**Issue 2**
May 30, 2023
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# NEWSLETTER

## Smart & Net-Zero Project

## Overview

Welcome to the FFTC Smart & Net-Zero Newsletter! Explore innovative technologies, sustainable practices, policy initiatives, and knowledge sharing platforms worldwide. The focus of this edition is achieving agrifood system sustainability through Information and Communication Technology (ICT), which includes sensor technology for monitoring field conditions for farmers to optimize the timing of fertilization, as well as the collaboration by farmers and tech companies to achieve supply chain transparency. Other topics of interests also include methods for reducing uncertainty in soil carbon stock measurement, replacing purchased protein feed with farm grown peas and beans for cost savings and reduced carbon footprint.

**Content**

# RESEARCH

**01 THEME:** ICT in agridfood sustainability

## Adoption of digital technologies in agriculture—an inventory in a european small-scale farming region

July 06, 2022 | Precision Agriculture | Source |

**Introduction:** As digitalization continues to reshape agriculture, there's been a surge in studies examining the adoption of digital technologies in large-scale crop production and livestock farming. However, the digitalization landscape in small-scale farming has often been overlooked. Bavarian State Research Center for Agriculture addresses this gap by investigating the sequential adoption of precision agriculture (PA) and other digital technologies in a small-scale agricultural region in southern Germany. The study conducted an online survey of 2,390 farmers, with 1,820 engaged in field farming and 1,376 in livestock farming. Using a heuristic approach, adoption patterns were identified, focusing on the usage of 30 digital farming technologies and decision-support applications.

**Key findings:** While Bavarian farmers are not highly digitalized, there's potential for adoption rates of 15–20% over the next five years for technologies such as barn robotics, section control, variable-rate applications, and satellite data mapping. Farmers already using entry technologies like automatic milking systems and digital field records were more likely to adopt additional technologies.

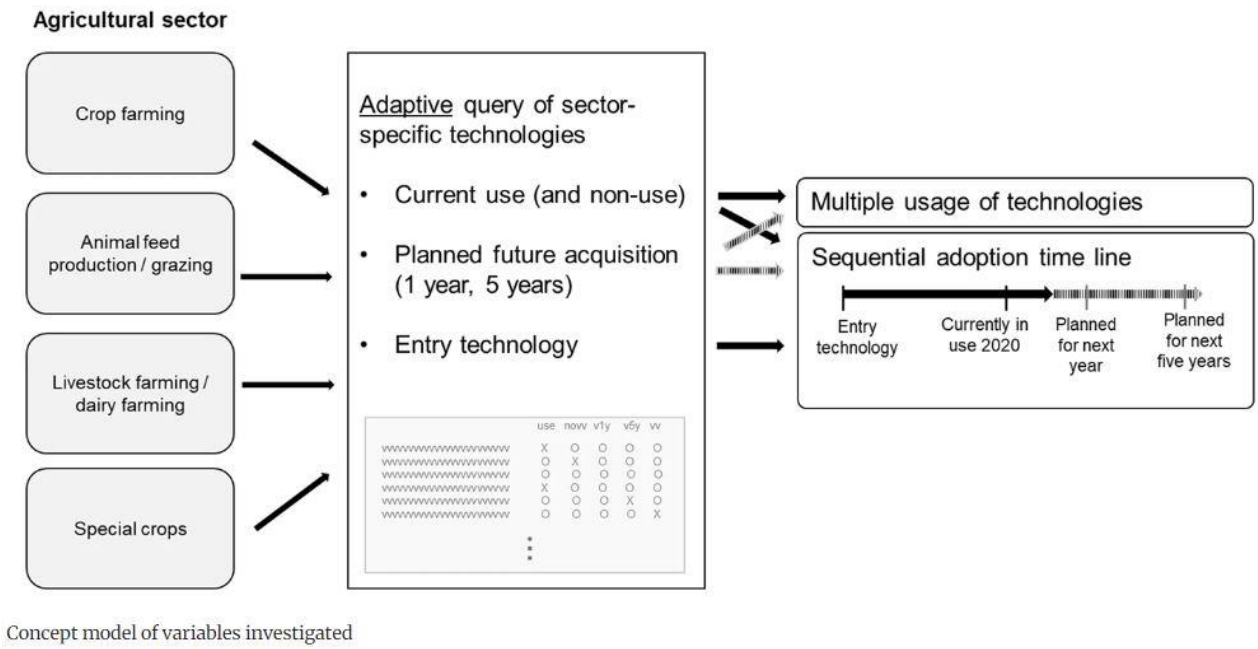


**Fig. | Concept model of variables investigated.**

**02 THEME:** ICT in agridfood sustainability

# IoT-Driven Artificial Intelligence Technique for Fertilizer Recommendation Model

March 01, 2023 | IEEE Consumer Electronics Magazine |

**Introduction:** The School of Computing at SASTRA Deemed University in India conducted a study on smart farming systems, which utilize modern technologies like the Internet of Things, Cloud, and Artificial Intelligence (AI) to enhance agricultural practices.

**Key findings:** By integrating AI with sensor technology, the study proposes a four-layer architectural model for energy-efficient smart farming. The model includes sensor, network, service, and application layers, and aims to guide agricultural practitioners towards successful outcomes. The study specifically focuses on developing a fertilizer recommendation system using deep learning techniques based on expert opinions. The research culminates in the presentation of a user-friendly mobile application that consolidates the entire system for farmers' convenience (Read more).

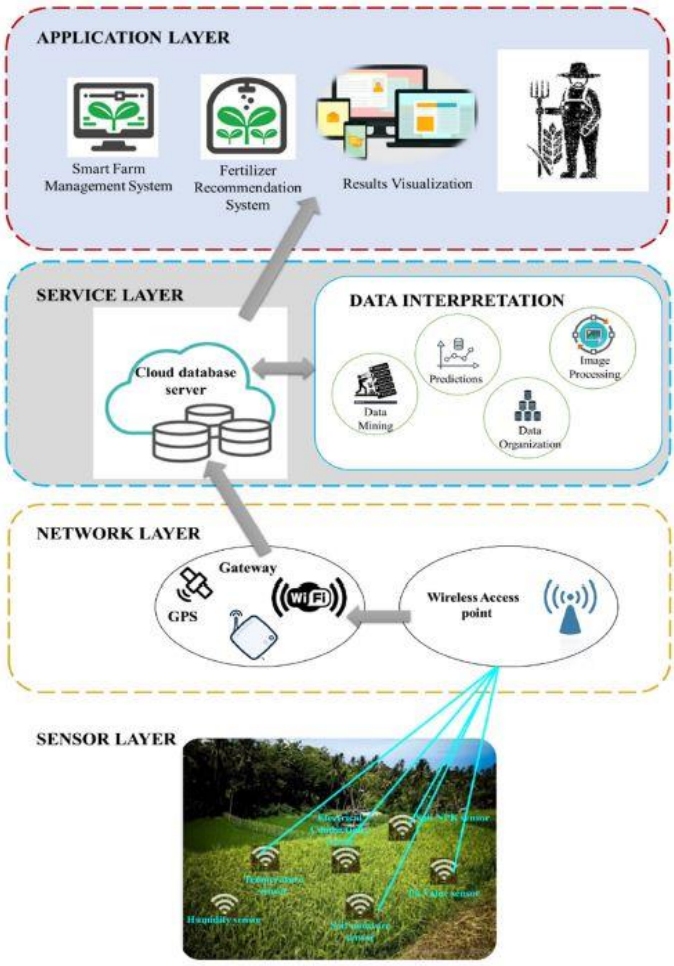


**Fig. | Overview architecture of the smart farming system.**

# NEWS

**01 THEME:** GHG emission reduction; ICT in agricultural sustainability; policy incentives

## First UK field trial of its kind is delivering a wide range of cost savings and reduced carbon footprint

March 15, 2023 | Welsh Government |

Pant y Deri farm in Wales conducted the first UK trial of replacing purchased protein feed with a dual crop of peas and beans for their cattle. The project aimed to cut costs and increase self-sufficiency while reducing the farm's carbon footprint. Growing their own feed eliminated the need to import soy from distant places, reducing emissions and plastic packaging. The nitrogen-fixing crop also reduced the need for purchased fertilizers. The farm used soil mapping technology and GPS systems on tractors to improve efficiency and save money. This trial showcases the potential for data-driven technologies and sustainable practices in achieving net zero emissions in agriculture.

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**02 THEME:** ICT in agricultural sustainabilty

## Tech collaboration revolutionizes agricultural sector to achieve supply chain transparency

January 31, 2023 | Trade Finance Global |

Modern farming faces escalating challenges, with accelerated operations demanding increased on-farm grain storage. Veridapt and GrainCorp collaborate to revolutionize the commodity and agricultural sectors. Veridapt's IoT solutions offer real-time insights, empowering farmers to manage stored grain effectively. Despite remote landscapes posing installation hurdles, advancements in IoT technology streamline setup, lower costs, and enhance reliability, catering to the sector's evolving needs.

Beyond agriculture, digital innovations find applications in diverse industries, addressing challenges like supply chain transparency. The collaboration between Veridapt and GrainCorp exemplifies how technology transcends boundaries, fostering a cycle of innovation across sectors. As the agricultural sector embraces technology-driven solutions, it navigates modern challenges, driving efficiency and sustainability in its wake.

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# POLICY

**01 THEME:** Nature-based solutions

## EU Soil Strategy 2030

European Commission | Source | Download |

**Introduction:** Soil, often overlooked, is a fundamental resource crucial for food production, biodiversity, and climate regulation. Despite its importance, European soils face significant degradation, threatening our ecosystems and economy. Recognizing this urgency, the EU has developed a Soil Strategy for 2030 to safeguard and enhance soil health.

**Objectives:** The strategy aims to achieve healthy soils by 2050 through a comprehensive approach. It targets combating desertification, restoring degraded land, reducing greenhouse gas emissions, improving water quality, and minimizing nutrient and chemical pesticide usage by 2030. Long-term goals include achieving no net land take, reducing soil pollution, and attaining climate neutrality.

### Key Solutions

- **Climate Change Mitigation and Adaptation:** Healthy soils play a vital role in carbon sequestration and water retention, making them essential for mitigating and adapting to climate change.
- **Circular Economy:** Soil is integral to a resource-efficient circular economy, recycling nutrients and filtering pollutants. Prioritizing circular land use over development helps limit soil sealing and land take.
- **Biodiversity and Water Resources:** Healthy soils support diverse ecosystems and ensure clean water sources, contributing to both environmental and human health.

**Prevention and Restoration:** The strategy emphasizes sustainable soil management practices, including agroecological principles, cover cropping, and reduced tillage. It promotes coordinated efforts at all levels to implement these practices effectively, with a focus on advisory services, CAP conditionality, and forest management.

**Knowledge and Innovation:** Enhanced soil monitoring, research, and digital technologies will provide critical data and insights for informed decision-making. The EU plans to establish an integrated soil monitoring system and invest in research initiatives like the Horizon Europe Mission 'A Soil Deal for Europe.'

**Enabling Transition:** Private finance, EU funding, and societal engagement are crucial for realizing the strategy's goals. Financial incentives for soil health, coupled with public awareness campaigns and educational initiatives, will drive positive change.

**02 THEME:** Climate smart agriculture

# Data in the Common Agricultural Policy: Unrealised potential of big data for policy evaluations

European Court of Auditors| Source | Download |

**Introduction:** The CAP plays a pivotal role in shaping agricultural livelihoods, environmental sustainability, and rural development within the European Union (EU). Effective policy formulation requires robust data and analysis. This policy brief highlights strategies to enhance data utilization for CAP analysis, fostering informed decision-making and achieving policy objectives.

## Key Strategies:

- **Framework for Disaggregated Data:** The European Commission should establish a framework for utilizing disaggregated data from Member States. This framework will enable more granular analysis, capturing critical elements such as environmental practices and off-farm income, essential for informed policy-making.
- **Development of Data Sources:** Prioritize the development of data sources tailored to meet CAP policy needs. Embrace innovative technologies and methodologies, including big data analytics, to enhance data collection, aggregation, and analysis capabilities.
- **Promotion of Data Standardization:** Advocate for data standardization across Member States to streamline data collection processes and ensure consistency and interoperability. Standardized data formats facilitate data sharing, comparability, and usability, empowering stakeholders to make evidence-based decisions.

**03 THEME:** Climate smart agriculture

# A Baseline Report 2022: The State of Digital Agriculture in the Commonwealth

The Commonwealth| Source |

**Introduction:** Digital agriculture holds immense potential to address systemic constraints in Commonwealth agriculture, fostering economic growth, resilience, and sustainability. This policy brief outlines key strategies to accelerate digitalization in the Commonwealth, addressing challenges and leveraging opportunities for transformative change.

## Key Strategies:

- **Infrastructure Investment:** Prioritize investment in digital infrastructure, including broadband, electricity, and cell towers, to create an enabling environment for digital agriculture to thrive.
- **Data Infrastructure Development:** Establish robust data infrastructure, setting standards for data sharing, conducting frequent agriculture censuses, and facilitating open access to government-collected data through APIs.
- **Business Development Support:** Promote business development in digital agriculture by subsidizing early-stage development, fostering partnerships between public and private sectors, and incentivizing investment in innovations tailored to smallholder contexts.
- **Gender-Inclusive Initiatives:** Close the gendered digital divide by investing in digital infrastructure and education to empower women to access and benefit from digital agriculture solutions.
- **Impact Evaluation:** Implement robust impact evaluation processes to document learnings and ensure that investments effectively benefit smallholder stakeholders.

# OPEN DATA

**01 THEME:** Agrifood system; GHG emission inventory; Land cover and soil

## FAOSTAT

Food and Agricultural Organiztion of the United Nations| Source | Data |

Agricultural Data: The Food and Agriculture Organization (FAO) of the United Nations provides access to a wide range of agricultural data, including crop production, food security and nutrition, food balances, trade, prices, cost and afforadability of a healthy diet, food value chain, cliamte change: agrifood systems emissions, forestry, macro-economic indicators, investment, and population and employment.

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**02 THEME:** Agrifood system; Environment and climate; Land cover and soil

## USDA's Ag Data Commons

USDA| Source | Data |

The Ag Data Commons serves as a repository and catalog for research data from projects funded by the United States Department of Agriculture. All USDA-funded researchers are required to create a catalog record for their data, with optional supplementary repository service. The USDA National Agricultural Library ensures data accessibility and quality through review by data curators. The data covers veterinary and food sciences, land and farm managemnet, animal production, applied economics, bioinformatics and computational biology, biological sciences, built environment and design, climate change science, crop and pasture production, earth sciences, ecological applications, engineering (environmental, geomatics), environmental sciences and management, food sciences, genetics, information and computer sciences, plant biology, pollution and contamination, soil science, urban and regional planning.

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