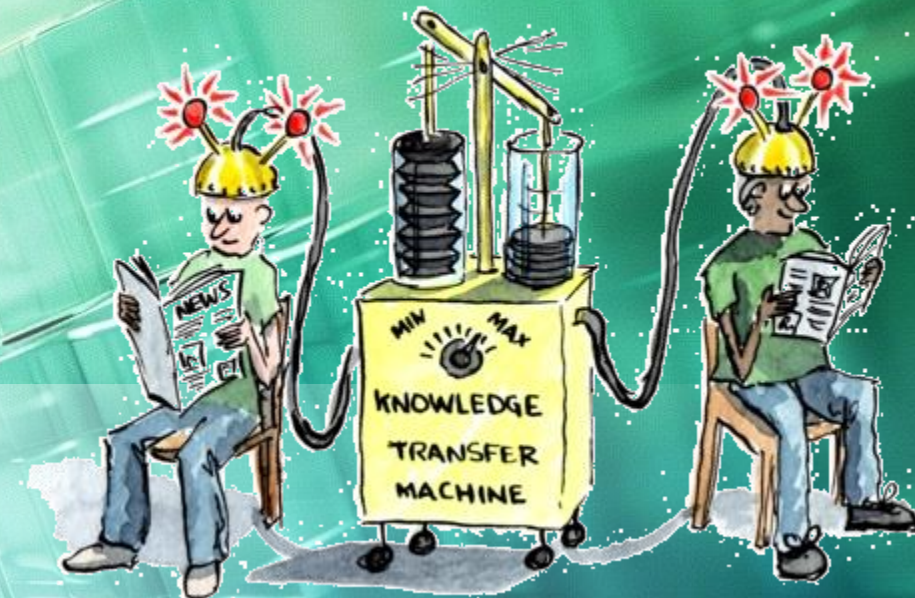


EMPHASIS: oblikovanje budućnosti kroz zelene i digitalne vještine

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Definicija i značaj

- **Zelene vještine:** Znanja i ponašanja koja omogućuju održiv, resursno efikasan rad, kao što su upravljanje energijom, načela kružne ekonomije i smanjenje otpada.
- **Digitalne vještine:** Tehnička vještina u umjetnoj inteligenciji, IoT alatima, analizi podataka i blockchainu za praćenje uticaja na okoliš i optimizacije.
- Zelene i digitalne vještine odnose se na kombinirane kompetencije potrebne za "**dvostruku tranziciju**" - integriranje održivih, ekološki prihvatljivih praksi s naprednim digitalnim tehnologijama.
- Ove vještine povećavaju zapošljivost, omogućujući radnicima optimizaciju resursa, korištenje umjetne inteligencije za održivost i osiguranje usklađenosti s ekološkim standardima (ESG).

- Izvještavanje o održivosti (ESG): Upravljanje podacima o utjecaju na okoliš radi usklađenosti s propisima.
- Industrija 4.0 i zelena tehnologija: Korištenje umjetne inteligencije, IoT alata i podataka za stvaranje autonomnih, ekološki prihvatljivih sistema.
- Ekodizajn i inovacije: Razvoj održivih, digitalnih proizvoda i usluga.
- Obnovljiva energija: Upravljanje pametnim mrežama i solarnom, vjetroelektranom ili hidroelektranama.

STARA KARIJERA (MODEL LJESTVI)



KARIJERA NOVOG DOBA (MODEL STIJENE ZA PENJANJE)



Prehrambeni lanac snabdijevanja – pokretači/ograničavajući faktori

FIGURE 2.1 Driving Forces Shaping Future Food Systems



Kompleksnost i brojnost aktera i interakcija koji se djeluju u prehrambenom lancu snabdijevanja, zahtijevaju posjedovanje zelenih i digitalnih vještina koje su ključne za transformaciju prehrambenog lanca snabdijevanja, omogućavajući efikasnije upravljanje resursima, smanjenje otpada i povećanje konkurentnosti u kontekstu klimatskih promjena i EU integracija.

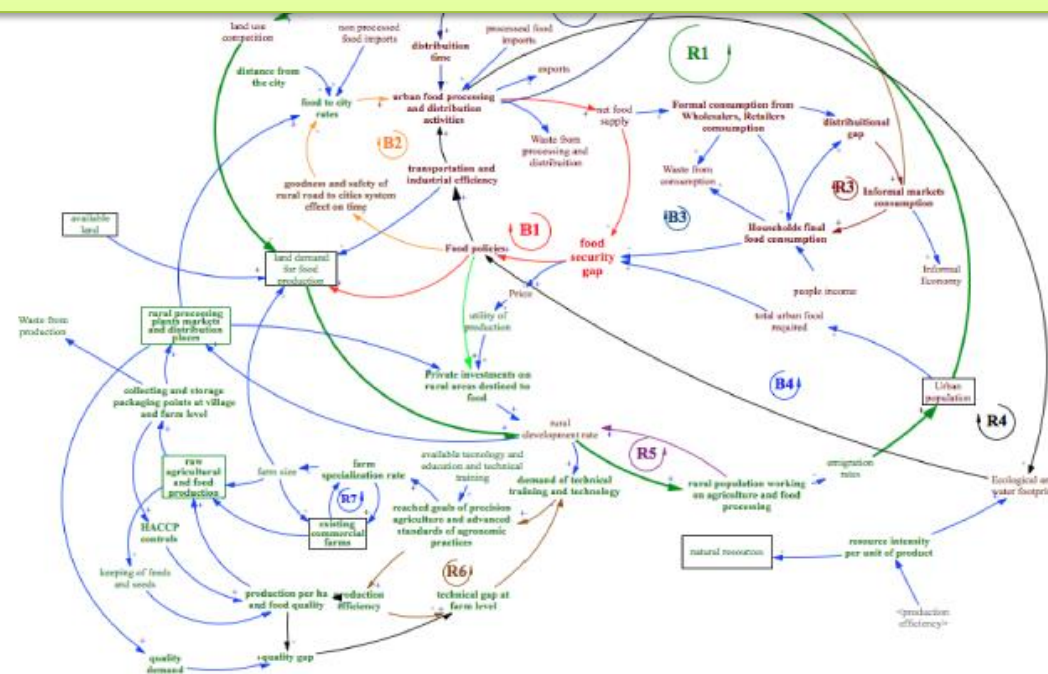


Figure 3 - Qualitative analysis of FSDS dynamics required by FAO as an introduction to SD methodology. Based on Aragrande and Argenti, 1999. (Armendariz et al. 2015B)

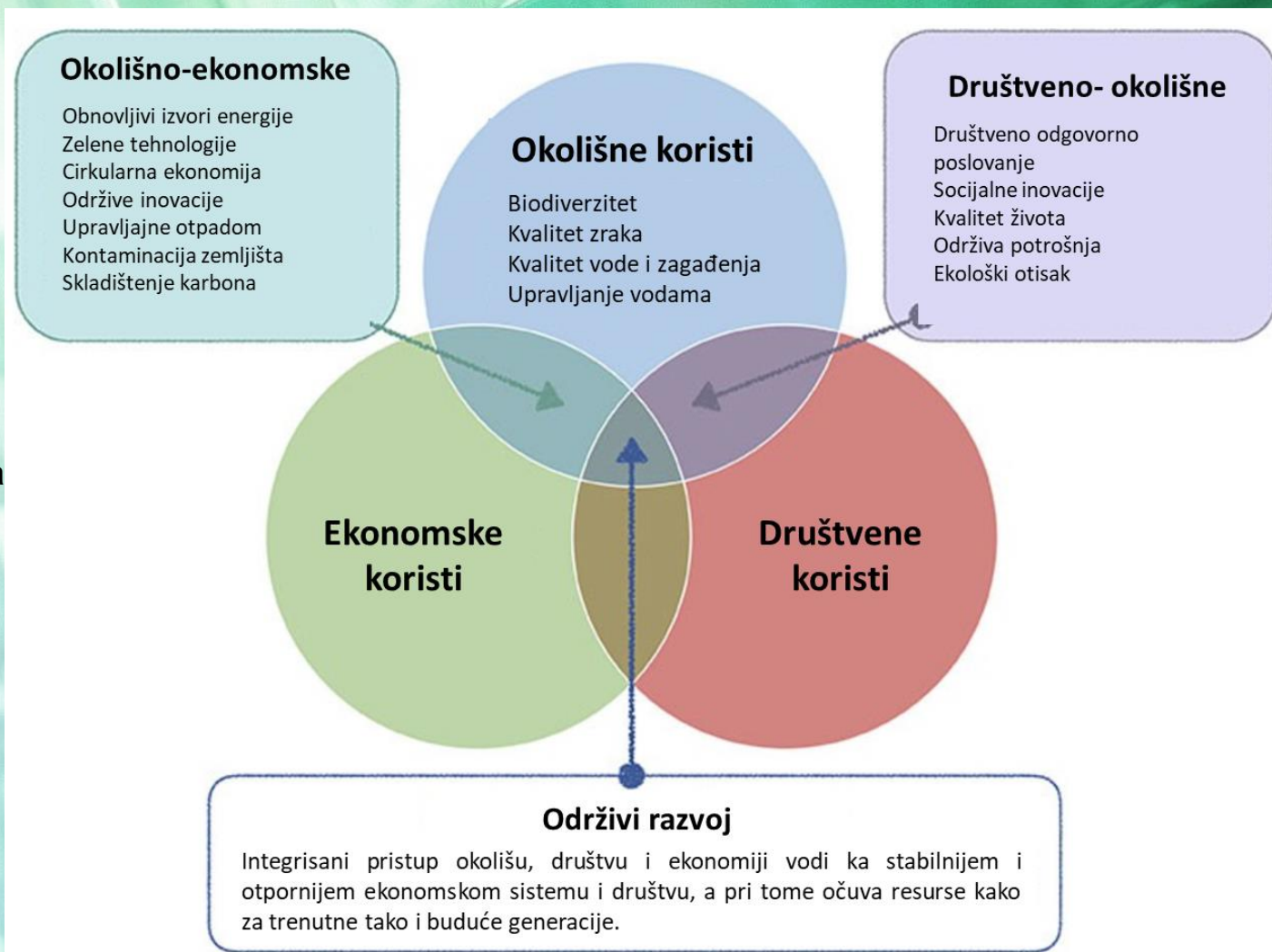
Zelene vještine za održive prehrambene sisteme

Zelene vještine (Green skills) predstavljaju znanje, sposobnosti i vrijednosti koje su neophodne za razvoj i podršku održivom razvoju. One omogućavaju razvoj **inovativnih ideja i poslovnih modela**, koje podržavaju uključenost mladih i razvoj lokalnih zajednica.

Ove vještine doprinose ciljevima održvog razvoja (SDG ciljevi), a posebno ciljevima poput:

- SDG 12: Održiva potrošnja i proizvodnja
- SDG 9: Industrija, inovacije i infrastruktura
- SDG 8: Dostojanstven rad i ekonomski rast

CILJEVI ODRŽIVOG RAZVOJA

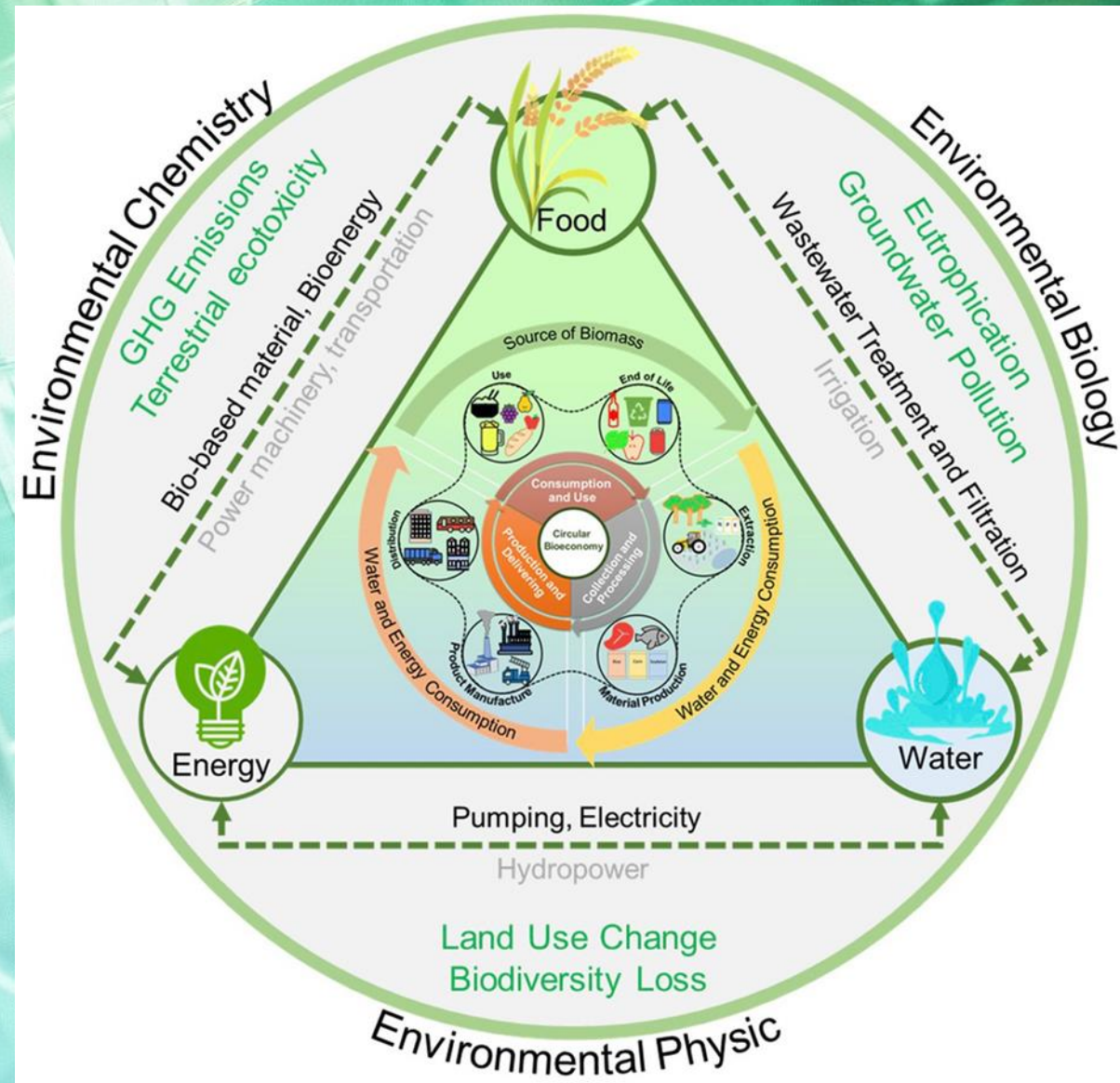


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Održivost prehrambenog lanca

- Poljoprivreda, kao glavni potrošač vodenih i energetske resursa, značajno utiče na okoliš, promjene u korištenju zemljišta, emisijama stakleničkih plinova i gubicima biološke raznovrsnosti (Lynch et al., 2021).
- Ovo zahtijeva **integraciju i holistički pristup** kako bi se ostvarili održivi ishodi i uravnotežio snabdijevanje i potražnja hranom.
- Pristup Water-Energy-Food (WEF) Nexus privukao je globalnu pažnju i doveo do međunarodnih i regionalnih sporazuma koji ističu međusobnu povezanost i ovisnost ovih ključnih elemenata (Geressu et al., 2020; Yue & Guo, 2021).
- Ovaj koncept također prepoznaje da ovi elementi **nisu odvojene jedinice, već su duboko povezani**, a promjene u jednom mogu značajno uticati na ostale.



Izazov gubitka i otpada od hrane

Pokretači:

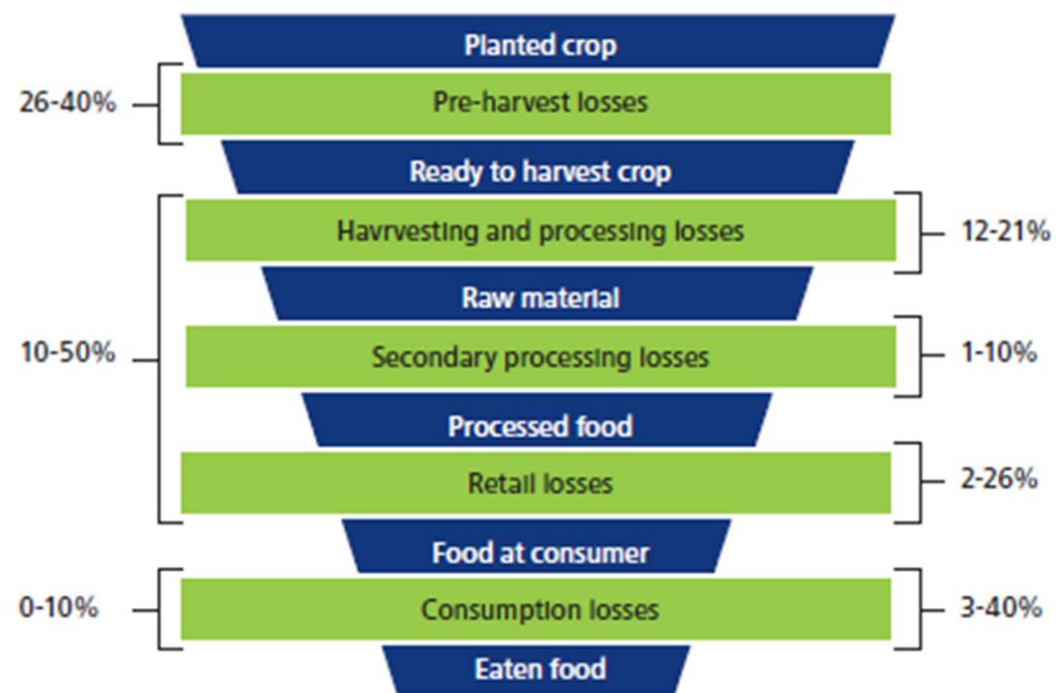
- Potražnja potrošača za održivim proizvodima.
- Nove tehnologije (IoT, precizna poljoprivreda).
- Vladaške politike i poticaji.
- Svijest o klimatskim promjenama.

Prepreke:

- Visoki troškovi inovacija.
- Nestabilnost tržišta.
- Asimetrija informacija između proizvođača i potrošača.
- Nedostatak tehničkog znanja među malim poljoprivrednicima.

Developing countries

Developed countries



Consumers

Processing

Retail Stores

Restaurants & hotels

Farm

Transport

Distribution

catering waste

4%

1%

Int'l

47%

20%

10%

10%

9%

[Source: \$27 billion revisited: The cost of Canada's annual food waste, YCM International, 2014]

Rješenja:

Bolje upravljanje lancem snabdijevanja.

Pametni senzori za skladištenje.

Edukacija potrošača.

Principi cirkularne ekonomije.

Ponovna upotreba otpada od hrane.

Stvaranje novih proizvoda (npr. biogas, kompost).

Smanjenje otpada štedi: novac, resurse, emisije.

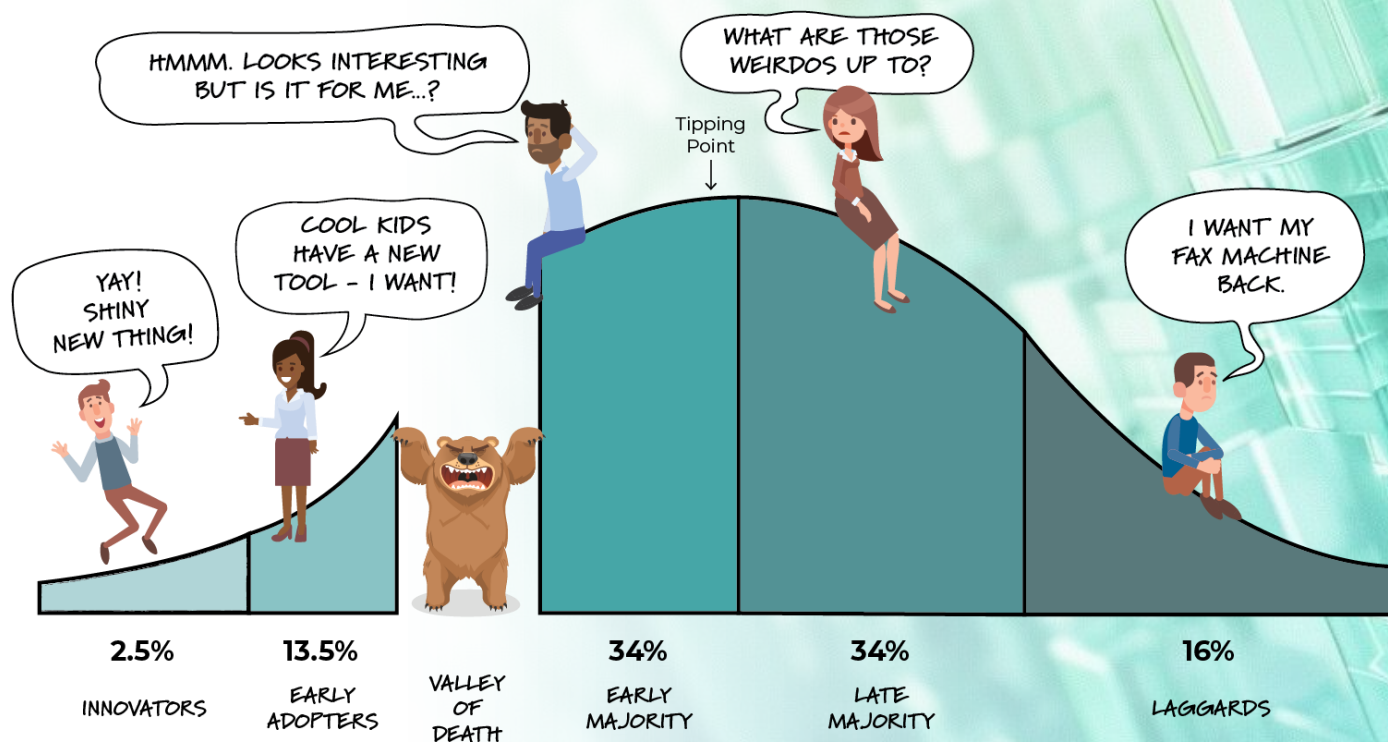
Odgovor u vidu novih poslovnih modela

Concept	Definition	Features Emphasized in the Supply Chain Analysis
Protected designation of origin (PDO)	European protection for agricultural products coming from a given geographical area and using recognized know-how	Geographical, cultural and historical identity of place-based products
Localized agrifood systems (LAS)	Farms and agrifood enterprises linked by their characteristics and operational methods to a specific territory	Territory, the “terroir” effect confers its qualities to the product
Territorial food systems (TFS)	A consistent set of supply chains located in a given geographic area of regional size	Territory and locally shared values related to sustainable production and food safety
Local food systems (LFS)	Food from here	Direct or close contact between producers and consumers
Organic production systems (OPS)	Characteristics of the production technologies used—no synthetic inputs or genetically modified seeds	Aside from the organic label, there are no unique features of the supply chain—can be either short or long supply chains
Mid-tier supply chains (MTSCs)	Multi-perspective approach of intermediate supply chains associating farmers and diverse intermediaries	Diversity of scales, key-player, modes of organization and values embedded
Agriculture of the middle (AoTM) and Values-based food supply chains (VBFSCs)	Strategies that fall between short and long supply chains set up by mid-sized farms and partners to sell their products	Farmers as strategic partners and not easily replaced suppliers. Story of the farmer and his family connects all the supply chain

- Neki od modela su priznati i svakodnevno dobivaju sve veći značaj.
- Brojni novi modeli pojavili su se kao odgovor na izazove povezane s prehrambenim lancima snabdijevanja.
- Novi koncepti/poslovni modeli/ideje usmjereni na održivost.

Neophodnost promicanja zelenih i digitalnih vještina

ROGERS' DIFFUSION OF INNOVATIONS CURVE



Promicanje ovih vještina može biti ubrzano kroz:

- Zelene mreže
- Kooperativama poljoprivrednika.
- Tehnološke platforme za dijeljene podatke.
- Partnerstva s istraživačkim institucijama.

Studij slučaja – eksperimentalni poligon Butmir (PPF UNSA) – digitalni voćnjak (u razvoju)



Praćenje u stvarnom vremenu – brže, efikasnije donošenje odluka.

Mogućnost djelovanja u različitim fazama uzgoja (trenutno primjena uglavnom u fazi branja)

Optimizacija upotrebe resursa (vode, hranjiva, energije)

Mogućnost eksperimentisanja u virtuelnom okruženju (štedi novac, vrijeme, učenje na pogreškama)

Podržava automatizaciju i integraciju novih senzora i IoT uređaja.

Upravljanje rizicima (vremenski uslovi, pojava štetočina, greške uređaja)

Moduli u razvoju

Module 1: Environmental Challenges (AU)

Focus: **Understanding global and local environmental issues and their impact.**

Suggested Units:

- Introduction to Environmental Sustainability
- Climate Change and Its Impacts
- Biodiversity and Ecosystem Loss
- Pollution (Air, Water, Soil) and Health
- Environmental Justice and Policy Frameworks

Module 2: Climate Awareness, Sustainability, and Resilience (UNSA&SVEHERC)

Focus: **Building awareness and personal responsibility for climate action.**

Suggested Units:

- Environment related SDGs (SVEHERC)
- Responsible Production and Consumption (UNSA)
- Climate Optimized Food Systems (UNSA)
- Local and EU Sustainability Policies (UNSA)
- The Role of Individuals and Communities (SVEHERC)

Module 3: Green Practices in Practice (to be enhanced with AR/VR) (UOWM-ANAX)

Focus: **Practical green skills for different disciplines and fields.**

Suggested Units:

- Circular Economy in Action
- Renewable Energy: Solar, Wind, Biomass
- Sustainable Agriculture and Food Systems
- Eco-friendly Construction and Architecture
- Case Studies (Industry, Education, Urban Planning)
- AR/VR Activity: Interactive simulations, industry virtual visits, etc.

Module 4: Efficient Energy Use in Practice (ANAX-UOWM)

Focus: **Energy efficiency in daily life and sectoral applications.**

Suggested Units:

- Introduction to Energy Efficiency
- Smart Technologies and Energy Saving
- Green Buildings and Urban Planning
- Energy Audits and Planning
- Policy Tools and Energy Regulations

Module 5: Labour Market and the Green Deal (FIFTY-FIFTY)

Focus: **Linking green skills to emerging job markets.**

Suggested Units:

- What Are Green Jobs?
- Labour Market Trends and Skills Demand
- Upskilling and Reskilling for Green Careers
- Gender Equality and Inclusion in Green Work
- Green Entrepreneurship and Innovation
- The European Green Deal and Future Opportunities

Climate Awareness, Sustainability and Resilience

Module aims and objectives:

This module is designed to offer comprehensive understanding of the concepts such as climate change, environmental sustainability and resilience across various fields. Through the series of case studies, quizzes and problem-based learning tasks, students are expected to **foster critical thinking** about socio-ecological systems, justice, ethics, and well-being in **the context of sustainable development**. The course is designed to engage students to become active participants, pursue **active engagement and advocacy** towards climate friendly solutions at the local, regional and global scales.

Climate Awareness, Sustainability and Resilience

Module learning objectives:

After completing the courses, students will be able to:

Knowledge:

- Understand fundamental **climate science** including causes and impacts of climate change, and the importance of adaptation and mitigation strategies.
- Recognize the **interconnections between environmental, social, and economic systems** underpinning sustainability and resilience.
- Comprehend key concepts such as **adaptation, mitigation, circular economy, social and environmental justice, and resilience**.

Skills:

- Analyze **environmental and climate risks** affecting socio-ecological systems.
- Assess **sustainable practices and identify opportunities** for resource conservation and climate resilience.
- Develop **solutions and strategies** for reducing carbon footprints and enhancing sustainability at various scales.
- Conduct **effective communication** on climate issues tailored to diverse audiences and stakeholders.
- Engage in **collaborative problem-solving and advocacy** related to climate and sustainability challenges.

Competence:

- Demonstrate capacity to **engage with diverse stakeholders** in climate action initiatives and sustainability practices.
- Apply **ethical reasoning and justice** considerations to sustainability challenges.
- **Communicate effectively** about climate awareness and sustainability issues across diverse communities and disciplines



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Hvala na pažnji!

Q&A



Co-funded by the
Erasmus+ Programme
of the European Union



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Commission