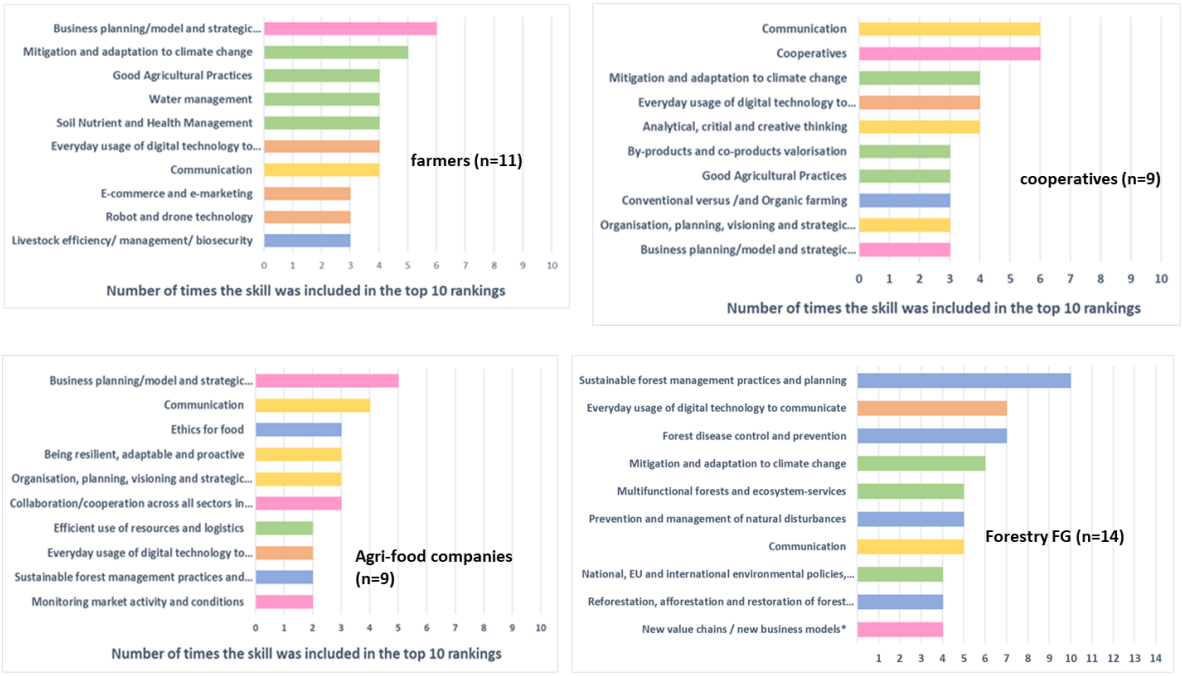

Figure 4. Most important skills selected per sector in each focus group (farmers, cooperatives, agri-food companies and forestry)

For farmers, although only one business-entrepreneurship skill appears in the list (business planning/model and strategic management) it is the first, indicating this skill is considered very important. Two skills not commented in the previous section appear within the three most cited. For cooperatives, *cooperatives (values, legal framework and management)* appears as the second most selected skill. Quotes remark the importance of cooperatives as an intermediate actor in the value chain and as promoters of sustainability values among their members.

As observed for farmers, for agri-food companies *business planning/model and strategic management* (business-entrepreneurship skills) is the most selected skill in the top 10 rankings as well for the agri-food industry participants, followed by *communication* (soft skills) and then 4 skills with 3 selections: *ethics for food* (bioeconomy skill), *being resilient, adaptable and proactive* (soft skill), *organisation, planning, visioning and strategic thinking* (soft skill) and *collaboration/cooperation across all sectors in the food chain* (business entrepreneurship skill).

For the forestry sector, the most selected skill was *sustainable forest management practices and planning* (10 selections, in the bioeconomy skill-forestry list but also related to sustainability), followed by *everyday usage of digital technology to communicate* (digital skill) and *forest disease control and prevention* (bioeconomy-forestry skill) both with 7 selections;

4 Discussion and conclusions

In the national focus groups, participants were asked to present and reason their “most important skills” selections and rankings. The most often selected skill among all participants is business planning /model and strategic management

Everyday usage of digital technology to communicate (digital skill) and communication (soft skill) reached the same number of selections, this shows that the ability to use digital technologies as a means to communicate and the ability to communicate overall was seen as a fundamental skill in transferring information to others. Business planning/model and strategic management and communication, everyday usage of digital technology to communicate are all skills included in the top preferences for farmers, cooperatives, agri-food companies. For the forestry focus group, the sustainability skills and bioeconomy skills specific for the forestry sector were predominant. In general, there was throughout the national focus groups common agreement that skills needs change and will change continuously in response to external factors, however, that especially digital and sustainability skills will gain importance in the near future.

Within organisations, there was general agreement that there is a common need to share knowledge and skills across different responsibility levels and that different levels or different positions in the chain, have to understand the necessity of skills in other levels of responsibility in order to create a mutual support for people at different job levels.

Participants saw a need for training on soft skills, special attention was given to communication related to the public image of the production sectors, particularly for farmers and foresters. From the education, advisory and forest industry sectors indicated that there is also a training need on Organization planning, visioning and strategic thinking. For business-entrepreneurship skills knowledge of the entire value chain was selected by different sectors as well as innovation. Regarding sustainability skills, water and energy management need training for some participants. For bioeconomy skills, food science & technology in general was indicated by a food industry participant and two education providers.

In the EU-policy focus group, it was pointed out that Social Dialogue should be reinforced, thus promoting the interaction between the employers and employees (at both EU and member states level), in order to set the basis for the needed skills and training. The needs of the national education-training systems show particular situations for each country.

There was general agreement that certifications can offer a way for providing evidence of the acquisition of specific knowledge and skills, to potential or current employers. The lack of official certification was mentioned in the EU-policy focus group as one of the factors that must be improved in the European policy landscape to enforce recognition and validation of prior learning, especially in the informal and non-formal sectors.

.

References

European Commission (2011) Horizon 2020 - The Framework Programme for Research and Innovation - Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions. Vol. 808, *Official Journal of the European Union*. Brussels, Belgium; 2011,. p 14

European Commission (2012). Innovating for Sustainable Growth: A Bioeconomy for Europe. Vol. 60, *Official Journal of the European Union*. Brussels, Belgium; 2012, p. 64

Hayati D, Ranjbar Z, Karami E. (2011). Measuring agricultural sustainability. Lichtfouse E, editor. *Biodiversity, Biofuels, Agroforestry and Conservation Agriculture.* Dordrecht Heidelberg London New York: Springer Netherlands;. 73–100 p. (Sustainable Agriculture Reviews; vol. 5). Available from: http://link.springer.com/10.1007/978-90-481-9513-1

Pretty JN. (1995). Regenerating Agriculture: Policies and Practice for Sustainability and Self-Reliance. Joseph Henry Press. Washington, D.C., USA. 336 p. Available from: http://www.nap.edu/catalog/4930

European Commission (2010). A strategy for smart, sustainable and inclusive growth. *Communication from the Commission EUROPE 2020* Com(2010), p. 37

Prankl H. (2016). Landwirtschaft 4.0: Neue Stufe der Vernetzung und Digitalisierung. *Österreichische Bauernzeitung*.;21:3

Salami P, Ahmadi H. 2010. Review of Farm Management Information Systems (FMIS). *New York Sci J Rev*; 3(5) 83-93.