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 much-expanded Research section this month presents technical papers on reducing GHG emission from the agricultural sector, covering climate smart agriculture, especially the use of ICT to improve farming efficiency, as well as nature-based solutions. The News section highlights recent developments in climate-smart agriculture and sustainable food systems from around the world. The highlight of the Policy and Open Data sections this month is Australia, including its strategies and roadmaps of Australia towards climate resilience, net-zero emissions, and sustainable soil management, as well as the data which is at the basis of its policy formulation.

https://net.fftc.org.tw/smartnetzero   *www.fftc.org.tw*

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RESEARCH

01 THEME: ICT in agridfood sustainability

Real-time vibration monitoring and analysis of agricultural tractor drivers using an IoT-based system

May 25, 2023 | Journal of Field Robotics | Source |

A recent study conducted by the University of Waterloo, Canada, along with institutes from the UAE, USA, and India, focused on the vibration exposure experienced by agricultural tractor drivers, particularly during soil tillage operations. While previous research mainly examined vertical vibration (z-axis), this study investigated the effects of rotary soil tillage on vibration acceleration, frequency, and power spectral densities (PSDs) along the three translational axes: x, y, and z. To ensure safety during the COVID-19 pandemic, the study utilized an Internet of Things (IoT) module for online data transmission, integrating with existing data loggers. Results revealed that vibration energy was more dominant along the z-axis, exceeding the exposure action value defined by Directive 2002/44/EU. PSDs indicated low-frequency vibrations induced by rotary soil tillage, while the seat-to-head transmissibility (STHT) response demonstrated higher transmissibility along the y and z axes compared to the x-axis. The frequency range of 4-7 Hz was associated with potential cognitive impairment in tractor drivers during rotary soil tillage. This study sheds light on the significant vibration exposure in agricultural settings, emphasizing the need for interventions to ensure the well-being and safety of tractor drivers.
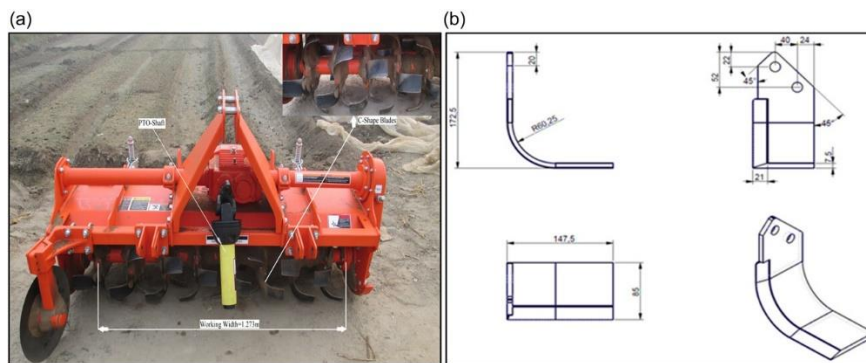

Figure | Representation of rotavator (a) and dimensions of the C‑shaped blade (in mm) (b).

02 THEME: ICT in agridfood sustainability

More than two decades of research on IoT in agriculture: a systematic literature review

March 2, 2023 | Internet Research | Source |

Agriculture holds great potential for the Internet of Things (IoT) to revolutionize the sector, but its adoption has been slower than anticipated. A systematic review conducted by Royal Holloway University of London examines the state of IoT in agriculture and explores the reasons behind its sluggish implementation. The review analyzed 1,355 relevant publications from the past decade. The findings highlight three major barriers in the agricultural sector: cost, skills, and standardization. Limited connectivity and data governance hinder the development of integrated IoT solutions, leading to standalone systems with restricted scope. Commercial efforts mostly focus on indoor environments. Notably, the review reveals a research opportunity in understanding barriers and solutions at the business layer of the IoT system architecture. The study provides practical insights into the technical and organizational challenges faced on the ground, offering a foundation for further investigation by information systems scholars. This comprehensive review is the first of its kind to address adoption barriers and solutions across all five layers of the IoT system architecture, making it a valuable contribution to the field.
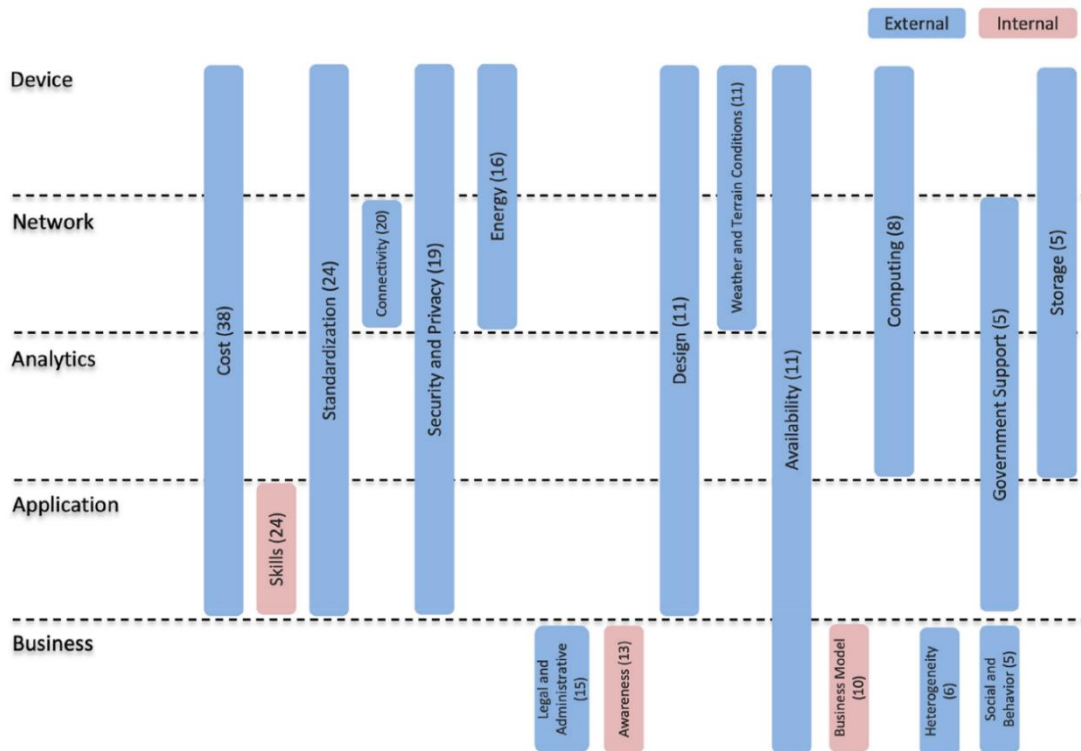

Figure | Barriers by IoT layer

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03 THEME: ICT in agridfood sustainability

Big Data and precision agriculture: a novel spatio-temporal semantic IoT data management framework for improved interoperability

April 28, 2023 | Journal of Big Data | Source |

Researchers from Spain have developed an innovative system for managing spatial, temporal, and semantic data in precision agriculture within the realm of the Internet of Things (IoT). This system addresses the challenges posed by the diverse data collected from sensors deployed on farms and the lack of standards, which hampers interoperability with other management solutions. The proposed solution includes a data query system that enables farmers and users to resolve daily queries, aiding in decision-making, monitoring, and task automation. The framework ensures service interoperability and has been validated with two European smart farming platforms, AFarCloud and DEMETER. To evaluate the system, a neural network was implemented and trained using the framework, providing accurate forecasts for crop harvest and baling, particularly for forage legume crops used in livestock feeding. The study demonstrates the system's high performance in handling complex spatio-temporal semantic queries, and concludes with a distributed framework that integrates external agricultural data models to enable effective management of such data in precision agriculture.

Graphical abstract

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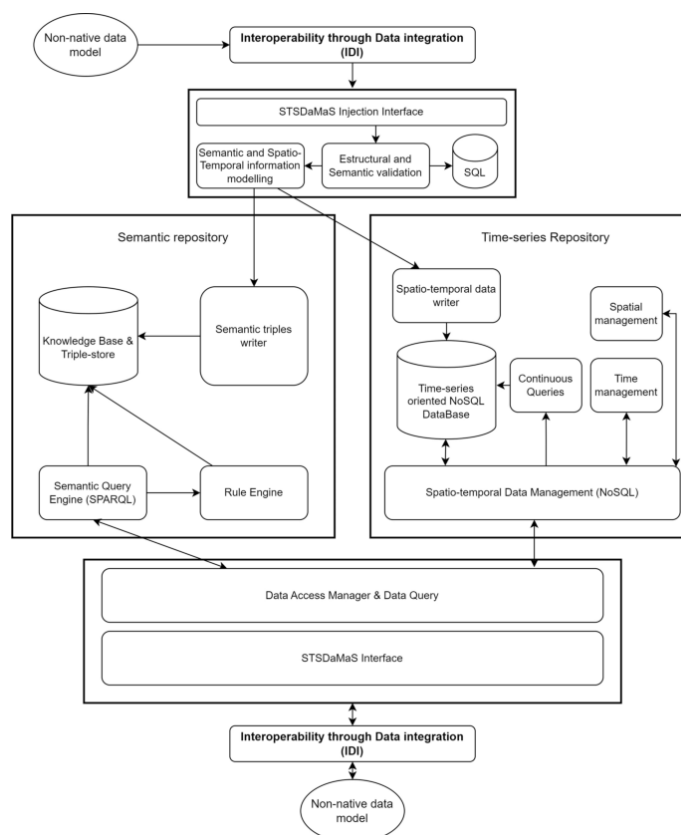
04 THEME: ICT in agridfood sustainability

Review of artificial intelligence and internet of things technologies in land and water management research during 1991-2021: A bibliometric analysis

August 2023 | Engineering Applications of Artificial Intelligence | Source |

The Indian Agricultural Research Institute conducted a study to address the challenges faced by agricultural systems and food security due to urbanization, land degradation, water scarcity, and climate change. They focused on the potential of digital agriculture, which involves the use of smart systems and advanced farming practices incorporating Artificial Intelligence (AI) and Internet of Things (IoT) technologies, to provide sustainable solutions.

Using a bibliometric analysis of 436 English language articles published between 1991 and 2021, the study examined the recent pulse and trends in AI and IoT-assisted land and water management (LWM) research. The analysis revealed a significant increase in research activity from 2010 onwards, with over 60 AI techniques employed in various AI and IoT frameworks for LWM. The study identified key AI techniques like Artificial Neural Networks, Adaptive Neuro-Fuzzy Inference System, Support Vector Regression, Random Forest, and Multilayer Perceptron-ANN as highly adopted methods.

China, India, Iran, Australia, and the USA emerged as pioneers in the field, while Italy, Spain, and Saudi Arabia showed potential as emerging countries with low collaboration links. The study also highlighted the current limitations and challenges of AI and IoT technologies in this domain.

Based on their findings, the researchers recommended future research areas for AI and IoT, including conducting comparative evaluations of AI techniques to determine the most effective approaches for specific LWM domains.
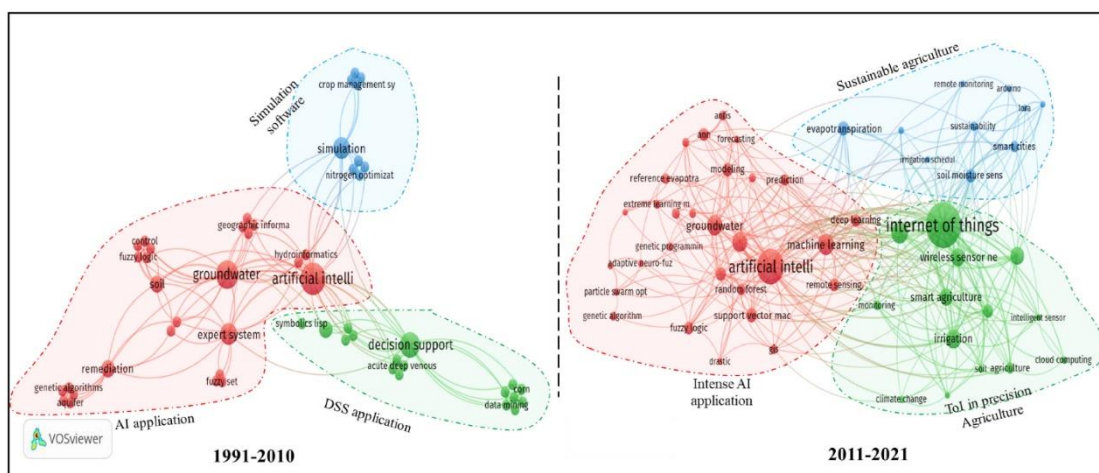

Figure | Keyword co-occurrence decadal analysis for the period of 1991–2010 and 2011–2021

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05 THEME: ICT in agridfood sustainability

Digitalization, sustainability, and coffee. Opportunities and challenges for agricultural development

May 2023 | Agricultural Systems | Source |

The University of Hohenheim in Germany, in collaboration with researchers from Austria, conducted a study to assess the potential of digital technologies in addressing sustainability challenges in the coffee value chain. The study aimed to critically examine the socio-environmental consequences of the digitalization process in this industry.

The researchers analyzed the technical characteristics of 20 digital tools designed for the coffee producing sector. They reviewed existing literature and conducted online interviews with the developers of these tools. Through qualitative analysis, the study focused on three main themes: knowledge and value systems represented, power structures, and effective use of digital technology.

The analysis revealed two pathways of digitalization in the coffee value chain, each impacting different dimensions of sustainability. The first pathway involved digital advisory services that aimed to optimize production using conventional agricultural practices for the commodity market. The second pathway focused on trade platforms and traceability systems, which enhanced producer visibility and facilitated participation in differentiated markets. However, access barriers to technologies created asymmetrical participation among producers.

The study emphasized that digitalization in the coffee value chain primarily focused on optimizing production through the use of synthetic inputs and traditional extension models. It also highlighted the role of centralized power structures in facilitating more efficient social coordination.

The significance of the study lies in its analytical framework, which considers digital technologies as a configuration of different technical arrays. This approach provides a nuanced understanding of the impacts and patterns of digitalization for agricultural development. The findings indicate that the sustainability outcomes of digitalization in the coffee value chain are complex and not straightforward.

Graphical abstract

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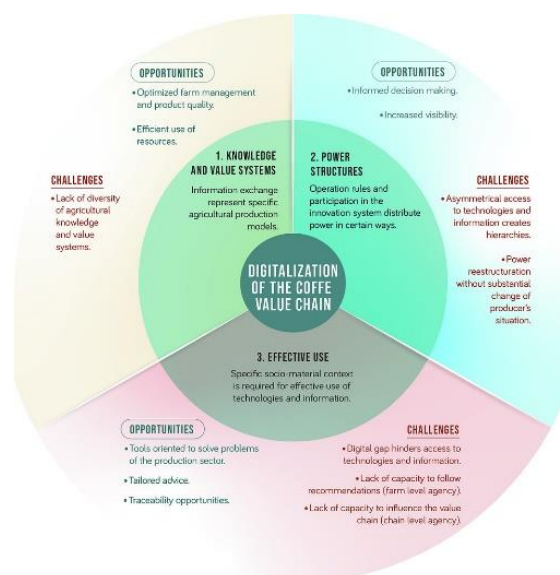
06 THEME: ICT in agridfood sustainability

Abaxial leaf surface-mounted multimodal wearable sensor for continuous plant physiology monitoring

April 14, 2023 | Science Advances | Source |

Researchers at North Carolina State University conducted a study on wearable plant sensors, which have the potential to revolutionize smart agriculture. The study focused on the development of a wearable sensor that can be attached to the lower surface of plant leaves to continuously monitor plant physiology. This sensor is capable of tracking both biochemical and biophysical signals of the plant and its microenvironment. It integrates sensors for detecting volatile organic compounds (VOCs), temperature, and humidity into a single platform.

The researchers strategically chose the abaxial leaf attachment position based on stomata density to enhance the sensor's signal strength. This versatile platform can be used for various stress monitoring applications, such as tracking plant water loss and detecting plant pathogens at an early stage.

Furthermore, the study involved the development of a machine learning model that can analyze the data collected by the multichannel sensor. The model demonstrated the ability to detect the presence of the tomato spotted wilt virus as early as 4 days after inoculation. It also evaluated different combinations of sensors for early disease detection and concluded that at least three sensors, including the VOC sensors, are required.

Overall, the study showcases the potential of wearable plant sensors in advancing agricultural practices by enabling real-time monitoring and early detection of plant stresses and diseases.
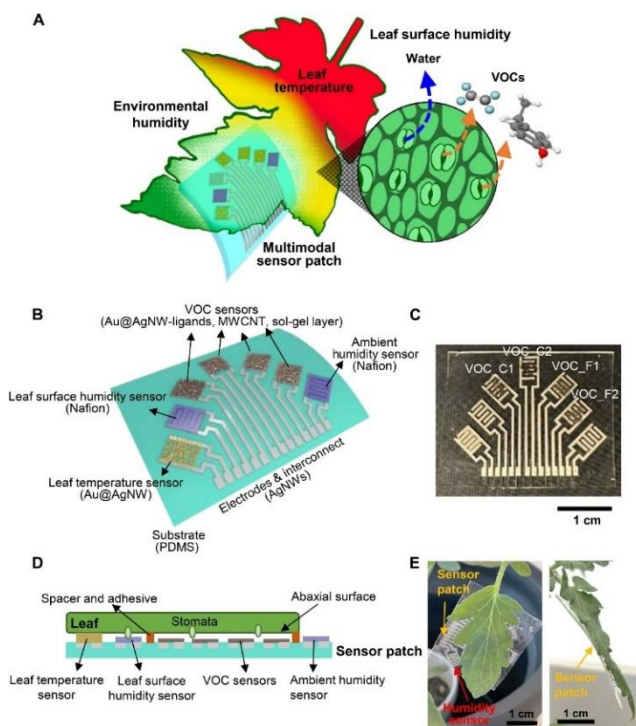

Figure | A multimodal wearable plant sensor. (A) Schematic illustration of the sensor attached to a plant leaf. Our multimodal sensor is attached to the abaxial leaf surface to simultaneously monitor various physiology data from the leaf. Blue and orange arrows represent emissions of water and VOCs through stomata, respectively. Different colors of the leaf represent the variation of leaf surface temperature. (B) Overview of the wearable sensor design, which consists of four VOC sensors, one leaf surface relative humidity sensor, one leaf temperature sensor, and one environmental humidity sensor. All seven individual sensors were integrated with AgNW interconnects on a PDMS substrate. (C) Photograph of the actual sensor. VOC sensors with different sensing materials are labeled. (D) Side view of the wearable sensor patch.(E) Photographs of an actual sensor patch attached to the lower epidermis of the tomato leaf. The environmental humidity sensor (red arrow) is the only sensor mounted outside the leaf surface area in the air near the plant.

07 THEME: ICT in agridfood sustainability

The q-rung fuzzy LOPCOW-VIKOR model to assess the role of unmanned aerial vehicles for precision agriculture realization in the Agri-Food 4.0 era

April 2023 | Artificial Intelligence Review | Source |

Afyon Kocatepe University in Turkey conducted a study focusing on smart agriculture and the role of unmanned aerial vehicles (UAVs) in this field. UAVs have become essential in modern agriculture due to their ability to assist in various agricultural activities. This study aimed to propose an integrated decision-making framework for determining the most suitable agricultural UAV.

Previous studies on UAV evaluation lacked effective modeling of uncertainty, systematic determination of expert weights, consideration of expert and criteria types during weight calculation, and personalized ranking of UAVs. To address these gaps, the researchers identified nine critical selection criteria based on literature and expert opinions, and considered five existing UAVs for evaluation.

The study developed a new integrated framework using q-rung orthopair fuzzy numbers for UAV selection. The experts' weights were estimated methodically using the regret measure, and a weighted logarithmic percentage change-driven objective weighting technique was formulated for criteria weight calculation. An algorithm combining the VIKOR approach with the Copeland strategy was presented for personalized ranking of UAVs.

The findings highlighted that the most important criteria for agricultural UAV selection were the "camera," "power system," and "radar system." The DJ AGRAS T30 UAV was identified as the most promising option. The developed framework can serve as an effective decision support system for farmers, managers, policymakers, and other stakeholders in the agriculture sector as the use of UAVs in agriculture becomes increasingly inevitable.
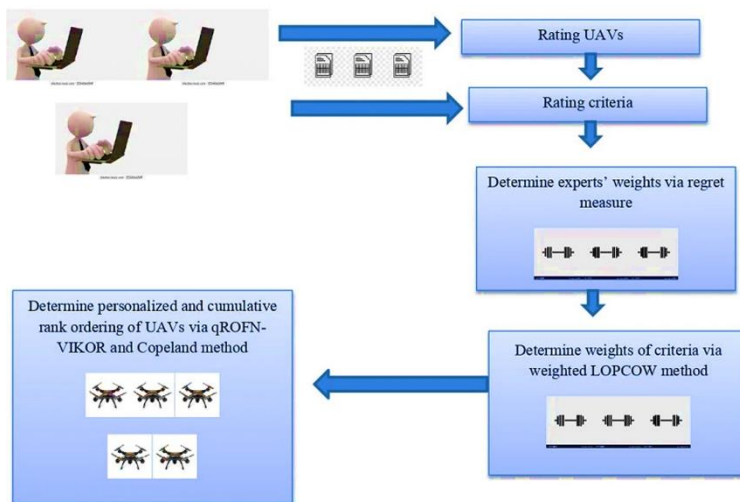

Figure | Proposed agricultural UAV selection model with the qRONs

08 THEME: ICT in agridfood sustainability

AnimalAccML: An open-source graphical user interface for automated behavior analytics of individual animals using triaxial accelerometers and machine learning

June 2023 | Computers and Electronics in Agriculture | Source |

The University of Georgia conducted a study to design and develop a user-friendly tool for customized machine learning model development and animal behavior analysis using accelerometer data. Automated collection of accelerometer data and machine learning modeling are common methods for recognizing animal behavior, but there is a lack of accessible tools for these tasks.

The researchers created a graphical user interface programmed in Python, which is publicly available for open access. The interface includes pages for managing projects, preprocessing data, developing models, and analyzing behavior. They used an open dataset of triaxial accelerometer data from six beef cattle to test the interface.

The results showed that users can easily customize machine learning models for behavior analysis through the interface. They can select and train from 15 different models to find the optimal one. Model performance can be improved by adjusting parameters such as window size, step size, and training-to-validation ratio. The tool also addresses data imbalance by merging minority classes into one. The developed model allows for analyzing overall behavior time budget, behavior duration statistics (mean, minimum, maximum, standard deviation), and frequency of behavior sequences.

This tool is significant for automated animal behavior analysis, which can contribute to improving animal welfare, housing environments, genetics selection, and flock management.
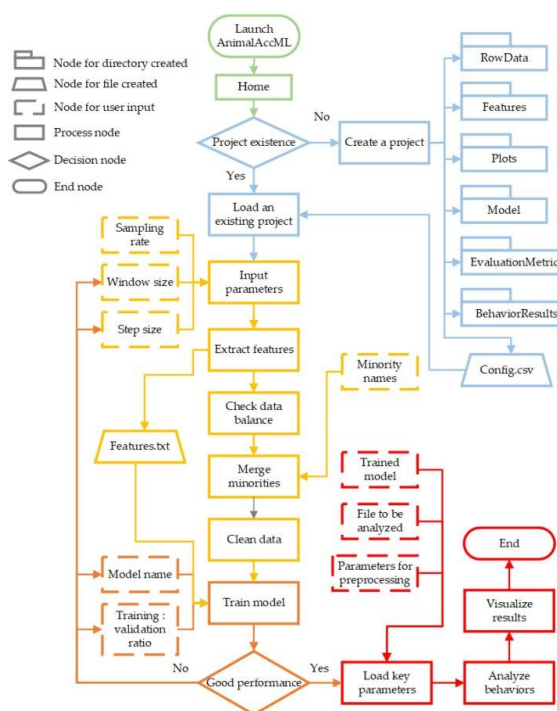
Figure | The overall workflow of the AnimalAccML for customized machine learning model development and behavior analysis based on accelerometer data. Green color indicates operations on Home page; blue color indicates operations on 'Manage Projects' page; gold color indicates operations on 'Preprocess Data' page; orange color indicates operations on 'Develop Models' page; and red color indicates operations on 'Analyze Behavior' page. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Application of Machine Learning Techniques to Discern Optimal Rearing Conditions for Improved Black Soldier Fly Farming

May 19, 2023 | Insects | Source |

This study, conducted by researchers from Kenya and the USA, aimed to address global food insecurity by exploring alternative sources of feed and food production. They focused on the black soldier fly (BSF) and its larvae, which have proven to be a sustainable and reliable source of animal feed. The researchers used machine learning techniques to identify the best conditions for farming these insects and increasing their production.

They studied various factors that influence the growth of black soldier fly larvae, such as rearing cycle time, feed formulation, bed length, larvae quantity, purity score, feed depth, and feeding rate. Using supervised machine learning algorithms, they trained models to predict the expected weight of the harvested larvae.

The results showed that the random forest regressor algorithm provided the most accurate predictions. The key factors affecting optimal production were identified as bed length, feed formulation, number of larvae per bed, feed depth, and cycle time. By adjusting these parameters accordingly, farmers can enhance BSF farming and produce more animal feed, leading to greater food production and ultimately reducing food insecurity worldwide. Moreover, the black soldier fly larvae have versatile applications, including biodiesel and bioplastic production, as well as biotechnological and medical potential, making them an even more valuable resource for the future.
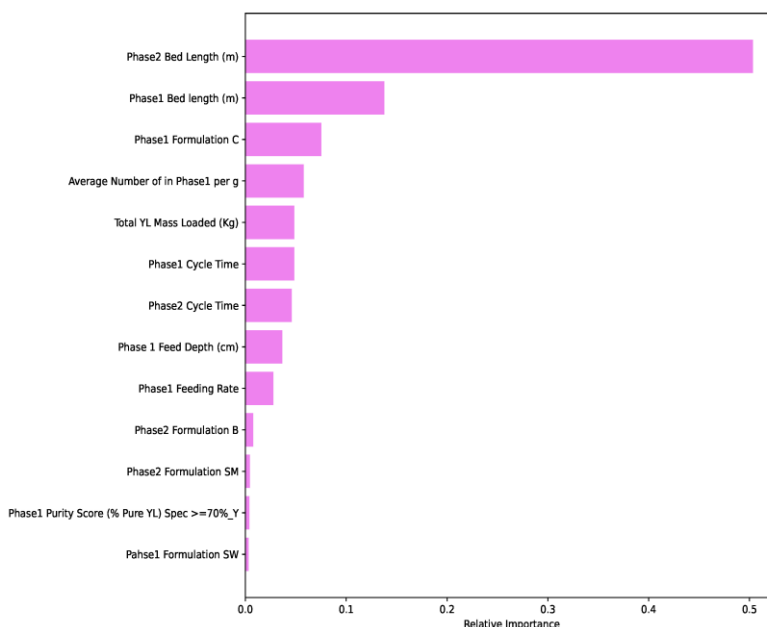

Figure | Important parameters that affect the rearing of BSFL

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10 THEME: Others

Divergent effectiveness of irrigation in enhancing food security in droughts under future climates with various emission scenarios

May 23, 2023 | NPJ Climate and Atmospheric Science | Source |

In this study conducted by the University of Chinese Academy of Sciences, Hong Kong Baptist University, and other international institutions, researchers aimed to understand the impact of irrigation on food security during droughts under future climate conditions with different emission scenarios. Food security is a crucial goal in the UN Sustainable Development Goals, and China, being the most populous developing country, faces significant challenges in this area.

Using the modified Palmer Drought Severity Index, the team assessed the severity of droughts and analyzed the resulting wheat yield losses in both irrigated and non-irrigated agriculture across China. They employed three methods, including Multiple Linear Regression, Deep Learning algorithms, and the Erosion-Productivity Impact Calculator model. The results indicated that droughts are projected to become more severe in the future, with expected wheat yield losses ranging from 32% to 49% under the high-emission RCP8.5 scenario.

Interestingly, the study revealed that irrigation could effectively reduce drought-induced crop-yield losses under the moderate-emission RCP2.6 and RCP6.0 scenarios. However, in the high-emission scenario, RCP8.5, the effectiveness of irrigation in enhancing food security was found to be limited. These findings underscore the importance of mitigating climate change to ensure future food security and prompt a reassessment of the role of irrigation in a warming climate.
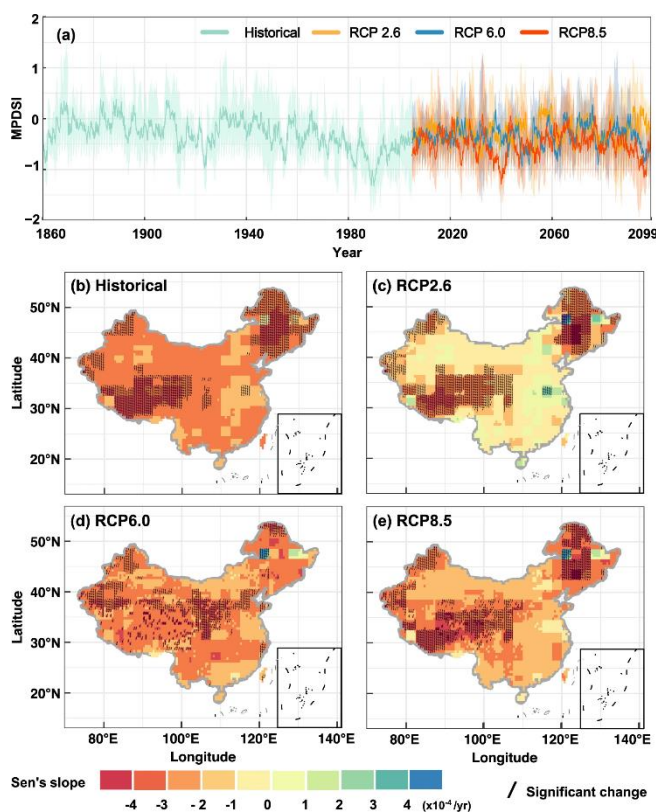
Figure | Historical and future changes in modified Palmer Drought Severity Index (MPDSI) in China from 1860 to 2099. An Annual-mean MPDSI based on the multiple ISIMIP datasets under historical (1860–2004) and future scenarios (2005–2099). The future scenarios include the Representative Concentration Pathways 2.6 (RCP2.6), RCP6.0, and RCP8.5. The bold curve is the multi-model mean, and the range shows the maximum and minimum values of the four GCMs. b–e Spatial distribution of the Sen's slope of MPDSI across China in modified Mann-Kendall (MMK). The diagonal line indicates that the trend is significant at the 99% level.

11 THEME: MRV (measurement, reporting, verification)

How good is the data for tracking countries' agricultural greenhouse gas emissions? Making use of multiple national greenhouse gas inventories

May 19, 2023 | Frontiers in Sustainable Food Systems | Source |

This study, led by the International Center for Tropical Agriculture (CIAT), focuses on tracking greenhouse gas (GHG) emissions from agriculture and land use to inform global climate policy. The researchers found inconsistencies in the reported emissions data from different sources, including UNFCCC country reports and independent databases. These discrepancies are particularly significant in developing countries, which collectively contribute the largest share of emissions.

The study emphasizes the need for better consistency in national agricultural GHG inventory data and transparency regarding the differences among scientific data sources. The researchers highlight limitations in the current inventories, such as poor reporting by low- and middle-income countries, uncertainties in reported data (especially for methane and nitrous oxide emissions), and a lack of robust activity data and emission factors.

To address these challenges, the study suggests using multiple sources of emissions estimates, including remote sensing, modeling, and machine learning. It also calls for improved inventory guidelines, an interactive platform for data submission, and increased engagement among stakeholders to enhance the transparency and accuracy of inventories.

The study concludes that reliable data is crucial for decision-makers and proposes using independent sources as a complement until UNFCCC data is more satisfactory. It also emphasizes the importance of developed nations providing sustained support and finance to help developing countries improve their inventory reporting capabilities.

Absolute difference between UNFCCC reported data and independent inventories (%)

Figure | Absolute difference, represented as a percentage, between UNFCCC inventories and (A) FAOSTAT (B) WRI-CAIT and (C) EDGAR inventories for agricultural emissions. Absolute differences of 200% occur when one of the inventories reported zero emissions. White countries = no NC/BUR or data.
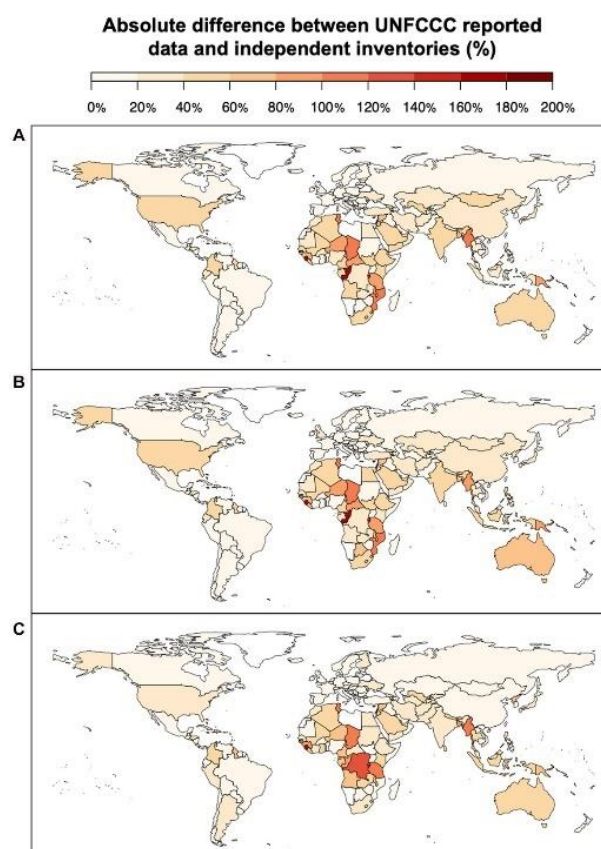
CH$_4$ and N$_2$O emissions from smallholder agricultural systems on tropical peatlands in Southeast Asia

April 26, 2023 | Global Change Biology | Source |

This study, conducted by researchers from the University of Nottingham in collaboration with Indonesia and Malaysia, aimed to understand greenhouse gas (GHG) emissions from smallholder agricultural systems on tropical peatlands in Southeast Asia. The researchers measured methane (CH$_4$) and nitrous oxide (N$_2$O) fluxes in different land-use types including cropland, oil palm plantations, tree plantations, and forests.

The study found that annual CH$_4$ emissions varied across the land-use classes, with cropland emitting the most and forests emitting the least. The depth of the water table was a significant factor influencing CH$_4$ emissions, with higher emissions observed when the water table was deeper. In contrast, N$_2$O emissions were strongly correlated with the concentration of dissolved nitrogen in soil water. Higher nitrogen concentrations led to increased N$_2$O emissions.

The findings of this study provide important data that can help develop more accurate emission factors for quantifying national GHG inventories. They also highlight the significance of soil nutrient status in influencing emissions, suggesting that reducing nitrogen fertilizer inputs can contribute to mitigating emissions from agricultural peat landscapes. Ultimately, the study emphasizes the need to protect peat swamp forests from conversion to agriculture as a crucial policy intervention for reducing emissions.
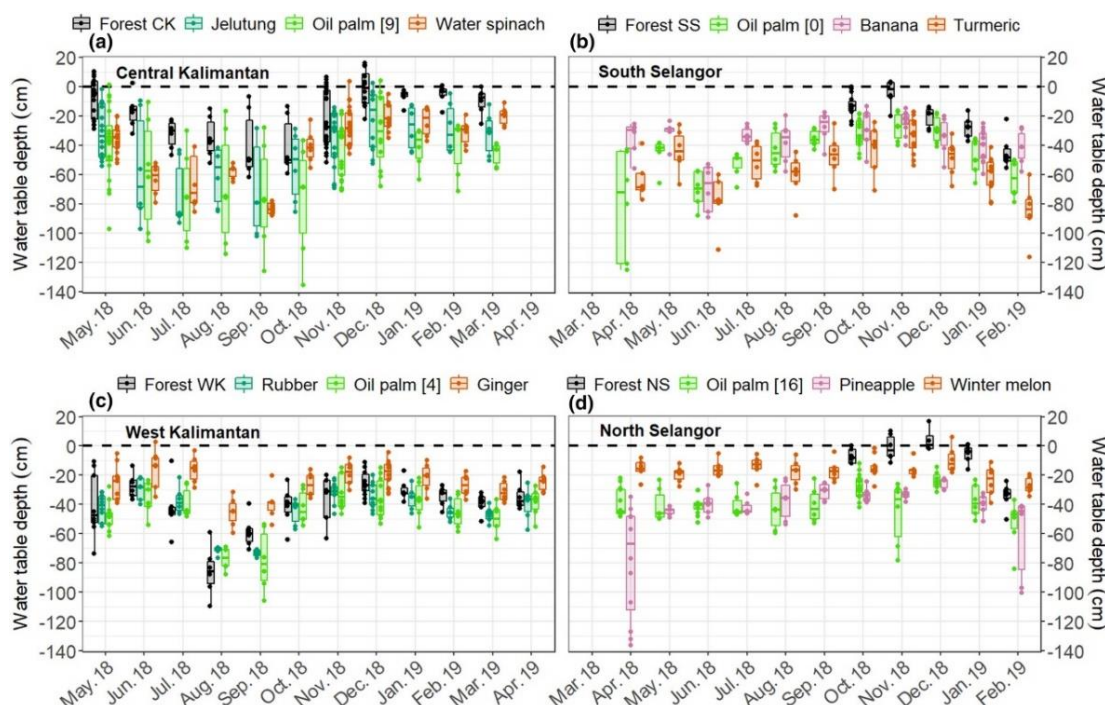
Figure | Seasonal variation of water table depth in the four land-use classes, grey—forest, blue—tree plantations, green—oil palm and orange and pink—cropland. The specific oil palm age, tree plantation species and crop types differed among regions so different plantation and crop types were measured in each location. Note that the forest condition differs substantially among the four regions. Each boxplot represents data from three replicates of each vegetation group.

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Mitigating trade-offs between global food access and net-zero emissions: the potential contribution of direct air carbon capture and storage

April 22, 2023 | Climate Change | Source |

Researchers from the Research Institute of Innovative Technology for the Earth in Japan conducted a study on a technology called direct air carbon capture and storage (DACCS) and its impact on global food access. The study aimed to find solutions for achieving net-zero greenhouse gas emissions while ensuring food security. DACCS is an innovative negative emission technology (NET) that captures carbon dioxide directly from the air and stores it. The researchers analyzed different scenarios and found that implementing DACCS could mitigate the negative effects on food access, particularly in Sub-Saharan Africa, by reducing the increase in food expenditure and minimizing GDP loss associated with emission reduction efforts. In this scenario, DACCS would become a mainstream NET, replacing bioenergy with carbon capture and storage. Additionally, DACCS would enable the use of gas and oil without carbon capture in regions and sectors where emission reduction is challenging, helping to mitigate GDP loss. Overall, the study suggests that DACCS is a valuable option for achieving both net-zero emissions and favorable food access.
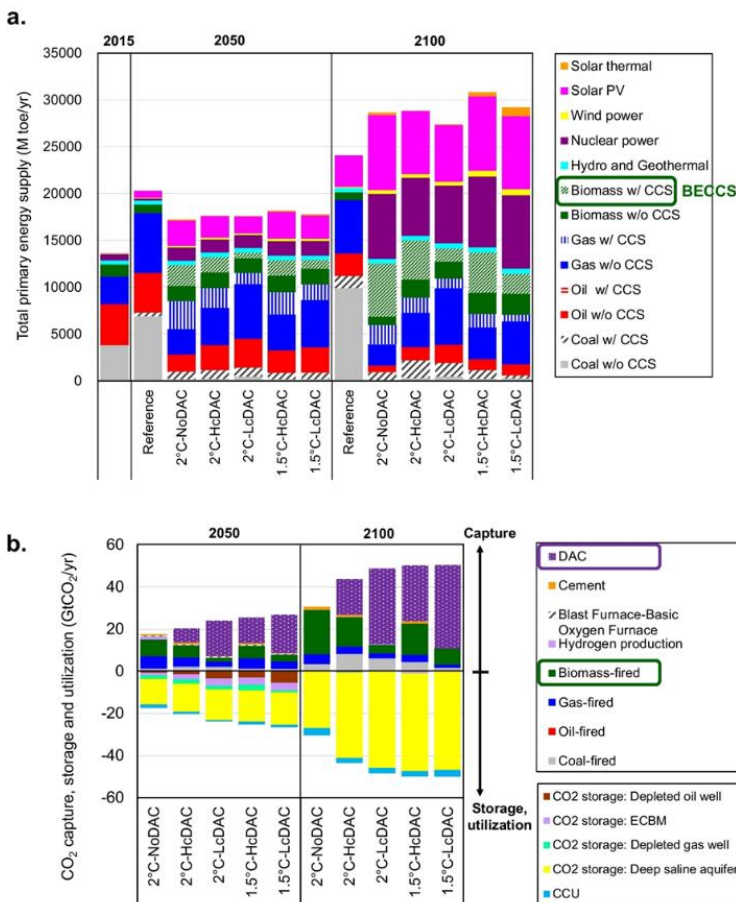

Figure | A Global total primary energy supply, and **b** global CO_2 capture, storage, and utilization. "CCU" in **b** refers to the use of the captured CO_2 for the production of synthetic methane, synthetic oil, etc. CO_2 removal by afforestation (around 5 Gt CO_2/ year in 2050 and almost zero in 2100 for all of the 2 °C and 1.5 °C scenarios) is not included in **b**

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14 THEME: Carbon sequestration

Mapping global forest regeneration-an untapped potential to mitigate climate change and biodiversity loss

May 5, 2023 | Environmental Research Letters | [Source](#) |

The World Wildlife Fund, US and others conducted a study on forest regeneration and its potential as a cost-effective solution to combat climate change. The study aimed to support global initiatives like the Bonn Challenge, which seeks to restore 350 million hectares of degraded forests and landscapes by 2030. By combining remote sensing data and expert surveys, the researchers identified approximately 55.7 million hectares of regenerated forests between 2000 and 2015 in areas that were not forested before 2000 and remained forested from 2015 to 2018. This regeneration potentially represents an astounding 22-25 billion young trees and a total biomass of around 3.2 billion tonnes. The study found that forest regeneration predominantly occurred in regions where agricultural land had lower opportunity costs. However, in more developed areas, regeneration took place in locations more suitable for cultivation. Successful forest regeneration was attributed to factors such as transitions in agricultural land use, the establishment of protected areas, effective management, and local support. The publicly available results of this study can facilitate discussions and aid in identifying strategic locations for promoting forest regeneration, thereby contributing to global climate change mitigation efforts and biodiversity restoration.
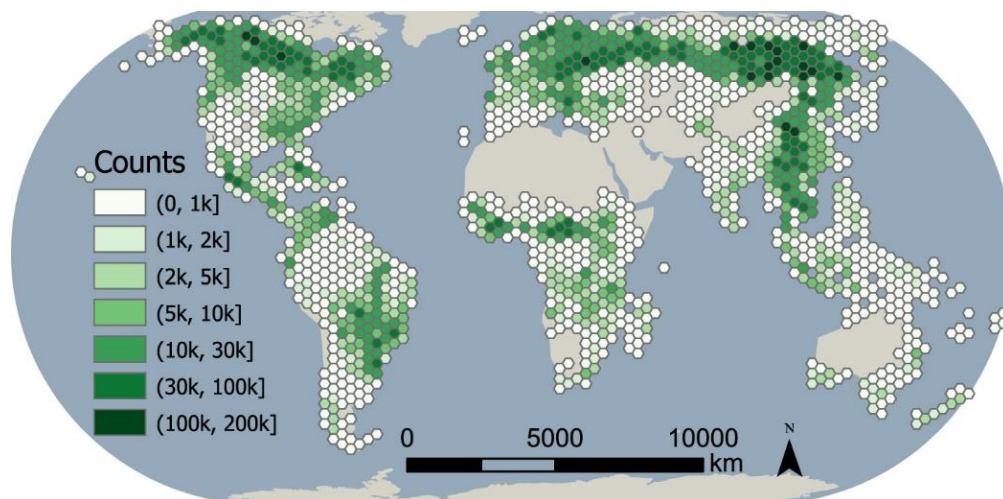

Figure | To make it visible at the global level, the forest regeneration map was aggregated by hexagons of 100 000 km2 each. Each hexagon indicated the number of pixels that indicated forest regeneration within. Projection of the map is Eckert IV, an equal area projection. Interactive version of the map that is not aggregated can be accessed at this website.

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15 THEME: MRV; Carbon sequestration

Estimating the global influence of cover crops on ecosystem service indicators in croplands with the LPJ-GUESS model

May 2023 | Earth Future | Source |

Researchers from the Karlsruhe Institute of Technology in Germany and Lund University in Sweden conducted a study to examine the benefits of using cover crops (CCs) in agriculture for soil health and climate change mitigation. The study utilized a dynamic global vegetation model called LPJ-GUESS to assess the impact of herbaceous CCs, with and without biological nitrogen fixation, on soil carbon stocks, nitrogen leaching, and crop yields. The model's performance was evaluated against field trial observations and compared with existing large-scale estimates. The results showed that incorporating N-fixing CCs with no-tillage techniques could potentially increase global soil carbon levels by 7% (equivalent to 0.32 Pg C yr^{-1} in croplands) and reduce N leaching by 41% (equivalent to 7.3 Tg N yr^{-1}) compared to fallow land after 36 years of simulation since 2015. This practice was also associated with a 2% increase in total crop production (37 million tonnes yr^{-1}) in the last decade of the simulation, benefiting major crops like wheat, maize, rice, and soybean. The study demonstrated that implementing CCs can promote long-term environmental sustainability without compromising crop productivity in global croplands, though the effects may vary depending on crop types and nitrogen fertilizer usage.
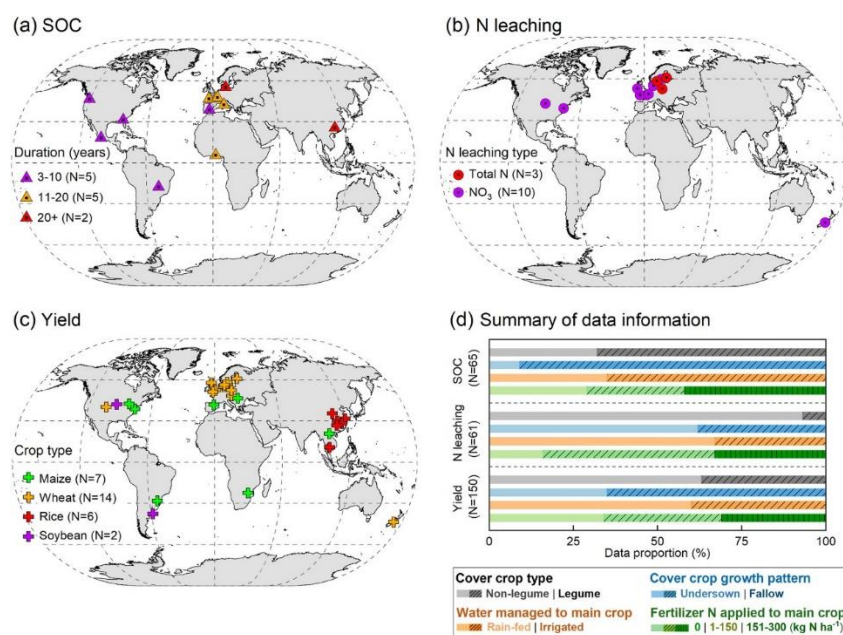
Figure | Distribution of cover cropping field studies used for model evaluation of cropland soil organic carbon (SOC) stocks (a), N leaching loss (b), and crop yields (c). All studied SOC sites (12) had continuously practiced cover crop (CC) cultivation for more than 3 years, and the leached N loss at the evaluated sites (13) were reported as either total N (mineral plus organic) or nitrate (NO3). The influence of CC practice on crop production was investigated in four cropping systems (maize, wheat, rice, and soybean) at 29 sites from 16 countries. A summary of field experiments—cover crop types (legumes or non-legumes), growth patterns (undersown or fallow), and water and N fertilizer managements to main crops—is shown in (d).

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16 THEME: GHG emission reduction

Mitigation Actions Scenarios applied to the dairy farm management systems

Apr 29, 2023 | Foods | [Source] |

The Università Cattolica del Sacro Cuore in Italy conducted a study to address the urgent need for farm-level actions in the dairy industry to mitigate its environmental impacts, particularly related to global warming. The study aimed to investigate five possible mitigation actions and determine which one farmers would be willing to adopt. These actions included management and distribution of livestock manure and fertilizers, anaerobic manure treatment, optimization of the herd composition, feed quality, and heat recovery.

To analyze the environmental impacts, a life cycle assessment was performed on 63 dairy farms using the product environmental footprint approach. From these farms, four representative ones were selected based on quartiles. For each farm, three scenarios were examined: the reference impact (reference scenario), the application of the mitigation actions (best-case scenario), and the realistic scenario considering the actions farmers would actually implement.

The study found that the most effective mitigation actions in the best-case scenario were anaerobic manure treatment and management and distribution of livestock manure and fertilizers. These actions showed the potential to reduce total environmental impacts by 7–9% and 6–7% respectively. Farmers expressed a greater willingness to implement the latter strategy. Optimization of the herd composition, feed quality, and heat recovery resulted in a range of impact reduction between 0.01% and 5% ([Read more]).

Graphical Abstract

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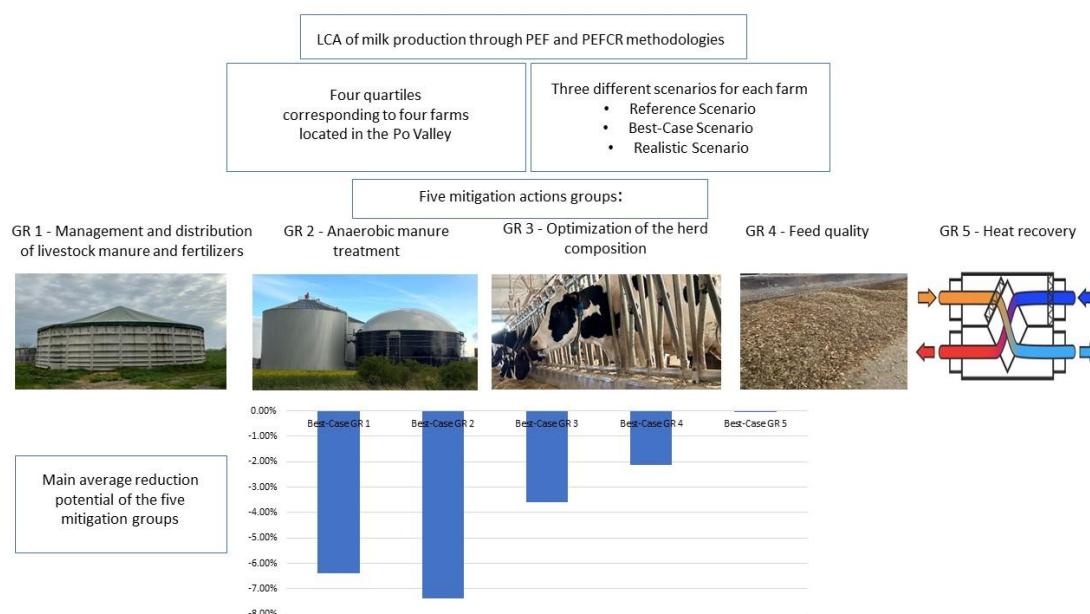
17 THEME: Carbon sequestration; Policy Incentives, financing, and pricing

Lost in action: Climate friendly use of European peatlands needs coherence and incentive-based policies

July 2023 | Environmental Science & Policy | Source |

The Leibniz Centre for Agricultural Landscape Research (ZALF) and Leibniz University of Hannover in Germany conducted a study focusing on the importance of peatlands in global efforts to combat climate change. Peatlands have been a missing piece in the European Union's (EU) climate change mitigation policies. The researchers investigated how policies at different governance levels, including the EU, member states, and regions, both support and impede existing and new climate-friendly peatland usage policies.

The study placed a particular emphasis on incentive-based policy instruments, which are often seen as promising for transitioning towards sustainable peatland management. The three peatland-rich EU countries Finland, Germany, and the Netherlands were selected for the analysis. Through semi-structured interviews with 35 experts, the study revealed a lack of horizontal policy coherence among various sectors including agriculture, nature conservation, water management, forestry, energy, and climate policies, regarding climate change mitigation measures for peatlands.

At the EU level, the Common Agricultural Policy was found to counteract climate targets by encouraging unsustainable peatland management through direct payments. National and subnational policies in Finland, Germany, and the Netherlands focused primarily on water quality, nature conservation, and subsidence respectively, rather than climate change mitigation.

The study identified a lack of clear guidance on raising the groundwater table, which rendered the current incentive-based policy instruments ineffective in reducing emissions. Despite the higher mitigation potential of rewetting peatlands, potential incentive-based policies faced regulatory barriers due to policy incoherence.

In conclusion, the transition to climate-friendly peatland usage necessitates coherent regulatory frameworks and incentive-based policies that support the rewetting of peatlands.

EU	AGRICULTURE CAP	ENERGY RED	WATER WFD, RBMPs	FOREST	NATURE Natura 2000	CLIMATE Climate Law and LULUCF	CROSS-CUTTING
🇫🇮 (Finland)	• Direct payment supports drainage • Paludiculture not qualify for payment • Less Favoured Area not recognize peatlands • Permanent grassland	• Burning peat is allowed for energy	• Manure spreading restriction caused leakage • Permission for new ditch drainage	• National forest strategy 2025 • Prohibition of new ditching for forestry on pristine mire areas	• Peatland restoration by national funding	• Carbon neutral by 2035 • LULUCF	• n.a.
🇩🇪 (Germany)	• Direct payment supports drainage • Paludiculture does not qualify for payment • Permanent grassland • Exception for some paludiculture crops	• Production of biogas on drained peatlands • Energy subsidy not recognize paludi biomass on rewetted peatlands	• Drainage infrastructure laws • Bavaria prohibited deepen the drainage on organic soils	• Forest law prevents to remove trees on peatlands as they are forest	• Peatland restoration by national funding • Preservation of habitats of §30 federal Act • Ecological passage prevents ditch blocking • Protected species	• Climate neutrality by 2050 • reduce GHGs by 55 % by 2030 • LULUCF	• National Peatland Protection Strategy: reduce annual GHGs at least 5 Mt by 2030
🇳🇱 (Netherlands)	• Direct payment supports drainage • Paludiculture not qualify for payment • Cattail is nationally recognized	• n.a.	• Water boards keep lowering the ditch level • Some water board reduces the lowering speed	• n.a.	• Peatland restoration by national funding • Preservation of habitats according to the Nature Conservation Act • Protected species	• 49% reduction in CO2 by 2030 • 1 Mt reduction by 2030 on peatlands • LULUCF	• Subsidence programs
ALL	• Government-owned peatlands are rented to the farmer with no requirement on emissions						

Figure | Relevant policies for climate change mitigation in peatlands (green: supporting; red: conflicting).

Landscape dependency of land-based salmon farming under climate change

April 5, 2023 | Climate Risk Management | Source |

A study conducted by Universidad Católica de la Santísima Concepción and other institutes in Chile focuses on the impact of climate change on salmon farming in south-central Chile. The success of salmon cultivation heavily relies on access to high-quality water, which is supplied by watersheds dominated by native forests and characterized by high precipitation levels. However, human activities and climate change pose risks to these attributes.

The researchers analyzed 123 watersheds that provide water to land-based salmon farms in the region. They assessed the risk of climate change based on exposure (fingerling and smolt production), sensitivity (land cover maps), and hazard indicators (climate change indicators). The results reveal a concerning reality: under a high emissions scenario, over 50% of current fingerling and smolt production would be located in high or very high-risk areas.

The projections are influenced by a drier and warmer climate, as well as the ongoing deforestation and fragmentation of native forests. This combination reduces water availability and quality, negatively impacting aquaculture production. The study suggests that landscape configuration could be a potential mitigation strategy to address the consequences of climate change on salmon farming. Particularly in south-central Chile, where existing watershed management and conservation strategies are insufficient to ensure resilience to projected hydroclimatic changes.
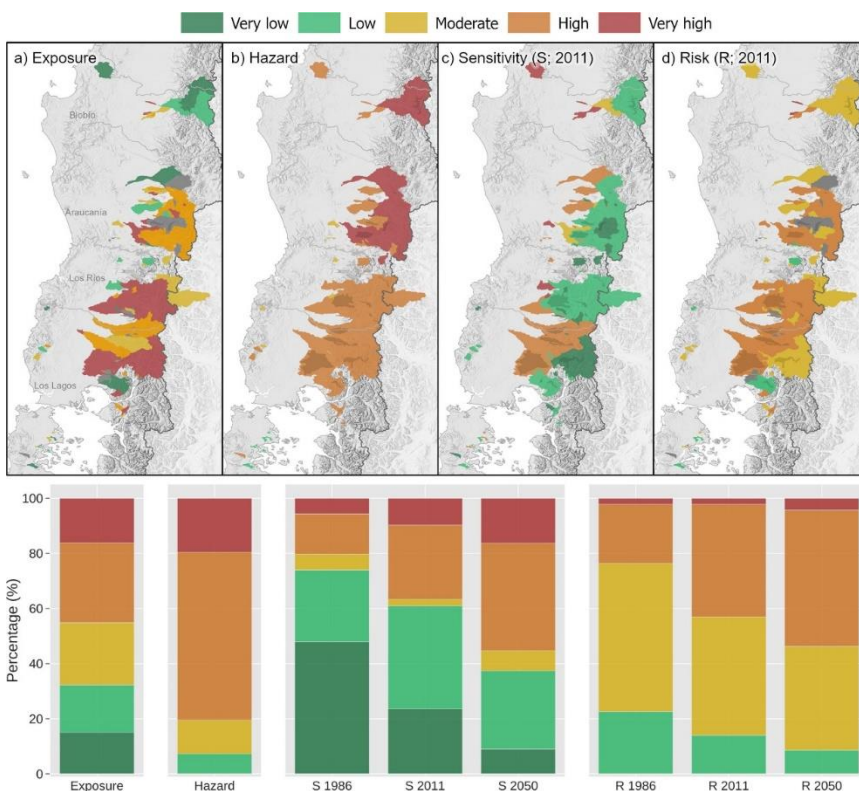

Figure | Exposure (a), hazard (b), sensitivity (c; 2011) and risk (d; 2011) for the land-based farms of south-central Chile. The grey area represents the watersheds without productive data in 2020–2021. The bars indicate the relative percentage of each class for different time periods.

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19 THEME: GHG emission reduction

Resilient or environmentally friendly? Both are possible when seafood businesses prepare for long-term risks

July 2023 | Journal of Cleaner Production | Source |

The University of Leeds and other institutions in the UK conducted a study to explore the relationship between circular economy principles, risk mitigation, and resilience in seafood businesses. Sustainable seafood production is crucial for future generations, and it requires businesses to be resilient in the face of future challenges. The study aimed to investigate how aligning with circular economy principles, such as reducing waste and regenerating natural environments, can enhance general resilience.

Through surveys and workshops with seafood companies in the United Kingdom, the researchers found that many businesses were actively implementing circular economy actions, such as recycling materials and minimizing single-use plastics. However, when it came to identifying specific risks, companies tended to focus on short-term mitigation measures rather than longer-term strategies aligned with circular economy principles.

While businesses expressed confidence in their ability to adapt and survive future risks, the study revealed that a short-term focus on risk mitigation might hinder their capacity to plan for longer-term risks. This inability to anticipate and prepare for long-term risks could impede businesses' ability to enhance their resilience to unforeseen disruptions, trapping them in a reactive cycle rather than building proactive capacities for risk mitigation.

Graphical abstract
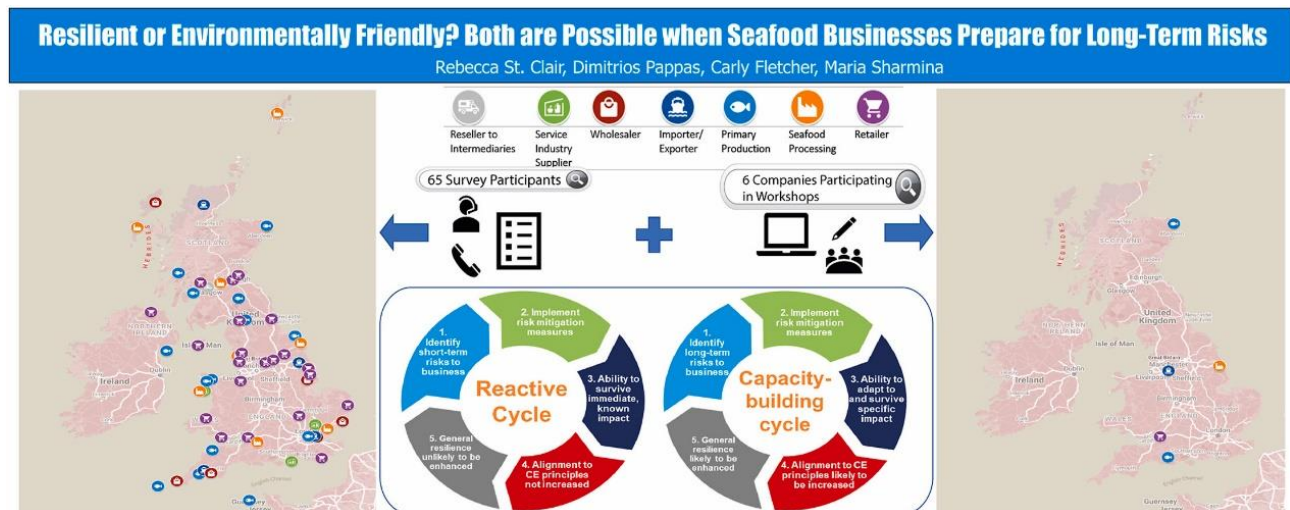
20 THEME: Carbon sequestration

The effectiveness of global protected areas for climate change mitigation

June 01, 2023 | Nature Communications | Source |

A recent study led by the University of Maryland has highlighted the crucial role that forests play in stabilizing the Earth's climate. The researchers focused on protected areas (PAs) as a strategy for forest conservation and quantified their global impact on the carbon cycle. By utilizing lidar data from NASA's GEDI mission, they estimated that PAs contain a total aboveground carbon stock of 61.43 gigatons (Gt), which accounts for about 26% of all mapped terrestrial woody carbon. Additionally, the study revealed that PAs contribute an additional 9.65 Gt of carbon, primarily through the prevention of deforestation and degradation compared to unprotected forests. This figure is equivalent to the carbon emissions produced by global fossil fuel usage in one year. The findings emphasize the importance of preserving high biomass forests within protected areas as a means of avoiding carbon emissions and safeguarding future carbon sequestration.
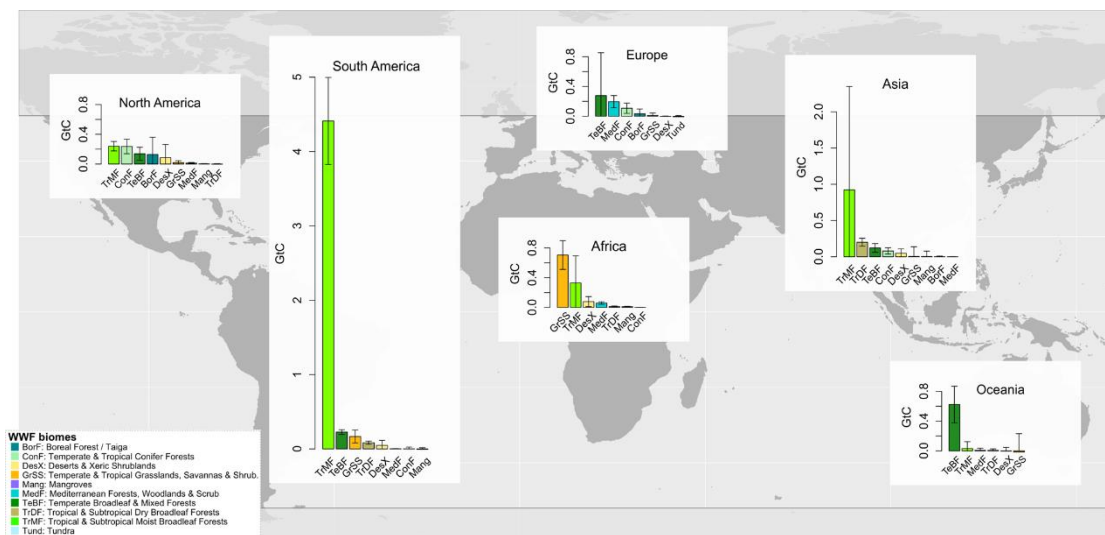

Figure | PAs effectively preserve additional AGC across continents and biomes, with forest biomes dominating the global signal, particularly in South America. The additional preserved AGC (Gt) in WWF biome classes (total Gt + /− SEM*area). World base map made with Natural Earth. The full set of analyzed GEDI data are represented in this figure (n = 412,100,767).

NEWS

01 THEME: ICT for agrifood sustainability

Increased automation should drive agri response to climate change

June 5, 2023 | AgriLand |

A recent report by McKinsey & Company consulting group highlights that increased automation in agriculture will play a crucial role in combating climate change. The report suggests that embracing new technology options can benefit the farming sector in the United States.
Although less than 5% of farmers currently use automation technology, the study indicates that pressures on farm economics and the push towards sustainable farming practices will drive the adoption of automation. By leveraging automation, farmers can mitigate the impact of climate change, particularly in the face of rising regulatory pressures.

The research shows that automation can improve the efficiency of resource usage, such as precision spraying and fertiliser application robots, reducing input costs and benefiting farmer economics. It also indicates that automation can address labor challenges, as it can lower the operating skills required by workers and enhance productivity. For instance, fully autonomous equipment can handle hazardous activities like spraying, allowing a single operator to manage multiple machines.

With growing interest from farmers in investing in innovative technologies and sustainability commitments from companies in the agriculture and food value chain, automation is becoming an increasingly attractive solution for the future of farming.

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02 THEME: ICT for agrifood sustainability; Policy incentives, financing, pricing

The Farm Is Not An Algorithm

June 9, 2023 | Legal Planet |

The article discusses the concept of precision agriculture and its potential socio-environmental risks and inequalities. Precision agriculture involves using digital technologies like sensors, artificial intelligence, and data analytics to optimize farming practices. The idea is to apply the right amount of resources, such as water, fertilizers, and pesticides, to each plant or animal, thereby reducing waste and increasing efficiency.

While some see precision agriculture as a solution to climate change and food security, the article presents a more nuanced perspective. The author, Oane Visser, an Associate Professor in Agrarian Studies, argues that precision agriculture is not as seamless as it's often portrayed. It relies on human action, and its effectiveness can be limited by changing environmental conditions and small datasets. Furthermore, the adoption of precision agriculture can create power dynamics that exploit farmers, as they may be held liable for issues arising from the technology.

Visser also points out a "precision divide" where certain crops and farming styles are favored over others by the algorithms, potentially reinforcing monocropping and leaving sustainable farming practices behind. Nevertheless, he sees opportunities for more equitable approaches to precision agriculture through farmer-led movements developing open-source technologies and innovative

solutions. Ultimately, the article calls for careful consideration and transparency in implementing digital technologies in agriculture to avoid costly and harmful outcomes.

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03 THEME: ICT for agrifood sustainability; Policy incentives, financing, pricing

What is "digital" about fish? A Policy Guide for the Commonwealth

May 23, 2023 | The Commonwealth |

The artisanal fisheries sector is a crucial source of food and income for millions of people in the Commonwealth countries. However, it faces various challenges like climate change, overfishing, and dangerous working conditions. To address these issues and attract the youth to the profession, digitalization is being explored as a potential solution.

The release of "The State of Digital Fisheries in the Commonwealth – A Baseline Report 2023" shows that digitalization in the fisheries sector is already underway across the Commonwealth. The report emphasizes the need for a policy approach to digitalization, focusing on three pillars: digital innovations, data infrastructure, and business development, as well as an enabling environment.

Different regions within the Commonwealth have varying degrees of progress in digital fisheries. Africa uses Automatic Identification Systems (AIS) and vessel monitoring systems, while Asia relies on donor-driven innovations. The Caribbean and Americas mainly use basic digital solutions, and the Pacific region has disjointed progress with several initiatives.

Overall, digitalization has the potential to transform artisanal fisheries, but it requires a supportive policy-enabling environment and investment to ensure increased food security and socio-economic well-being for coastal communities.

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04 THEME: ICT FOR AGRIFOOD SUSTAINABILITY

New digital tool enables farmers' decisions for sustainable agriculture

June 5, 2023 | Phys.org |

An international team of researchers from Germany, France, and the Czech Republic has developed a "digital decision support tool" called the Digital Agricultural Knowledge and Information System (DAKIS). DAKIS is designed to facilitate the transition towards more diversified and sustainable agricultural systems. It integrates data from various sources and provides a framework for linking scientific knowledge with strategic decision-making and farm management.

The agriculture sector has shifted its focus from solely delivering agricultural products and services to considering environmental aspects like ecosystem services, biodiversity, land use, and climate change. DAKIS aims to support this "paradigm shift in priorities" by promoting multifunctional and sustainable farming practices. The tool utilizes digital technologies to analyze large data sets, extract critical insights, involve citizen science, and provide actionable crop management options.

DAKIS is currently being tested in agriculturally diverse regions in Germany. It has the potential to transform agriculture and promote more resilient and sustainable food systems by enabling farmers to make informed decisions that consider ecosystem services and sustainability. However, successful adoption will require support from farm-level actors, industries, and policymakers. The

flexible design of DAKIS allows for future innovations and data connections to keep pace with rapidly developing digital technologies in agriculture.

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05 THEME: ICT for agrifood sustainability; MRV (Measurement, Reporting, Verification)

New program to develop Aussie agriculture from space

May 23, 2023 | IT Brief Australia |

Australia's SmartSat Cooperative Research Centre (CRC) has launched the Maya Nula research program to develop Australian satellite Earth Observation (EO) capability to advance the country's agriculture industry. Maya Nula aims to create an agricultural intelligence capability from space to help farmers reduce risk and boost productivity through environmentally friendly processes. SmartSat will develop projects to deliver a measurement, reporting, and verification (MRV) tool for communicating sustainable farming practices on soil health, crop conditions, biosecurity, and the environment. The program will use space assets combined with on-ground sensor technology to monitor crops and develop sophisticated prediction models for commercial outcomes and environmental protection. The SmartSat CRC, with over 100 national and international partners, is focused on contributing to the Australian government's goal of tripling the size of the space sector to $12 billion and creating up to 20,000 jobs by 2030, with priority sectors including agriculture.

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06 THEME: ICT for agrifood sustainability

Digital supply chain traceability for ASC-certified shrimp

May 24, 2023 | The Fish Site |

The Aquaculture Stewardship Council (ASC) has launched the Key Data Elements (KDE) project to enable digital traceability of ASC-certified shrimp products. The software captures key data from ASC-certified farms and feed sources and transfers it digitally along the supply chain, providing transparency and traceability. The captured data includes scientific name, stock size, origin of broodstock, production method, location of farm, transportation documents, certification status of feed ingredients, and more. The project's initial focus is on shrimp in Vietnam, with many companies labeling their shrimp products with the ASC label already signed up. UK retailer Sainsbury's and supplier Lyons Seafoods Ltd are participating in the project's initial phase, offering valuable feedback for continuous improvement. The digital traceability tool aims to build trust in seafood, support responsible sourcing policies, and ensure integrity for shrimp products across the supply chain.

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07 THEME: ICT FOR AGRIFOOD SUSTAINABILITY; POLICY INCENTIVES, FINANCING, PRICING

Government signs agreement with six states to start digital crop survey

May 25, 2023 | BQ Prime |

The Indian government has signed an agreement with six states - Assam, Gujarat, Madhya Pradesh, Odisha, Rajasthan, and Uttar Pradesh - to initiate a digital crop survey as part of the Agristack or India Digital Ecosystem for Agriculture (IDEA) project. The workshop organized by the Union agriculture ministry discussed the implementation plan for the digital crop survey, aiming to create a comprehensive and verified source of information about farmers and their crop-sown data. The digital survey will utilize advanced technologies like visual and advanced analytics, GIS-GPS,

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artificial intelligence, and machine learning to provide a transparent, efficient, and timely system for assessing crop cultivation across the country during different agriculture seasons. The initiative, known as Krishi-Decision Support System (Krishi-DSS), is expected to address various challenges faced by the agricultural sector and enhance decision-making processes to support farmers and stakeholders effectively.

08 THEME: ICT for agrifood sustainability

Trends driving automation on the farm

May 31, 2023 | USDA Press |

The agriculture industry is facing economic pressures and sustainability challenges, leading to the adoption of next-generation automation technologies. Input costs for farmers, such as fertilizers and crop protection chemicals, have risen significantly, while climate change-induced weather variability and pests are reducing yields. To remain economically viable, farmers are seeking innovative solutions, and automation shows promise in reducing farming's impact on climate change and adapting to financial challenges.

Automation in agriculture ranges from semi-automated technology, like assisted steering, to fully automated systems, such as weeding robots. These technologies use sensors, analytics, robotics, and equipment to help farmers make smarter decisions, reduce chemical usage, and improve labor productivity. Automation can address two major issues for farmers: rising input costs and labor challenges. By enabling more efficient use of pesticides and fertilizers, automation can reduce input costs. It can also improve working conditions and lower labor costs by automating hazardous and physically taxing activities.

Furthermore, the push toward sustainability is expected to accelerate adoption of automation technologies. Governments are setting ambitious targets for environmentally sustainable practices, and consumer demand for sustainable food is increasing. Automation can help farmers comply with regulations by reducing pesticide and fertilizer usage and providing traceability. As more growers realize the benefits of automation—increased productivity, improved safety, and progress toward sustainability goals—the excitement about these technologies is expected to grow.

09 THEME: ICT for agrifood sustainability; Carbon sequestration

Hawk networks and RuralUrban Labs announce a joint partnership to establish a 5G Zone and "HardTech" autonomous agriculture testbed + broadband to rural Indiana

June 8, 2023 | Businesswire |

Hawk Networks and RuralUrban Labs have formed a partnership to establish a 5G Zone and "HardTech" Autonomous Agriculture Testbed in Camden, Indiana. The initiative aims to bring high-speed broadband internet to the area and power the development of next-generation automated farm equipment and machinery. Hawk Networks will use its Althea platform and KeyLTE™ technology to provide farm-wide connectivity at a fraction of the cost of legacy cellular networks. This will enable the deployment of innovative AgTech, autonomous, and artificial intelligence

solutions on Camden's 500 Acre 5G Farm, including the RuralUrban Labs' "5G Farm - Carbon Sequestration Testbed."

The collaboration not only focuses on technological advancements but also aims to enhance the educational opportunities of local high school students through 21st-century internship programs and other socially focused engagements. By combining resources and expertise, Hawk Networks and RuralUrban Labs seek to revolutionize agriculture practices and drive economic growth in the region.

10 THEME: ICT for agrifood sustainability

FarmERP to boost cassava plantation with tech-enabled platform

June 9, 2023 | Global Ag Tech |

FarmERP, a smart farm management software provider, is focusing on assisting Cassava farmers by using its tech-enabled platform to extend crop life and increase plant mortality in Cassava plantations by up to 40%. The platform aims to unlock the true potential of Cassava cultivation, improving productivity, profitability, and predictability for farmers. FarmERP has successfully deployed this platform in Nigeria and plans to expand it to other countries such as Thailand, Indonesia, Angola, and Ghana.

Cassava is a vital crop globally, with applications in food, feed, and industrial sectors, contributing to food security, livelihoods, and economic growth. However, Cassava plantations face challenges related to pest and disease management, weather extremes, and the need for adequate moisture for growth. To address these challenges, FarmERP's FarmGyan, incorporating AI, ML, computer vision, and deep learning, helps users make informed decisions about crop management, re-plantation, and weed control strategies. The platform also promotes the use of sensors, drones, and other IoT devices in precision farming, enabling efficient crop management and higher yields.

11 THEME: Policy incentives, financing, pricing

Defra increases funding to £31m for farming equipment grants

June 8, 2023 | Farmers Weekly (UK) |

The UK government's Department for Environment, Food & Rural Affairs (Defra) has increased funding from £17 million to £31 million for the latest round of productivity and slurry grants under the Farming Equipment and Technology Fund (FETF). The increase in funding was prompted by high demand from farm businesses, with more than 3,000 applicants expected to receive grants. The scheme offers grants for over 90 pieces of equipment, including direct drills and rainwater harvesting tanks, aimed at helping farmers improve the environment by reducing waste, inputs, and emissions. The grants aim to empower farms to invest in new equipment, fostering innovation and sustainability in the agricultural sector. Additionally, the Animal Health and Welfare grant is part of the FETF, providing funding for farming equipment such as creep feeders, cow mattresses, and livestock handling systems.

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12 THEME: GHG emission reduction; Carbon sequestration

Cattle country: sustainable agriculture – exploring net zero, indigenous agriculture, biodiversity

May 24, 2023 | University of Manitoba News |

The 9th Annual Sustainability of Canadian Agriculture Virtual Conference took place recently, discussing various topics related to sustainable agriculture. The conference explored the possibility of achieving net zero emissions in farming, the role of Indigenous agriculture, and the connection between biodiversity and agricultural production. Speakers at the event highlighted the challenges and potential solutions for reaching net zero emissions, such as restoring land to natural systems, enhancing biodiversity, and reducing food waste. Indigenous farming practices were recognized for their contribution to sustainable agriculture, including no-till farming, pest management, and fire-based ecosystem reconfiguration. The conference also emphasized the importance of addressing biodiversity in agriculture and its impact on ecosystem health. The event featured student research presentations, a workshop on greenhouse gas emissions modeling, and discussions on agricultural sustainability. The organizers expressed gratitude to participants and highlighted the success of the conference.

13 THEME: Policy incentives, financing, pricing; Carbon Sequestration; MRV; GHG emission reduction

U of I kicks off $55M grant for climate-smart agriculture

May 23, 2023 | Boise State Public Radio News |

The University of Idaho has received its largest grant ever, amounting to $55 million from the U.S. Department of Agriculture, to promote "climate-smart agriculture" in Idaho. Over the five-year pilot period, more than half of the funds will be given directly to farmers as incentives for implementing techniques that improve soil health and store carbon. The remaining funds will be allocated to data collection and reporting. The grant is part of the USDA's $3.1 billion "Climate-Smart Commodities" initiative, which aims to address greenhouse gas emissions in the agriculture sector. The University of Idaho project will provide financial incentives and technical assistance to 144 farms across the state, supporting the adoption of practices like special crop rotations, cover crops, rotational grazing, and no-till planting. The initiative seeks to help farmers overcome barriers and see the environmental and financial benefits of these practices. The project will also focus on measuring emissions and collecting data to better understand the impact of climate-smart agriculture on greenhouse gas reduction.

14 THEME: Policy incentives, financing, pricing; Carbon Sequestration; GHG emission reduction; ICT in agrifood sustainability

Defra and UKRI set aside £30m for agritech projects to achieve net zero and boost food production

May 31, 2023 | Tech Monitor |

The UK government has pledged up to £30 million in funding for agritech projects aimed at boosting food production and moving towards net-zero emissions. The projects will explore the use of emerging technologies such as artificial intelligence (AI), drones, and automation to increase yields and make the agricultural sector more resilient. Over 50 projects have been awarded funding through the joint initiative between the Department for Food and Rural Affairs

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(Defra) and UK Research and Innovation (UKRI). The funding includes competitions focused on climate-focused solutions, farming technology, and early-stage research and development concepts. An additional £12.5 million is available through the On-Farm Environmental Resilience competition to support the development of new technologies and farming methods to detect pests, manage diseases, reduce fertilizer use, and address threats from extreme weather. The initiatives aim to drive innovation and create a sustainable agriculture sector for the future.

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15 THEME: Others

How climate-smart techniques are giving Thailand's farms a boost

June 6, 2023 | Devex |

Thailand is adopting climate-smart techniques in its agricultural sector to ensure a more sustainable food supply chain amid global food insecurity caused by climate change, conflict, and the COVID-19 pandemic. The country is using methods such as laser land leveling, canal-style irrigation systems, and the implementation of agroecological approaches to improve yields and resilience. Laser land leveling prevents rainwater from destroying crops, while canal irrigation systems and changes in land use patterns help manage water more effectively. Agroecology practices, such as using earthworm casts as organic fertilizer and promoting stress-tolerant rice varieties, are also being adopted. These techniques aim to increase income for farmers, improve soil fertility, and mitigate climate change impacts. Thailand's efforts highlight the potential of climate-smart methods to address the climate, food, and nutrition crises, provided there is continued support from the government.

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16 THEME: Policy incentives, financing, pricing

NOMAD: an EU project for sustainable agriculture development

June 13, 2023 | Earth.org |

NOMAD, an EU-funded research project, aims to promote sustainable agriculture and address the environmental impact of synthetic fertilizers by developing biofertilizers and implementing a circular economy approach. Synthetic fertilizers, although crucial for supporting the growing global population, have negative effects on the environment. They also require heavy natural gas usage, which can lead to price spikes and economic repercussions. To combat these issues, the European Union introduced the Fertilising Products Regulation, which aims to simplify access to innovative organic fertilizers derived from recycled waste and by-products. These standards encourage balanced fertilization, sustainable nutrient management, and reduced reliance on natural gas. Additionally, the European Commission proposed guidelines to support resilient and sustainable agriculture and increase organic waste and nutrient recycling. The NOMAD project, involving experts and partners from eight countries, has developed a scalable technology to convert organic waste into high-performance biofertilizers. Pilot sites in Greece, Italy, Malta, and the UK have been chosen to test the technology's effectiveness. The project's goal is to establish a local circular economy based on agriculture and food production and facilitate sustainable agriculture development.

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17 THEME: Policy incentives, financing, pricing; GHG emission reduction; MRV

Green premiums make for more fruitful farming

May 23, 2023 | Farmers Weekly (NZ) |

Mike Casey, an orchard farmer in New Zealand, has achieved the world's first fossil fuel-free orchard by electrifying his entire farm and using renewable energy. However, he discovered that farmers are not properly rewarded for their environmental efforts in the current food system. To address this issue, Casey developed his own certification called NZ Zero, which incentivizes emissions reductions rather than offsetting. The certification has enabled him to recoup his costs and brings in a significant premium for his fruit. Casey believes that the consumer's recognition and reward for sustainable farming practices are the main catalysts for change. He aims to empower farmers and growers to consider different options and showcase the positive financial implications of electrifying a farm.

18 THEME: Policy incentives, financing, pricing; GHG emission reduction; MRV

Carbon offsetting: the good, the bad and the ugly

May 25, 2023 | AgFunder News |

The value of carbon credits generated by the forestry and agriculture sectors is being questioned due to concerns about measurement accuracy, inconsistent standards, and potential fraud. An investigation by The Guardian revealed that over $1 billion of carbon credits certified by leading platform Verra may be worthless, as they had little evidence of deforestation reduction and lacked climate benefits. The situation has prompted calls for increased integrity and regulation in the global carbon market. A panel of entrepreneurs at the Hack Summit discussed the state of carbon offsetting in the food and agriculture industry. They emphasized the need for consensus-based certifications involving multiple entities to ensure quality credits. The panelists also highlighted the importance of considering other environmental factors such as biodiversity and farmer livelihoods in carbon offsetting efforts. They discussed upcoming carbon offsetting regulations in Europe and the US and shared their wishlist for the future of carbon markets.

19 THEME: Policy incentives, financing, pricing; Carbon sequestration; MRV

Which deserves a carbon credit – nature or technology?

June 5, 2023 | Carbon credits |

The United Nations (UN) is drafting a document that will shape the future of the global carbon market and appears to favor nature-based solutions over technological carbon removal. The UN panel questions the viability and sustainability of engineered carbon removal solutions, such as direct air capture, and suggests that they do not contribute to sustainable development or reduce global mitigation costs. This stance has raised concerns among the growing carbon dioxide removal (CDR) industry, which plays a crucial role in combating climate change. The panel's position on carbon removal methods could significantly impact the fate of the CDR industry. The debate centers around whether carbon credits should be awarded to natural solutions like reforestation or to technological solutions like direct air capture. Supporters of the carbon removal industry advocate for a criteria-based approach that recognizes the combination of nature-based and engineered carbon removal approaches. The UN will likely make its final decision on the matter at the COP28 climate talks in November.

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20 THEME: GHG emission reduction; Carbon sequestration

Why big names are backing seaweed-based biostimulants

June 1, 2023 | The Fish Site |

Seaweed has the potential to be commercially successful and environmentally positive as a biostimulant for terrestrial crops, reducing reliance on chemical fertilizers and increasing yields, according to Lisa Boulton, ocean regeneration lead at Nestle Purina Petcare. While Nestle struggles to integrate large quantities of seaweed directly into their products, they are promoting the use of seaweed-based biostimulants in their existing supply chains. Seaweed biostimulants have the potential to improve plant performance, increase soil health, and support regenerative agriculture. The use of seaweed can also contribute to biodiversity improvement, reduce acidification in the seas, and help combat the overuse of inorganic fertilizers that contribute to oceanic problems. Paul Dobbins, director of impact investing at WWF, agrees that the real climate opportunity lies in using seaweed to displace less sustainably produced ingredients rather than direct carbon sequestration. Seaweed-based biostimulants have the ability to regenerate soil health and improve carbon drawdown.

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POLICY

01 THEME: Climate smart agriculture; Sustainable consumption

Delivering Ag2030 (Australia)

Australian Government| [Source](#) | [Download](#) |

Introduction: The Australian Government remains steadfast in its commitment to support the agriculture industry's ambitious target of achieving $100 billion in production by 2030 (Ag2030). Through policy reforms, substantial investments, and active engagement with industry stakeholders, the government is laying the groundwork for the sector's sustainable growth and resilience.

Current Landscape: Despite facing challenges such as bushfires, droughts, floods, and the COVID-19 pandemic, the agriculture industry continues to be a cornerstone of the Australian economy. With a forecasted gross value of agricultural production at $86.8 billion in 2021-22, the industry remains resilient, providing significant employment opportunities and contributing to food security both domestically and globally.

Challenges and Opportunities: Meeting the Ag2030 goal requires overcoming various challenges, including shifting consumer preferences, global market volatility, and climate-related risks. To sustain growth, the industry must embrace emerging opportunities, enhance productivity, and adapt to changing market dynamics. Maintaining biosecurity standards, strengthening supply chains, and investing in innovation and research are crucial for navigating these challenges.

Government Commitments: The Australian Government has allocated over $600 million to agriculture in Budget 2022-23, focusing on seven key themes to support industry growth.

- **Trade and Exports:** Strengthening ties with major export markets and reducing trade barriers to facilitate market access.
- **Biosecurity:** Safeguarding Australia's agricultural interests by implementing robust biosecurity measures.
- **Stewardship:** Recognizing and rewarding farmers for their sustainable land and water management practices.
- **Supply Chains:** Promoting fair and resilient supply chains to ensure equitable treatment for all stakeholders.
- **Water and Infrastructure:** Supporting rural communities with essential infrastructure and water management solutions.
- **Innovation and Research:** Creating an enabling environment for agricultural innovation to enhance productivity and competitiveness.
- **Human Capital:** Investing in skills development and infrastructure to support the agriculture workforce and rural communities.

Smart & Net-Zero Project

National Soil Strategy (Australia)

Australian Government| [Source](#) | [Download](#) |

Introduction: Healthy soils are essential for achieving resilience to climate change, ensuring food security, and supporting economic growth. The National Soil Strategy (the Strategy) is a collaborative effort aimed at valuing, managing, and enhancing Australia's soil resources over the next 20 years. Developed in partnership with stakeholders, the Strategy outlines clear goals and objectives to drive coordinated action across various sectors.

Key Objectives

- **Prioritize Soil Health:** Focus on restoring and protecting soil health through collaborative efforts in research, education, and governance.
- **Empower Innovation and Stewards:** Support innovative approaches and empower land managers to adopt sustainable soil management practices.
- **Strengthen Knowledge and Capability:** Enhance soil knowledge and build capacity among stakeholders to ensure effective soil conservation efforts.

Action Plan: By June 2022, the Australian Government will unveil a National Soil Strategy Action Plan detailing specific actions aligned with the Strategy's objectives. These actions will adhere to the SMART principles—Specific, Measurable, Achievable, Relevant, and Time-bound—to ensure effectiveness and accountability.

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03 THEME: Climate smart agriculture; Nature-based solution

The National Climate Resilience and Adaptation Strategy 2021-2025 (Australia)

Australian Government| [Source](#) | [Download](#) |

Introduction: Released on October 29, 2021, the National Climate Resilience and Adaptation Strategy aims to prepare Australia for the challenges posed by climate change. It outlines the Australian Government's commitment to supporting efforts across all sectors to anticipate, manage, and adapt to the impacts of a changing climate.

Objectives:

- **Drive Investment and Action Through Collaboration:** Facilitate collaboration among governments, businesses, and communities to enhance resilience and adaptability. This includes providing leadership, coordination, and partnerships to spur action and investment.
- **Improve Climate Information and Services:** Enhance access to climate information and services to enable better prediction, management, and adaptation to climate change. This involves delivering coordinated climate information, supporting climate science, and ensuring broader accessibility of climate-related data.
- **Assess Progress and Improve Over Time:** Regularly evaluate national climate impacts, adaptation progress, and areas for improvement. This includes delivering national assessments, independent evaluations, and continuous improvement mechanisms.
- **Adaptation Across Domains:** The strategy addresses adaptation across four domains—natural, built, social, and economic—to effectively respond to climate challenges. By focusing on these domains, it aims to safeguard economic prosperity, environmental health, and community well-being.

Engagement: The Strategy was developed through extensive engagement with governments, industry stakeholders, academia, and community groups. Workshops, consultations, and feedback mechanisms involving over 300 participants helped shape the Strategy, ensuring broad representation and inclusivity.

Strong, innovative, sustainable: a new strategy for agriculture in Victoria

Victoria State Government| [Source](#) | [Download](#) |

Introduction: Agriculture in Victoria is undergoing profound transformation, driven by evolving farming practices, changing consumer demands, and shifting environmental landscapes. As we navigate these changes, it is essential to recognize the challenges they pose while seizing the opportunities they present. The Victorian Government is committed to supporting the agriculture sector through innovation, collaboration, and proactive measures outlined in this strategy.

Themes and Commitments

- **Recover:** Support farmers in building resilience post-drought, bushfires, and the COVID-19 pandemic. Strengthen local supply chains and promote opportunities for local manufacturing.
- **Grow:** Increase the value and output of agriculture through exports, investment, diversification, and the development of new products.
- **Modernise:** Drive innovation, investment, and skills development to modernize Victorian agriculture, ensuring its competitiveness in the global market.
- **Protect:** Safeguard the future of agriculture by addressing climate change, pest management, resource scarcity, and disease control.
- **Promote:** Build confidence in the sector among international markets and communities, positioning Victoria as a leader in sustainable agriculture.

Key Priorities

- Support farmers to enhance profitability and expand market reach.
- Foster growth in emerging industries and create favorable investment conditions.
- Facilitate the adoption of cutting-edge technologies and promote AgTech innovation.
- Strengthen collaboration between research institutions and industry for commercialization.
- Develop future-ready agricultural skills and promote low-emission practices.
- Implement robust regulatory frameworks and promote quality standards.
- Cultivate a positive reputation for agriculture as a desirable career path with excellent workplace standards.

Smart & Net-Zero Project

05 THEME: Carbon market; Climate smart agriculture; Nature-based solution; Net Zero; Supply chain

Queensland Low Emissions Agriculture Roadmap 2022–2032

Queensland Government| Source | Download |

Introduction: The Queensland Low Emissions Agriculture Roadmap 2022–2032 (the roadmap) outlines a strategic framework for achieving a low emissions agriculture sector in Queensland. Co-designed with industry partners and government, it emphasizes collaborative efforts to reduce production-based emissions and increase carbon farming, aligning with the state's commitment to a zero net emissions economy by 2050.

Key Objectives

- **Drive Collaborative Action:** The roadmap emphasizes collaboration among governments, industries, and communities to facilitate a gradual decline in greenhouse gas emissions while supporting industry targets.
- **Improve Climate Information and Services:** Enhancing access to climate information and services enables better prediction and management of climate impacts, fostering adaptation and resilience.
- **Assess Progress and Enhance Adaptation:** Regular assessments of climate impacts and adaptation progress inform ongoing improvements and strategies for effective response.

Action Pathways: The roadmap identifies five pathways for action:

- **Livestock Emissions:** Focus on reducing methane emissions through technology adoption, dietary supplements, and sustainable management practices.
- **Cropping and Horticulture Emissions:** Promote soil health and develop low-emission fertilizers to mitigate nitrous oxide emissions.
- **On-Farm Energy Opportunities:** Encourage investment in renewable energy options to reduce on-farm energy emissions.
- **Carbon Farming and Landscape Management:** Support carbon capture initiatives in natural sinks and holistic landscape management to improve soil health and biodiversity, supported by Australian Carbon Credit trading.
- **Regions and Supply Chains:** Create opportunities for carbon-neutral projects across regional planning areas, integrating low-emission practices into supply chains.

Collaborative Approach: Partnerships between industry, government, research providers, and communities are essential for achieving real carbon reductions in the agriculture sector. The roadmap aligns with other key emissions reduction strategies and initiatives, maximizing opportunities for the agriculture sector and its supply chains.

Smart & Net-Zero Project

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06 THEME: Climate smart agriculture; Nature-based solution

National Agricultural Innovation Agenda and Policy Statement (Australia)

Australian Government | Source | Download |

Introduction: In September 2020, the Australian Government launched the National Agricultural Innovation Agenda to enhance the nation's agricultural innovation system. This comprehensive strategy aims to strengthen leadership, increase investment, embed innovation practices, bolster regional development, and create a next-generation innovation platform.

Key Pillars

- **Ecosystem Leadership and Collaboration:** Focused on providing clear strategic direction and fostering collaboration to drive innovation across the agricultural sector.
- **Balanced Funding and Investment:** Aims to deliver both incremental and transformational innovation by enhancing public and private sector investment.
- **World-Class Innovation Practices:** Emphasizes transparency and entrepreneurship to embed world-class innovation practices within the sector.
- **Regional Strengthening:** Aims to promote greater uptake of innovation in regional areas to drive economic growth and sustainability.
- **Next-Generation Innovation Platform:** Focuses on improving foundational elements of agricultural innovation, including data and regulatory settings.

National Agricultural Innovation Priorities

- Premium Food Exporter
- Climate Resilience Champion
- Biosecurity Futureproofing
- Digital Agriculture Leadership

Target Investments: The Australian Government has allocated $2.8 million to Agricultural Innovation Australia (AIA) to develop investment strategies aligned with the innovation priorities. Additionally, Research and Development Corporations (RDCs) continue to play a vital role in driving productivity and innovation within the sector.

Digital Agriculture Strategy: The Digital Foundations for Agriculture Strategy, released in April 2022, sets out a national approach to enhance digital adoption across agriculture, forestry, and fisheries industries. Key focus areas include leadership, skills development, data governance, value proposition, and connectivity infrastructure. Furthermore, the expansion of the Australian Farm Data Code aims to provide transparency and regulation in data management, benefiting both farmers and service providers.

International Collaboration: The growAG platform facilitates international collaboration and showcases Australian agricultural innovations to attract global investment. With a $2 million government contribution, growAG accelerates commercialization and fosters collaboration on a global scale.

Smart & Net-Zero Project

07 Theme: Climate smart agriculture

Australian Farm Data Code

National Farmers' Federation | Source | Download |

Introduction: The Australian Farm Data Code (the Code) represents a collaborative effort between the National Farmers' Federation (NFF), industry stakeholders, and the Australian Government to establish guidelines for the responsible management of farm data. This brief outlines the significance of the Code, its benefits, and the pathway for adoption.

Key Features and Benefits

- **Enhanced Transparency:** The Code promotes transparency by providing farmers with insight into how their data is collected, used, and shared by service providers, fostering trust and accountability within the agricultural sector.

- **Empowering Farmers:** By offering a framework for comparison and negotiation, the Code empowers farmers to make informed decisions regarding data agreements, ensuring their interests are protected.

- **Improved Industry Practices:** Through voluntary adoption, the Code incentivizes service providers to adhere to best practices, driving continuous improvement in data management standards across the agricultural industry.

Adoption Process

- **Voluntary Compliance:** The Code operates on a voluntary basis, encouraging all product and service providers handling farm data to align their policies with its principles.

- **Assessment and Certification:** Providers with direct contractual relationships with farmers can undergo independent assessment by the NFF to evaluate their compliance with the Code. Those meeting the standards are eligible for certification.

- **Future Expansion:** In the future, certification will be open to any entity managing farm data, further extending the reach and impact of the Code.

Governance Structure

- **Funding and Development:** The Code received support from the Australian Government and was developed by the NFF Farm Data Working Group, comprising diverse stakeholders from farming, research, and technology sectors.

- **Collaborative Approach:** The governance structure underscores the collaborative nature of the initiative, ensuring alignment with industry needs and fostering inclusive decision-making processes.

Smart & Net-Zero Project

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08 THEME: Climate smart agriculture; Nature-based solution

Primary Industries Plan 2020–2024 (Western Australia)

Government of Western Australia| [Source](#) | [Download](#) |

Introduction: Western Australia's primary industries are vital to the state's economy, contributing over $10 billion annually and supporting thousands of jobs. The Primary Industries Plan 2020–2024 aims to enhance the sector's competitiveness, sustainability, and resilience, building on its strengths in producing premium, safe food and addressing challenges like climate change and biosecurity.

Key Objectives: The Plan sets clear priorities for investment and collaboration between government, industry, and communities. It aims to protect natural resources, build trust in primary production, maintain competitiveness, diversify industries, and secure markets.

Implementation Strategy: Led by the Department of Primary Industries and Regional Development (DPIRD), the Plan will be implemented through active engagement with industry stakeholders, advocacy for supportive policies, and collaboration with government agencies. Progress will be monitored through regular reporting on key indicators.

Strategic Initiatives: The Plan outlines specific initiatives across five key areas.

- **Protecting Resources:** Sustainable management of land, soil, and aquatic resources, along with climate change adaptation strategies.
- **Building Trust:** Strengthening biosecurity measures, animal welfare standards, and industry-led certification.
- **Maintaining Competitiveness:** Investing in research, technology, workforce development, and supply chain improvements.
- **Diversifying Industries:** Supporting value-added agribusiness, aquaculture development, Aboriginal participation, and forest industries.
- **Securing Markets:** Establishing industry partnerships, enhancing market access, and prioritizing investment in export innovation.

Smart & Net-Zero Project

OPEN DATA

01 THEME: GHG emission inventory

Australia's National Greenhouse Accounts

Australian Government | Source | Data |

Australia, as a Party to the UNFCCC and the Paris Agreement, commits to reducing and reporting greenhouse gas emissions. The Australian National Greenhouse Accounts, comprising comprehensive reports and databases since 1990, fulfill international reporting obligations, track progress, and inform policies. Reports adhere to IPCC guidelines and utilize country-specific methodologies for accuracy. Quarterly updates provide timely emissions data, while State and Territory inventories offer regional insights. Economic sector breakdowns supplement national reports. The Full Carbon Accounting Model calculates emissions from the land sector, contributing to national inventories. National Greenhouse Accounts Factors aid in emissions estimation. The National Greenhouse and Energy Reporting Scheme provides a framework for reporting company emissions, essential for compiling national accounts. These efforts support Australia's commitment to reducing emissions and meeting international obligations.

02 THEME: Environment and climate

Climate Service for Agriculture Tool (Australia)

Department of Agriculture, Fisheries and Forestry, Australia | Source | Data |

My Climate View is a platform developed by Australia's CSIRO and Bureau of Meteorology, designed with input from farmers and funded by the Australian Government's Future Drought Fund. It provides climate data tailored to farmers' locations and commodities. Users can access historical data from 1964, seasonal forecasts for 1-3 months ahead, and climate projections for the 2030s, 2050s, and 2070s. The platform covers various commodities such as wheat, beef, almond, and mango, with more being progressively added. Its mission is to increase farmers' awareness of future climate trends to aid decision-making. Through user-centered co-design and ongoing innovation, My Climate View aims to support long-term agribusiness planning and risk mitigation. Key milestones include the launch of the prototype in June 2021, expansion to cover additional commodities, and the introduction of new features like the overview page and report downloads.

03 THEME: Agrifood system; Land cover and soil; Environment and climate

Australian Agricultural Data

Department of Agriculture, Fisheries and Forestry, Australia | Source |

The Department of Agriculture, Fisheries and Forestry, through its research arm ABARES, provides weekly commodity price updates, including world and Australian market indicators, horticulture prices, and weekly price movements. These updates are available every Thursday at 4:30 pm. ABARES collaborates with the Australian Bureau of Statistics to modernize agricultural statistics, aiming to reduce survey burden, cut data collection costs, and enhance data quality. The Australian Agricultural Census 2020–21 visualizations offer data for different regions, while

the Farm Data Portal presents interactive tools showcasing information from broadacre and dairy farm surveys, along with agricultural productivity estimates. These resources aim to provide accurate, timely, and reliable analysis and data about Australian agriculture.

Farm Data Portal: The Farm Data Portal from ABARES is an innovative platform designed to provide farmers and policymakers with easy access to comprehensive and up-to-date agricultural data and information. The Farm Data Portal serves as a central hub for accessing a wide range of agricultural data, including production statistics, market trends, weather information, and farm management practices. It aims to support evidence-based decision-making and improve the overall productivity and sustainability of the agriculture industry in Australia.

Key features of the Farm Data Portal include:

- **Data Repository:** The portal hosts an extensive collection of agricultural data, sourced from various government agencies, research institutions, and industry bodies. It covers diverse areas such as national farm data, regional farm data, farm performance by size and productivity estimates.
- **Data Visualization Tools:** The platform provides interactive and user-friendly tools for visualizing and analyzing agricultural data. Farmers and policymakers can explore trends, climate conditions, market, and correlations to gain insights into the performance and dynamics of the sector.

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04 THEME: Agrifood system; Land cover and soil

Multi-Criteria Analysis Shell for Spatial Decision Support (MCAS-S)

Department of Agriculture, Fisheries and Forestry, Australia | Source |

The Multi-Criteria Analysis Shell for Spatial Decision Support (MCAS-S) is a powerful tool designed to view and combine mapped information, enhancing spatial decision-making processes and stakeholder engagement. With its transparency, flexibility, and real-time processing capabilities, MCAS-S empowers decision-makers to make well-informed choices without the need for Geographic Information Systems (GIS) programming. This user-friendly tool allows stakeholders to understand how mapped data is integrated to meet specific objectives, enabling them to explore trade-offs and compare different options. MCAS-S is freely available and has been widely used at international, national, regional, and catchment scales within the Australian Government Department of Agriculture and Water Resources policy environment since the early 1990s. It offers a comprehensive and efficient approach to spatial analysis, making it a valuable asset for decision-makers seeking to optimize their spatial decision-making processes.

Smart & Net-Zero Project

05 THEME: Agrifood system; Land cover and soil

Online Farm Trials

Grains Research & Development Corporation and Federation University Australia | Source |

Online Farm Trials (OFT) is a web-based system that provides a platform for farmers, researchers, and agricultural professionals to access and share information on agricultural trials and research conducted in Australia. It is a collaborative initiative that aims to bridge the gap between scientific research and practical on-farm decision-making.
OFT serves as a central repository for trial data, reports, and resources, allowing users to easily search, explore, and analyze agricultural trial information. The system encompasses a wide range of trials conducted across various agricultural sectors, including cropping, livestock, horticulture, and soil management.

06 THEME: Land cover and soil; Environment and climate

Digital Earth Australia - Satellite imagery to inform Australia

Digital Earth Australia, Geoscience Australia | Source |

Digital Earth Australia (DEA) is a program under Geoscience Australia, with a mission to integrate satellite imagery and data into decisions that promote a sustainable environment, resilient society, and strong economy in Australia. DEA provides easy access to over 30 years of landscape imagery and data from US and European satellites through interactive maps, web tools, and services, facilitating planning, monitoring, and problem-solving. By equipping government, industry, and communities with analysis-ready data and high-performance computing infrastructure, DEA unlocks the value of satellite observations across various sectors, including environmental management, agriculture, emergency management, and mining. Collaboration with international partners and organizations strengthens DEA's efforts in creating innovative data products and raising awareness of Earth observation technology's potential for societal benefit and economic growth.

DEA offers a suite of tools, datasets, and analytical capabilities that enable users to visualize, analyze, and extract information from satellite imagery and related data. Key datasets include land cover, fractional cover, mangroves, wetlands and surface reflectance.

07 THEME: Land cover and soil

Soil and Landscape Grid of Australia

Australian Government | Source |

The Soil and Landscape Grid of Australia is a collaborative effort by researchers from across the country to create detailed digital maps of soil and landscape attributes. Offering relevant, consistent, and comprehensive nationwide data in an easily-accessible format, the Grid presents high-resolution (3 arc-seconds) digital soil and landscape attribute maps with estimates of reliability. It leverages the best available data from existing databases, new sensor measurements, and spatial modeling to provide a first approximation of national scale maps. These datasets are designed to be continuously updated and improved over time as new resources, data, and advanced technologies become available. All products are freely available under a Creative Commons Attribution License.

Soil attributes provided include, Bulk Density (Whole Earth), Organic Carbon, Clay, Silt, Sand, pH Soil Water, pH CaCl$_2$, Available Water Capacity, Total Nitrogen, Total Phosphorus, Effective Cation Exchange Capacity, Depth of Regolith, Depth of Soil, Coarse Fragments.

Landscape attributes provided include Slope (%), Slope Relief Classification, Aspect, Relief 1000m Radius, Relief 300m Radius, Topographic Wetness Index, Topographic Position Index, Partial Contributing Area, MrVBF, Plan Curvature, Profile Curvature, Prescott Index, SRAD Net Radiation January, SRAD Net Radiation July, SRAD Total Shortwave Sloping Surface January, SRAD Total Shortwave Sloping Surf July.

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08 THEME: Land cover and soil; Environment and climate

Data access portal by CSIRO

Commonwealth Scientific and Industrial Research Organization (CSIRO) | Source | Data |

The Data Access Portal (DAP) of CSIRO (Commonwealth Scientific and Industrial Research Organization) is an online platform that provides access to a wide range of scientific datasets and research outputs generated by CSIRO researchers. It serves as a central repository for CSIRO's vast collection of data, enabling researchers, industry professionals, policymakers, and the public to discover, access, and utilize valuable scientific information. There are some available agricultural dataset including crop, pasture, land and farm management dataset.

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09 THEME: Agrifood system; Land cover and soil; Environment and climate

Web APIs of Agriculture and Food in Western Australia

Government of Western Australia | Source |

The Department of Primary Industries and Regional Development (DPIRD) aims to create a progressive, innovative and profitable agriculture and food sector that benefits Western Australia. DPIRD supports the success of our State's agrifood businesses through services and partnerships that help increase industry profitability and sustainability, while safeguarding our state's precious natural resources.

To enable third parties (API Users) to access this Data, DPIRD has developed Application Programming Interfaces (APIs). The APIs are designed to allow API Users the opportunity to access and use a broad range of Data to build into their own applications. Several APIs are provided, including weather, organism, science, soil, pest and disease.

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10 THEME: Agrifood system

Agriculture Statistics in Australia

Australian Bureau of Statistics | Source |

Australian Bureau of Statistics provides national statistics report related to agriculture:

- Livestock Products (Production)
- Agricultural Commodities (Production areas and volumes)
- Value of Agricultural Commodities Produced
- Water Use on Australian Farms