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Fields task 1.5 Scenario Analysis

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Aim and method

Aim:

- To develop scenarios for agriculture, the food industry and forestry sectors, to help guiding Vocational Education and Training development
- Specified for sustainable production, bio-economy, digitalisation, business models

Steps:

- Analysis of trends in agriculture and food industry*
- Scenario development (3 scenarios)*

(EU level and 7 countries: Ireland, Finland, Netherlands, France, Austria, Italy, Spain)

Trends in agriculture, the food industry and Forestry



Agriculture

- > ecological production
- > emissions

- > changes in farm structure
- > short food supply chains

- > precision farming
- > SC information systems and new customer relationship



Food industry

- > co- and by products and circular production
- > new proteins

- > clean and "green" labels
- > new diets

- > food supply chain monitoring
- > industry 4.0 (robotics, 3D printing etc.)



Forestry

- > impact climate change
- > illegal logging

- > biomass production
- > eco-system services

- > increasing demands for wood
- > urban green spaces

Differences between countries, some examples

	Netherlands	Ireland	Spain
Sustainable production	<ul style="list-style-type: none"> -intensive agri-production -nitrogen emission crisis and deteriorating biodiversity -animal sector under pressure 	<ul style="list-style-type: none"> -most agriculture on grass land -increasing grass-based dairy -improving biodiversity 	<ul style="list-style-type: none"> -pressure on water use -(technology in) irrigation -selection of climate resilient crops
Business model	<ul style="list-style-type: none"> -strong trend towards multifunctional farms 	<ul style="list-style-type: none"> -stable nr of farms and further move to dairy production 	<ul style="list-style-type: none"> -increase of organic farming and increased consumer interaction (also food industry)

Definition of scenarios

- We aim at a limited number of scenarios representing different roadmaps in sustainability, bio-economy, digitalisation, business models
- One of the scenarios represents furthering on historical socio-economic patterns, an "Established Paths" scenario
- The elements of the project seem to be best covered by "Sustainable paths" and "High Tech paths"
 - Sustainable path scenario reflects environmental awareness, an active public sector, inclusiveness (Globally)
 - High-Tech scenario reflects faith in technology, strong role private sector, Globalisation and free trade
- Scenarios are described through "narratives". The trends identified in the study are the elements of the narratives

Scenarios for sustainability and bioeconomy: key topics



Sustainability

- >focus plant-based consumption
- >diversified cropping systems (sme)
- >agroforestry and ecosystem services

Bioeconomy

- >decarbonised energy markets
- >increasing wood consumption

Sustainability

- >consumer focus on cost, taste, convenience
- >Intensive agricultural production
- >focus on resource efficiency

Bioeconomy

- >fossil fuel based energy markets
- >biomass supply by forests

Sustainability

- >healthy personalised diets
- >technology intensive large scale production (agriculture, food industry and forestry)

Bioeconomy

- >high tech circular production systems
- >technology driven biobased industries

Scenarios for digitalisation and business models: key topics



Digitalisation

- >precision farming for sme sustainable and diverse production
- >industry 4.0 (incl. SMEs), precision forestry

Business models

- >short, regional, chains
- >mixed multinationals and medium size food industries
- >multifunctional forestry businesses



Digitalisation

- >precision farming varies across sectors and regions
- >focus on large scale farms and forestry businesses

Business models

- >global markets and long chains
- >multinationals focusing on cost efficiency in global chains
- >focus on large businesses



Digitalisation

- >precision farming/ large scale prod.
- >integration of systems across FSC
- >industry 4.0, precision forestry

Business models

- >large specialised corporate farms
- >joint ventures food and health industry, for personalised and healthy food
- >integration in international value chains

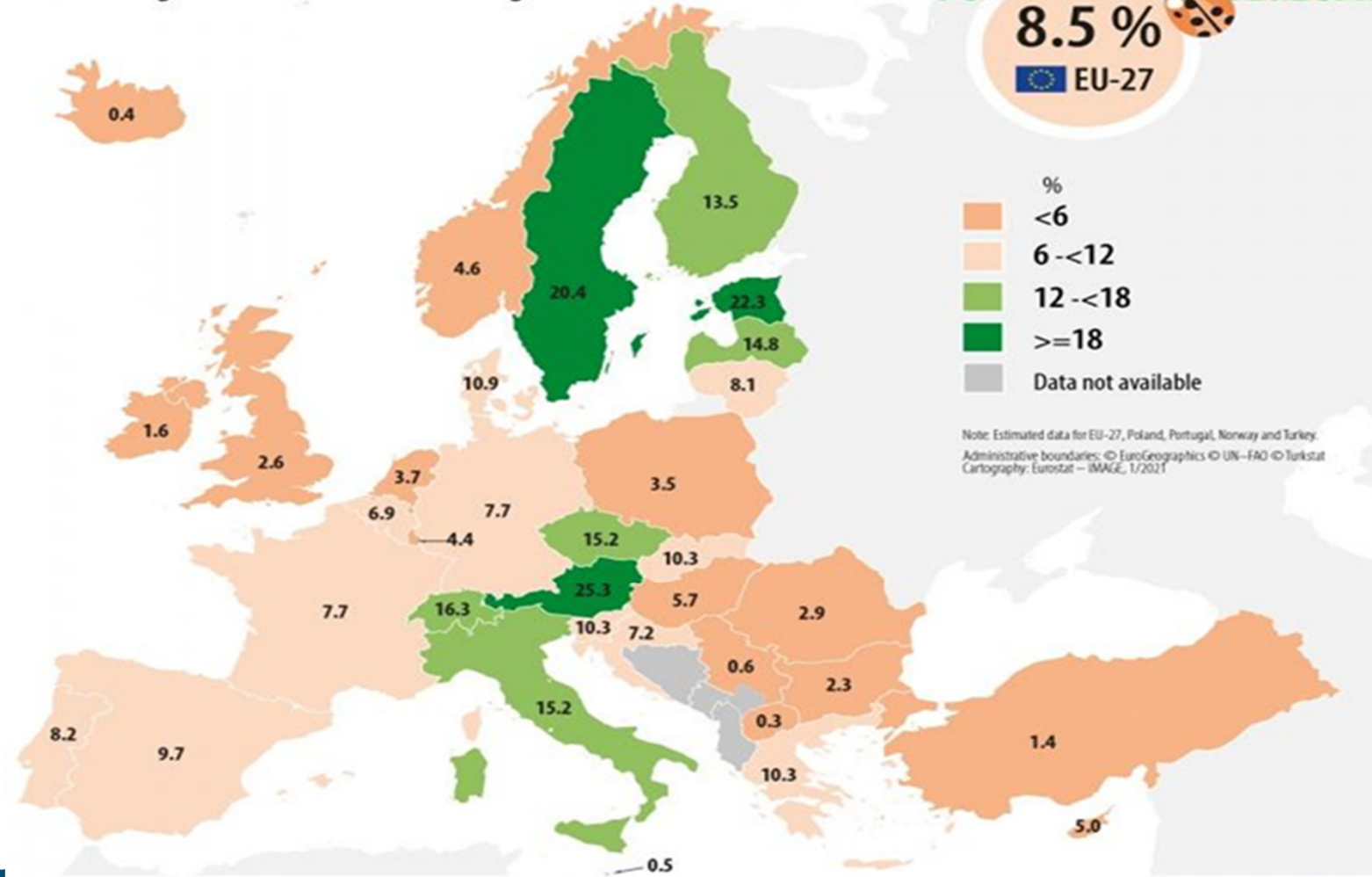
Example Country scenario: France - Bio-economy

Sustainable paths	Established paths	High tech paths
<ul style="list-style-type: none"> French agriculture has made a strong move towards circular production with optimal use of by-products and waste streams. Farm and household waste is used in livestock production. 	<ul style="list-style-type: none"> There is only moderate development towards circular production in French agriculture. Livestock and crop production are not well connected. 	<ul style="list-style-type: none"> High tech agriculture and precision farming lead to a strong move towards circular production.
<p>100% of the wastes produced in the agrifood industry are transformed into highly added value making way to a new highly-added value specialties business line.</p>	<p>40% of the wastes produced in the agrifood industry are transformed into highly added value making way to a new highly-added value specialties business line.</p>	<p>New by-products emerging from a novel specialty agrifood industry in which new technological approaches achieve more & more highly added products contributing to diversify the business model.</p>
<ul style="list-style-type: none"> Agriculture is self sustaining in energy production through production of bio-gas, wind and solar energy. 	<ul style="list-style-type: none"> Agriculture is still for the largest part dependent on fossil based energy sources, only moderately supported by renewable energy sources which are also supplied to some niche markets. 	<ul style="list-style-type: none"> Agriculture is still strongly based on fossil fuel, however supported by cost-effective renewable energy production.
<ul style="list-style-type: none"> Water consumption and effluents are minimized in agrifood factories by recycling and reusing techniques. 	<ul style="list-style-type: none"> Demands of water are reduced because of recycling. Industrial effluents are treated efficiently before discharge. Technologies can provide cheap reclaimed water 	<ul style="list-style-type: none"> Innovative systems allows to optimize the use of different sources of water and reclaimed wastewater for several applications in industry, agriculture and other uses.
<ul style="list-style-type: none"> Forest acreage has been increased, the use of forest has been sustainably diversified. Agroforestry and small-scale forestry including so-called "tiny" forests are integral part of the rural and urban landscape. Degraded land has been afforested. Forestry strongly contributes to biodiversity. Most forest is "nature forest" or regional parc. 	<ul style="list-style-type: none"> Forest acreage has increased very moderately. Planting of trees in urban and rural settings increases slowly albeit steadily. Most forest is "production forest". 	<ul style="list-style-type: none"> Forest acreage has increased moderately. Degraded land has been afforested. Forestry and agriculture are functioning separately. Most forest is "production forest" with around 50% of the harvested wood used for energy production.
<ul style="list-style-type: none"> The food industry has moved strongly to circular production supported by new technologies, including the introduction of sustainable packaging materials. 	<ul style="list-style-type: none"> The French food industry is dependent on fossil fuel energy sources but gradually improves its valorisation of by-products and waste streams through research centres. Technology growth is moderate but increasing through French legislations. 	<ul style="list-style-type: none"> The French food industry is moving swiftly to smart factory solutions where use and recycling of resources is based on economic incentives and legal demands. Intelligent packaging lead to lower cost production with less waste.

Differences
between
countries:

Organic farming area

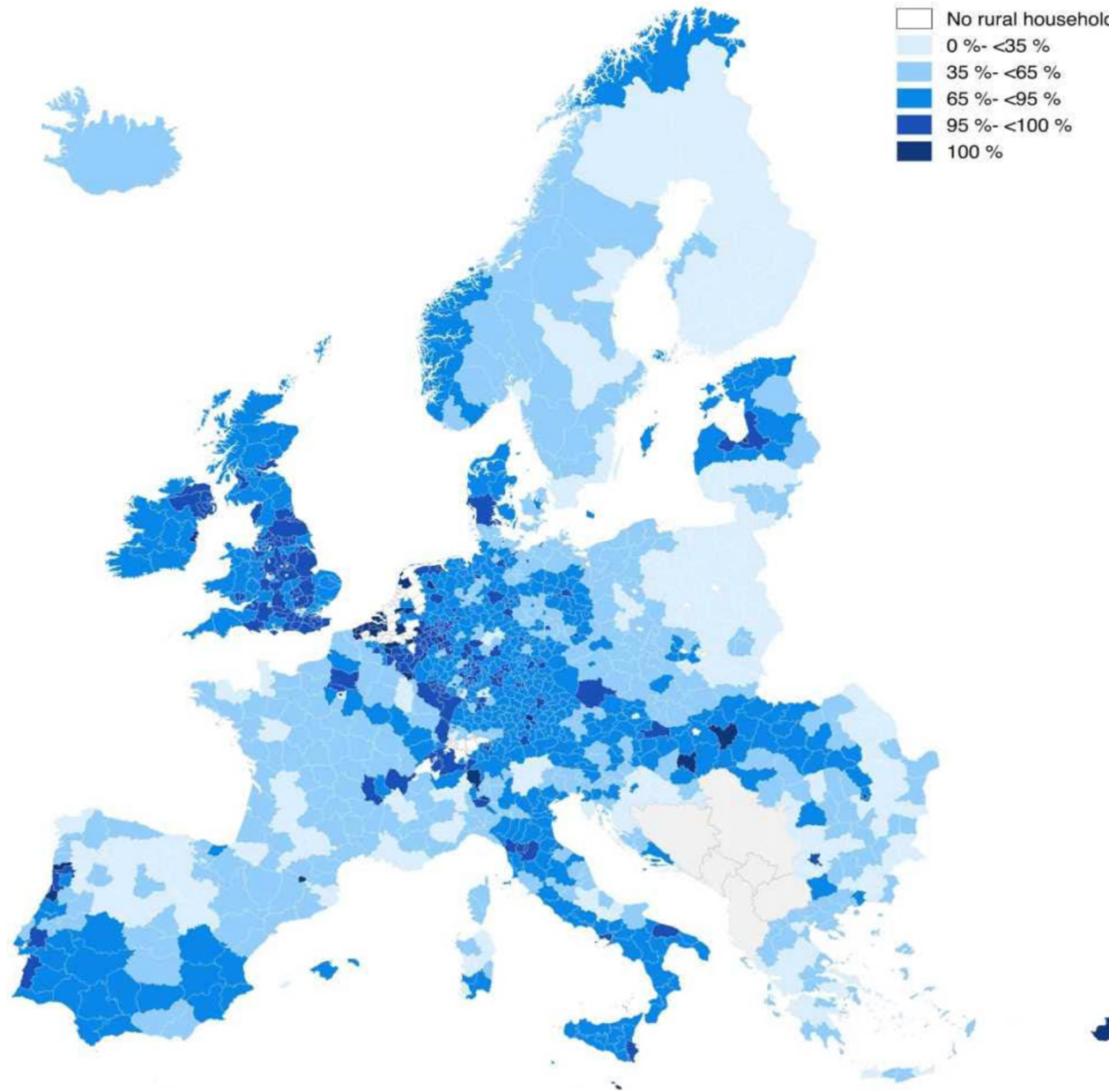
(% of organic area in total utilised agricultural area, 2019)



Differences between countries:

Example Rural broadband coverage in Europe, 2019

Digital Economy and Society Index (DESI) 2020
(study by IHS Markit, Omdia and Point Topic).



Conclusion: different implications of trends and scenarios throughout Europe

- Trend and scenario study support decision making on training and education development
- Trends show differences between EU countries
- Starting position of countries is also different
- Implying that scenarios should also be differently implemented: sustainability, bio-economy, digitalisation and business models
- Implying, besides commonalities, different skill and training needs
- Challenging the EU Green Deal objectives

Thank you for your attention!



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fields

ADDRESSING THE CURRENT AND FUTURE SKILL NEEDS FOR SUSTAINABILITY, DIGITALIZATION
AND THE BIO-ECONOMY IN AGRICULTURE EUROPEAN SKILLS AGENDA AND STRATEGY - AGREEMENT 612664-EPP-1-2019-1-IT-EPPKA2-SSA-B