

Module 1

Sustainable land management legislation, systems & schemes

The challenges include

- Land use change
- Pollution & nutrient enrichment
- Over exploitation
- Invasive species
- Afforestation & forest management & deforestation
- Air pollution
- Climate change
- Aquifers, abstraction & modification of water bodies
- Over & under grazing
- Recreational damage such as footpath over use
- Renewable energy? (wind turbines, pylons)
- Succession/abandonment etc bracken & gorse

25 Year Environment Plan, published 11th January 2018

By adopting this plan, we will achieve

1. Clean air.
2. Clean & plentiful water.
3. Thriving plants & wildlife.
4. Reduced risk of harm from environmental hazards (flooding and drought)
5. Using resources from nature more sustainably & efficiently.
6. Enhanced beauty, heritage and engagement with the natural environment.

In addition, we will manage pressures on the environment by:

7. Mitigating & adapting to climate change.
8. Minimising waste.
9. Managing exposure to chemicals.
10. Enhancing biosecurity.

Defra's 25 Year Environment Plan

- 'Natural capital, sum of ecosystems, species, freshwater, land, soils, minerals, air & seas.
- Bring value to people & the country at large.
- Providing food, clean air & water, wildlife, energy, wood, recreation & protection from hazards.
- 70% of UK surface is farmed - Natural Capital is largely looked after by land managers.
- Should land managers be paid for helping provide ecosystem services?
- How do we measure them?

Agriculture Act 2020,

- A new approach to domestic agriculture policy
- Financial Assistance
- Direct Payments after EU exit
- Other financial support after EU exit
- Food & agricultural markets
- Intervention in agricultural markets
- Transparency & fairness in the agri-food supply chain.
- Collection & sharing of data
- Fair dealing with agricultural producers & others in the supply chain
- Producer Organisations
- Matters relating to farming & the countryside
- Marketing standards, organic products & carcass classification
- WTO Agreement on Agriculture
- Wales, Northern Ireland
- Stakeholders' overall views

Environment Act 2021, - Clean Air Strategy,

- Understanding the problem
- Protecting the nation's health
- Protecting the environment
- Securing clean growth and innovation
- Action to reduce emissions from transport
- Action to reduce emissions at home
- Action to reduce emissions from farming
- Action to reduce emissions from industry
- Leadership at all levels
- Progress towards our goals

National Pollinator Strategy

- promote opportunities to farmers
- farm advice providers
- pollinator events
- Integrated Pest Management (IPM)
- ongoing research on IPM under active review,
- share IPM practices with farmers and growers
- revise and re-publish guidance on insecticide best practice

Net Zero Strategy.

- Advancing Offshore Wind
- Driving the Growth of Low Carbon Hydrogen
- Delivering New and Advanced Nuclear Power,
- Accelerating the Shift to Zero Emission Vehicles
- Green Public Transport, Cycling and Walking
- Jet Zero and Green Ships
- Greener Buildings
- Investing in Carbon Capture, Usage and Storage
- Protecting Our Natural Environment
- Green Finance and Innovation

Environmental Improvement Plan 2023 (5-year update)

Goal 1 Thriving plants and wildlife

Goal 2 Clean air

Goal 3 Clean and plentiful water

Goal 4 Managing exposure to chemicals and pesticides

Goal 5 Maximise our resources, minimise our waste

Goal 6 Using resources from nature sustainably

Goal 7 Mitigating and adapting to climate change

Goal 8 Reducing risk from environmental hazards

Goal 9 Enhancing biosecurity

Goal 10 Enhancing beauty, heritage and engaging with the natural environment

How shall we measure Natural Capital

Key drivers are

- Clean Water
- Healthy Soil
- Wildlife
- Clean Air
- Qualify
- Quantify
- Monetise

Summary of policies

- Using and managing land sustainably
- Recovering nature and enhancing the beauty of landscapes
- Connecting people with environment to improve health and wellbeing
- Increasing resource efficiency and reducing pollution and waste
- Securing clean, healthy, productive & biologically diverse seas & oceans
- Protecting and improving our global environment

Key Dates

1992.	UN Conference on environment & development (Rio Janeiro)
1997.	Kyoto Protocol on Climate Change
2002.	World summit on Sustainable Development (Jo Burgh. SA)
2015.	COP 21. 4% per mill proposed
2030.	All Soils will be managed Sustainable
2040.	NFU Carbon Net Zero
2042.	Elimination of all avoidable plastic waste
2050.	Achieve Carbon Net Zero (Gov. 25 yr plan)
2060.	12% of England will be covered with woodland

Earth Summit (Rio de Janeiro, 1992),

- The Earth Summit, formally known as the United Nations Conference on Environment and Development (UNCED), was held in Rio de Janeiro, Brazil, in June 1992.
- It was a landmark global event focused on sustainable development and environmental issues, bringing together over 100 heads of state and representatives from 178 nations.

Kyoto Protocol Agreement on climate change (11 Dec 1997)

- First international treaty to set legally binding targets to cut greenhouse gas emissions, was adopted 27 years ago.
- Operationalizes the UN Framework Convention on Climate Change by committing industrialized countries and economies in transition to limit and reduce GHG emissions in accordance with agreed individual targets.

World Summit on Sustainable Development (Johannesburg, 2002)

- The WSSD highlighted the lack of sufficient progress since the Earth Summit and emphasized the need for implementation and accountability.
- It also stressed balancing economic development with environmental sustainability and equity.

UK's State of Nature report.

- The **State of Nature report** serves as a critical tool for understanding biodiversity trends and shaping conservation policies in the UK.
- It underscores the urgency of addressing ecological challenges to preserve natural heritage for future generations.

Conference of the Parties (COP)

- An international climate meeting held each year by the UN
- COP is short for "Conference of the Parties," meaning those countries who joined—are "party to," in legal terms—the international treaty called the:
- U.N. Framework Convention on Climate Change (UNFCCC).

The Wildlife and Countryside Act 1981,

- Prohibiting & limiting action involving wild animals & the primary piece of legislation for protection of animals in the UK.
- Prohibiting taking, injuring, killing & disturbing places used for shelter and protection.

All birds, nests and eggs protected by law it is an offence, with certain exceptions to:

- Intentionally kill, injure or take any wild bird.
- Intentionally take, damage or destroy nest of any wild bird while it is in use or being built.
- Intentionally take or destroy the egg of any wild bird.
- Possession or control any wild bird, dead or alive, or any part of a wild bird, which has been taken in contravention of the Act or the Protection of Birds Act 1954.
- Possession or control any egg or part of an egg which has been taken in contravention of the Act or the Protection of Birds Act 1954.
- Use traps or similar items to kill, injure or take wild birds.
- Possession or control any bird of a species occurring on Schedule 4 of the Act unless registered, and in most cases ringed, in accordance with the Secretary of State's regulations (see [Schedules](#)).
- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.

The Conservation of Habitats and Species Regulations 2010

- Provide for the designation & protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.
- Legal protection can be given to species on national or international scale.

Levels of protection vary for species and may include protection against:

- killing,
- capturing,
- disturbing,
- trading,
- damaging or destroying their breeding sites or resting places.

Countryside and Rights of Way (CROW) Act 2000.

- Normally gives a public right of access to land mapped as open countryside (mountains, moor, heath or down) or registered open common land.
- These are known as open access land

Farming Rules for Water April 2018

- Rules in place so farmers manage their land, to avoid water pollution and to benefit their business.
- Rules apply to all farmers in England to ensure soil is kept on land, nutrients are applied to match crop need and livestock, fertiliser and manures are kept out of water.
- Environment Agency is responsible for enforcing these rules.
- Will do this through farm inspections work and check areas like records, soil tests and evidence of pollution

Basic Payment Scheme (BPS)

- This scheme is now closed in England to new entrance
- Farmers with at least 5 ha of agricultural land.
- Businesses not allowed to claim if they carry out certain activities.
- Rules about what you can and cannot do with your land if you claim BPS.
- An arable farmer might need to grow 3 different crops and use 5% of land to do specific things that are good for the environment.
- Needed to make decisions about what to do with land so that they follow the rules.
- If you claimed BPS you must also follow the rules.
- Final BPS claim will be 2024
- Delinked period from 2024 – 2027

Delinked payments: replacing the Basic Payment Scheme

- BPS will end after the 2023 scheme year – now closed
- BPS replaced in England with delinked payments in 2024.
- RPA make delinked payments each year from 2024 to 2027.
- BPS replaced in England with delinked payments in 2024.
- When payments delinked, will not need any land to receive payments.
- Delinked payments phased out by the end of 2027.

Environmental Land Management Scheme (ELMS)

Schemes are designed to support farmers and land managers in England to meet the commitments of the 25 Year Environment Plan and achieve net zero by 2050

- clean and plentiful water
- clean air
- thriving plants and wildlife
- protection from environmental hazards
- reduction of and adaptation to climate change
- beauty, heritage and engagement with the environment

Sustainable Farming Incentive (SFI)

DEFRA running pilot scheme 2022, group of 900 farmers, to learn from the process and to test the standards. Defra ambition to have 70% farmers in schemes by 2028

9 Actions

3 yr contracts

Local Nature Recovery / Countryside Stewardship plus

Countryside Stewardship (CS)

Examples:

AB1 Nectar flower mix's

AB2 Basic overwinter stubble

AB3 Beetle banks

AB4 Skylark plots

AB5 Nesting plots for lapwings

AB6 Enhancing overwinter stubble

Landscape Recovery

Multi stakeholder approach

Projects 500 – 5000 ha

22 Projects 2022 agreed

Adur river restoration example

Defra looking for 25 projects 2023

Sustainable Farming Incentives

- Soils
- Moorland
- Hedgerows
- Integrated pest management
- Nutrient management
- Farmland wildlife on arable and horticultural land
- Farmland wildlife on improved grassland
- Buffer strips
- Input grassland
- Across SFI and CS, payments will be increased on average by 10%.
- Higher payment rates will be applied to existing agreements.
- More options will be available to apply for, or to add to an existing SFI agreement, from summer 2024.
- By the end of February Defra has said it received 11,000 SFI applications.

Countryside Stewardship

CS agreements provide financial incentives for farmers to look after and improve the environment through:

- Conserving and restoring wildlife habitats
- Offering farmers incentives for flood risk management
- Offering funds for woodland creation and management
- Preserving historical features and incentivising education access
- Keeping the character of the countryside.

Agreements are management by the RPA.

CS is made up of multiple grants; the main elements include:

- Capital grants
- Higher Tier
- Mid-Tier and Wildlife Offers

Biodiversity,

- The phrase was created by the zoologist E Wilson to summarise 'Biological diversity, the variety of life that exists around us'
- Differences between living organisms, habitats, plants.
- Includes diversity within species, between species and their ecosystem.
- Essential for ecosystem, food chains, soil health, structure, natural balance and sustainability.
- Part of the carbon cycle
- To promote biodiversity, need a source of food from plants all year round.
- Combination of winter & spring crops with different flowering times to provide AYR food source

Natural capital,

- World's stocks of natural assets which include:
- geology,
- soil,
- air,
- water
- all living things.
- It is from this Natural Capital that humans derive a wide range of services, often called ecosystem services, which make human life possible

Ecosystem Services,

- Climate regulation
- Nutrient cycling
- Habitat for organisms
- Flood regulation
- Source of pharma
- Foundations for human infrastructure
- Provision of construction material
- Cultural heritage
- Provision of food fibre and fuel
- Carbon sequestration Water purification and soil contaminant reduction

Climate change.

- Long-term shifts in temperatures and weather patterns.
- Can be natural, due to changes in sun's activity or volcanic eruptions.
- Since the 1800s, [human activities](#), has been primarily course due to the burning of fossil fuels.
- These generates GHG emissions insulate the Earth, trapping the sun's heat and raising temperatures.
- Main GHG carbon dioxide and methane.
- Cutting down forests can also release carbon dioxide.
- Energy, industry, transport, buildings, agriculture and land use among the [main sectors](#) causing GHG

Agriculture GHG

- GHG Nitrous Oxide – Produced under anaerobic conditions
- CO₂ (GHG) – burning fossil fuels - cultivations
- Methane (GHG) – Livestock – ruminants
- Ammonia (Not GHG) Air pollutant– particulates – from livestock housing – fertiliser application

Integrated Pest Management (IPM),

- A coordinated and planned strategy for the prevention, detection and control of pests, weeds, and diseases
- Part of the Sustainable Use Directive, the UK government is required to show that UK growers are using integrated pest management practices.
- Cultural – Biological - Chemical

Integrated Crop Management (ICM),

Method of farming that balances the requirements of running a profitable business with environmental responsibility.

It includes practices that

- avoid waste,
- enhance energy efficiency
- minimise pollution.

Integrated Farm Management (IFM) and

9 sections across the entire business:

- Organisation & Planning,
- Soil Management & Fertility
- Crop Health & Protection,
- Pollution Control & By-Product Management
- Animal Husbandry,
- Energy Efficiency,
- Water Management,
- Landscape & Nature
- Conservation & Community Engagement.

Regenerative Agriculture

Holistic approach that focuses on interconnection of farming systems and ecological systems as a whole.

It has five key principles

- minimising soil disturbance
- keeping soils covered
- increasing plant diversity
- keeping living roots
- integrating animals in the system.

Conservation agriculture

- Sustainable approach to production aims to protect soil from erosion and degradation, improve its quality and biodiversity, contribute to the preservation of natural resources, water and air, whilst optimising yields.

Based on three core principles:

- minimum soil disturbance
- maintenance of permanent soil cover
- use of crop rotations with a diversity of crop species.

Organic Farming

An agricultural system that uses ecologically based

- pest controls
- biological fertilizers derived largely from
 - animal and plant wastes
 - nitrogen-fixing cover crops.

Livestock important role on most organic farms, although stockless management is possible.

Organic standards address all aspects of livestock management including:

- stocking and housing requirements,
- feed and veterinary medicines
- transport and slaughter.

Organic farming provides a range of environmental benefits:

- improved natural soil health and fertility,
- increasing carbon storage in soil
- wildlife and biodiversity.
- Organic farms have up to 50% more wildlife on average.

Organic Farming Certification

Funding application window for England's Countryside Stewardship Scheme is now open for 2023

Financial benefits

- On-farm production
- Processing involving food storage, packing and storage, including on-farm processing
- Animal feeds production
- Re-labelling of products at any stage of the distribution chain
- Organic products imported from countries outside European Union, known as third countries

Extensive farming:

- Agricultural production system that uses small inputs of labour, fertilizers, and capital, relative to the land area being farmed

Intensive farming

- Type of agriculture, both of crop plants and of animals, with higher levels of input and output per unit of agricultural land area.
- Characterized by a low fallow ratio, higher use of inputs such as capital and labour, and higher crop yields per unit land area.

Conventional Farming Practices

Certification process for organic farming systems

Major Assurance Schemes

Red Tractor,

- Logo represents over 20 years of world leading British food standards.
- Since 2000, worked closely with animal welfare experts, vets, agronomists and entire supply chain to ensure whenever you buy a product with the logo, it is traceable, safe and farmed with care.
- Assurance covers entire food supply chain - work with over 350 independent inspectors to ensure most robust assessments.
- Inspectors trained and sufficiently experienced – conduct over 60k inspections a yr.
- Logo only used on food produced, transported, stored and packed to required standards as defined by licensing rules.
- Standards in all farming sectors (chicken, dairy or vegetables) agreed by a panel of experts to ensure they are as robust as possible.

LEAF Marque,

- Principles of IFM underpin requirements of LM certification.
- Whole farm business approach delivers more sustainable farming.
- Tech. & trad. methods used with goal of delivering prosperous farming that enriches the environment and engages local communities.

Site-specific and continuous improvement across the farm including:

- Organisation and Planning,
- Soil Management and Fertility,
- Crop Health and Protection,
- Pollution Control and By-Product Management,
- Animal Husbandry,
- Energy Efficiency,
- Water Management,
- Landscape and Nature Conservation
- Community Engagement.

RSPCA Assured

- Farm animal welfare assurance scheme.
- Must comply with the RSPCA's stringent higher welfare standards.
- Standards cover every aspect of the animals' lives from birth through to slaughter.
- Label on a meat, fish or dairy product, means that the hatchery, farm, haulier and abattoir were all assessed and confirmed to have met the RSPCA's higher farm animal welfare standards.

Environmental Management & Food Chain Supply Efficiencies

- conducting a waste assessment.
- improving purchasing to reduce waste.
- improving storage and inventory management.
- conserving energy.
- conserving water.
- preserving waterways.
- keeping waste out of drains.
- reducing waste outputs

UK carbon codes

Woodland Carbon Code,

- QA standard for woodland creation projects in UK, generates high integrity, independently verified carbon units.
- Backed by Government, forest industry and carbon market experts, the Code provides woodland carbon units here in the UK.
- Internationally recognised for high standards of sustainable forest management and carbon management and is endorsed by ICROA, the global umbrella body for carbon reduction and offset providers in the voluntary market.
- Projects provide social & environmental benefits for many communities across UK.
- Include biodiversity and habitat creation, improvements in health and wellbeing, benefits for farming, local employment and educational opportunities.

Peatland Code,

- A voluntary certification standard for UK peatland projects wishing to market the climate benefits of peatland restoration and provides assurances to voluntary carbon market buyers that the climate benefits being sold are real, quantifiable, additional and permanent.

Hedgerow Carbon Code

- Hedgerows sequester carbon at twice the rate of woodland because of their three-dimensional linear structure and England's hedges already store 9 million tonnes of carbon.
- Will become the QA standard for hedgerows and aims to generate hedgerow carbon credits, independently certified by Organic Farmers & Growers – who already do the same for the Woodland Carbon and Peatland Codes.

UK Farm Soil Carbon Code

- Will consist of a set of formal protocols that allow farmers to quantify and verify reduced greenhouse gas emissions and/or soil carbon capture as a result of adoption
- Code will be free to use and open access to all farmers.
- Straightforward, practical, affordable, accessible and achievable.
- Outcome-based, not practice-based. ng regenerative farming practices.
- Code will be applicable for different 'C accounting' purposes - offset registries, carbon insetters, carbon capture incentive schemes, ecosystem services and environmental investment products - whether carbon capture will be monetised or not.

Nutrient Neutrality

Ensuring development does not add to existing nutrient burden and this provides certainty that the whole of the scheme is deliverable in line with the requirements of the Habitats Regulations.

Achieving nutrient neutrality often requires mitigation as part of development, either in the form of onsite treatment of

- wastewater and surface water runoff,
- or by offsetting any increase in nutrient loading by converting land on- or offsite with woodlands or wetlands.

The Allerton Project (winter supplementary feeding),

- Researches effects of different farming methods on wildlife and environment, sharing results of research through advisory and educational activities.
- Undertaken on 320 ha demonstration farm based in Leicestershire.
- Identify management that delivers multiple benefits for rural landscape.
- Work covers natural capital accounting, agri-environment schemes and regenerative farming systems.
- From soil and water, to woodland and environmental habitat that increases biodiversity, aims to build farmland resilience.

RSPB Hope Farm,

- Took over Hope Farm in 2000, to demonstrate, research and encourage wildlife-friendly farming.
- Showing it's possible to run a successful farming business, that produces food, makes a profit, and is valuable for wildlife as well.
- Developing new farming techniques, that can then share with the rest of the farming community.

The three main needs of farmland birds are:

- A safe place to nest
- Food in spring and summer for their growing chicks
- Food and shelter over the winter

Hope Farm have been able to provide all these habitats through careful use of our agri-environment scheme and good farming practice.

Environmental Legislation

- UK agriculture is in a period of significant change, with new government legislation & guidance focussed on the environment and agriculture.
- Developed due to the requirement to tackle global environmental challenges & the critical role UK agriculture can play within this.
- Important to understand these new policies in the UK, how they work and their key objectives and environmental

The main pieces of legislation and government policy, along with their objectives and environmental goals, & how they relate to agriculture

Demonstration Test Catchments (water catchment research).

- Keeping contaminants from entering into waterways improves river quality and protects downstream communities.
- Appropriate land management in drinking water catchments: helps create sustainable farming practices

Catchment consists of both:

- surface (streams, rivers, lakes, estuaries) and
- subsurface (soil water, groundwater) waterbodies and is separated from neighbouring catchments by a region of higher topography known as the catchment boundary.

Catchment Sensitive Farming (CSF), works with farmers and partners across England to produce food in a way that protects:

- water
- air
- Soil
- Adviser locally based with understanding of challenges farmers face.

Latest advice and tailor it to best benefit your business

- soil management
- nutrient, slurry, and manure management
- ammonia emission reduction
- farm infrastructure and machinery set-up
- pesticide handling
- water resources and natural flood management
- local environmental priorities
- land management
- agricultural transition, including grants

You can ask CSF for advice by [emailing your local mailbox](#).

You must include:

- a brief description of your farm and query
- your farm address
- single business identifier (SBI) number (if you know it)
- your contact details

Reply based on the environmental priorities in your area and will either:

- arrange a 1:1 consultation with your local CSFA within an agreed timeframe
- link to other sources of advice and information
- focus support on farms that can make the greatest improvement to water and air quality.
- Get help for queries related to the [Countryside Stewardship](#).

CSF also works with a range of partners including:

- water companies
- local authorities

- trade bodies
- environmental organisations
- river trusts

This work includes:

- Flood and Coastal Resilience Innovation programme with local authorities and the Environment Agency
- part-funding farm advisers in partnership with rivers trusts and National Parks authorities
- producing videos, tools and factsheets with Voluntary Initiative and Innovation for Agriculture

Championing the Farmed Environment (CFE)

- Soils
- Water
- Air
- Wildlife
- Climate Change Mitigation

Farm Wildlife

- Farm Wildlife is a partnership of organisations working together to provide a single source of best-practice management advice for wildlife on farmland
- Helping you to help wildlife on your farm
- Good conservation management is about understanding the locally important wildlife, choosing the right measures and managing them in the right way.
- Farm Wildlife has been developed with farmers for farmers.
- Management approach brings together best practice advice from a broad range of wildlife organisations to identify the 6 most important steps for restoring wildlife on your farm.

Agricology,

- An independent knowledge platform supporting all farmers and growers to transition to more sustainable and resilient farming systems.
- Free platform set up in response to increasing challenges of declining soil fertility, climate change, declining biodiversity and the need to rethink the way we tend the land.
- Agrologists provide leadership in environmental sustainability through their efforts in conservation,
- wetland protection
- land management techniques
- renewable resource management

Agroforestry

- Growing **both trees & crops** on same piece of land.
- Designed to provide tree & crop products and at same time protect, conserve, diversify & sustain vital economic, environmental, human and natural resources.
- Differs from traditional forestry & agriculture by its focus on the interactions amongst components rather than just on the individual components themselves.
- Research over 20 years confirmed that agroforestry can be more biologically productive, more profitable, & more sustainable than forestry or agricultural monocultures.
- Many other benefits have been shown.
- Temperate agroforestry systems are already widespread in many parts of the world & are central to production in some regions.
- Success of agroforestry is largely determined by the extent to which individual forest & agricultural components can be integrated to help rather than hinder each other.

- The choice of tree and crop species combinations is critically important when setting up systems

AHDB

- A statutory levy board, funded by farmers, growers and others in the supply chain to help the industry succeed in a rapidly changing world.
- Want to create a world-class food and farming industry, inspired by and competing with the best.
- Research and knowledge exchange for farmers

Voluntary Initiative

- Industry led programme.
- Through schemes, tools and messages promote the responsible use of PPP through an IPM-based approach to sustainable agriculture.
- Mission is to be the UK's primary delivery mechanism for promoting best practice in PPP use through enhanced adoption of Integrated Pest Management (IPM) as defined by the Sustainable Use Directive to protect water and the environment.

Farm business economics

- Understand the business opportunities and impacts of agri-environment schemes and wider funding options, including income vs management costs

Business audit – resources – natural capital

Adding value to the business

Opportunities - Diversification – Alternative Markets

ELMS

- BASIC Payment Scheme – delinked payments
- Sustainable Farming Incentives
- Countryside Stewardship
- Landscape Recovery
- Capital Loans / Grants
- Understand the business opportunities
- funding options, including
- income vs management costs.
- sources of finance/funding available
- gross margin,
- net margin
- machinery and labour costs.
- Agri-environment payment rates
- implementation of options - seed mixes, establishment and management.

Understand the implications of advice on farm costs and Digital mapping

- Computer-assisted production of digital maps of [soil types](#) and soil properties.
- Soil mapping involves the creation and population of spatial soil information by the use of field and laboratory observational methods coupled with spatial and non-spatial soil inference systems.
- The international Working Group on Digital Soil Mapping defines digital soil mapping as:
- *"The creation and the population of a geographically referenced soil databases generated at a given resolution by using field and laboratory observation methods coupled with environmental data through quantitative relationships."*

MAGIC maps data layers.

GIS systems

- Optimising fertilization: vegetation and productivity maps generated help to differentiate between productive and low-productive field areas to apply more or fewer nutrients where needed.
- Detection of crop health issues: array of vegetation indices provides insight into crop conditions at various growth stages, which is essential for the detection of threats to plants (pests, diseases, excessive moisture) and estimation of their nutrient availability to come up with a timely response.
- Irrigation control: Index-based analysis allows farmers to find overly dry or waterlogged areas within fields and adjust fertilization plans respectively to minimize crop losses.
- Simplified scouting: optimizes on-field visits with a convenient task management system. The agricultural manager can drop a pin where a potential threat has occurred based on satellite data for the scout to visit, and the latter can add detailed information about the inspection results directly to the platform, even offline.