

# Understanding AI & Impact of AI Act on Agriculture



**IFA**

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A hand holding a smartphone is visible in the background, with a semi-transparent green overlay covering the entire image. The text is centered and written in a white, bold, italicized font.

***"In my lifetime, I've seen two demonstrations of technology that struck me as revolutionary... the GUI and ChatGPT"***

**Bill Gates, March 2023**

# What is AI?

The **AI Act** aligns its definition of an AI system with the work of international organisations like the **OECD**.

**AI systems go beyond** traditional software or programming approaches, which are solely based on rules defined by humans (**DETERMINISTIC**).

**AI systems can infer, learn, reason, or model** to achieve objectives, which may include **predictions, detections, recommendations, or decisions** based on **PROBABILISTIC** models.

*Simply put, AI systems are characterised by their ability to infer outputs from data.*

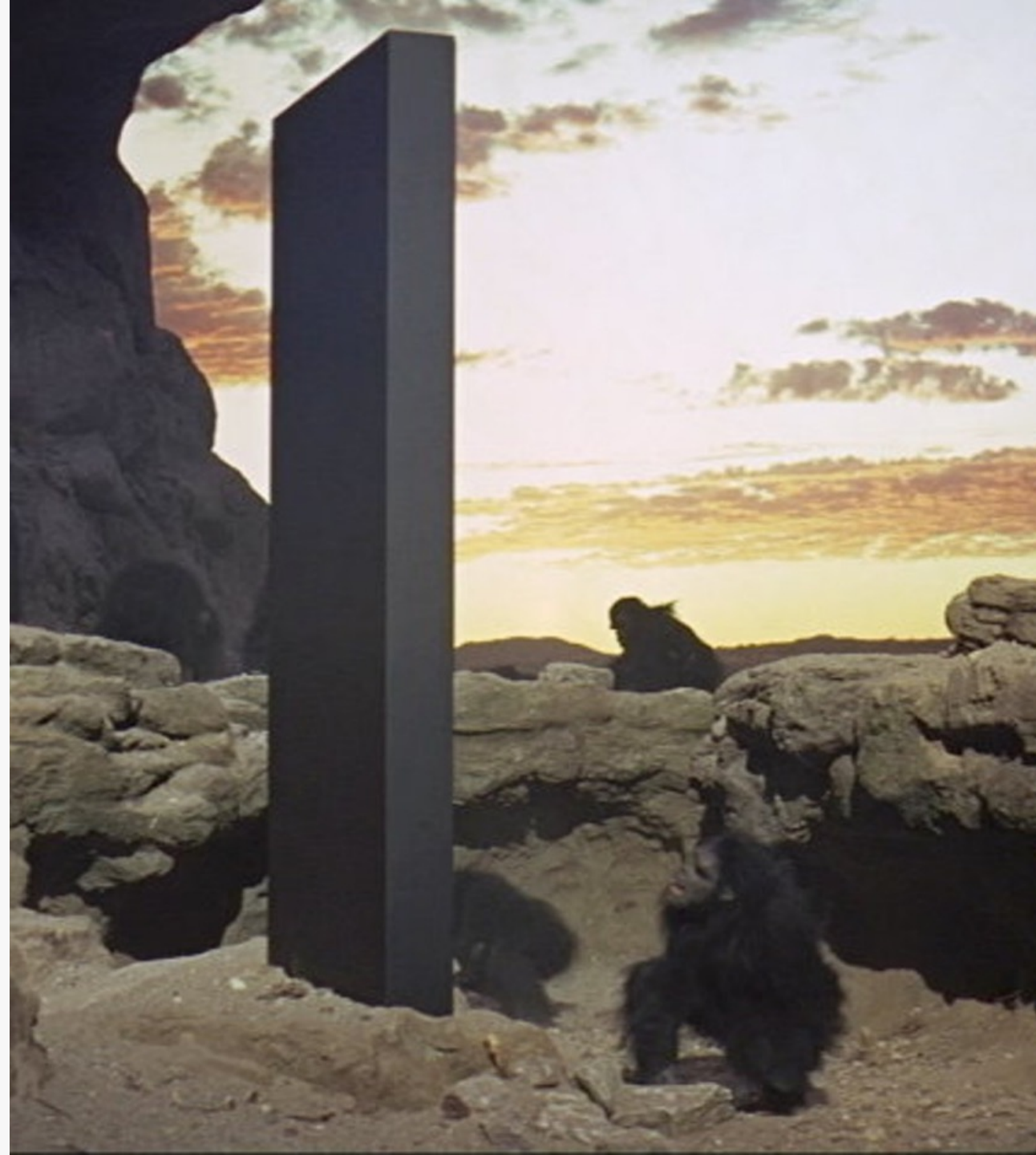


# What is AI?

# Do we know what AI really means?

**Artificial intelligence (AI)** refers to the **simulation of human intelligence** in **systems** and **machines** that are **programmed to think and learn** like humans.

**Machine learning (ML)** is a subset of AI that involves the use of **algorithms** and **statistical models** to **enable systems** and **machines** to **improve from experience** without being **explicitly programmed**.



# Do we know what AI really means?

**AI technologies** are edging towards **mainstream awareness** but have been used by people for years at this stage.

## Unhelpful ways to think about AI

Data is the new oil

Apple, Microsoft, Meta (Facebook), Amazon...have all the data

AI will take all the jobs

AI will ruin political systems

## Useful ways to think about AI

Data, like oil, must be refined and transformed to make it into useful products and services.

The most notable advances and successes in AI in the last 2 years were from startups: Stable Diffusion, Midjourney, Open AI, Mistral

AI is an automating and enabling layer

EU AI Act...agriculture ignored or excluded?!

# Machine Learning = Patterns

Ways or techniques to perform statistical analysis of data to find patterns, detect anomalies and make recommendations and predictions.

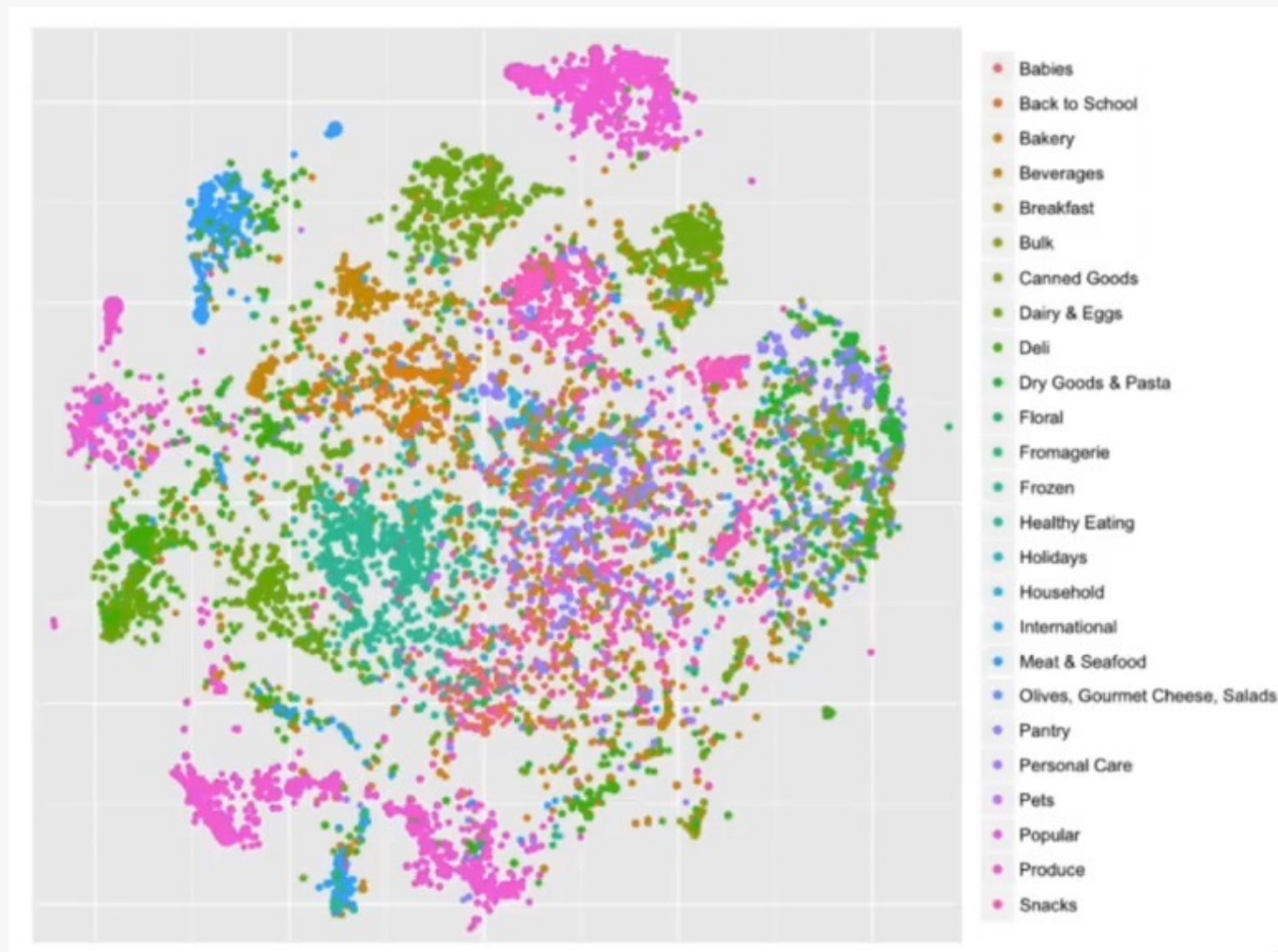
What types of data (Multi-Modal)

Text

Images

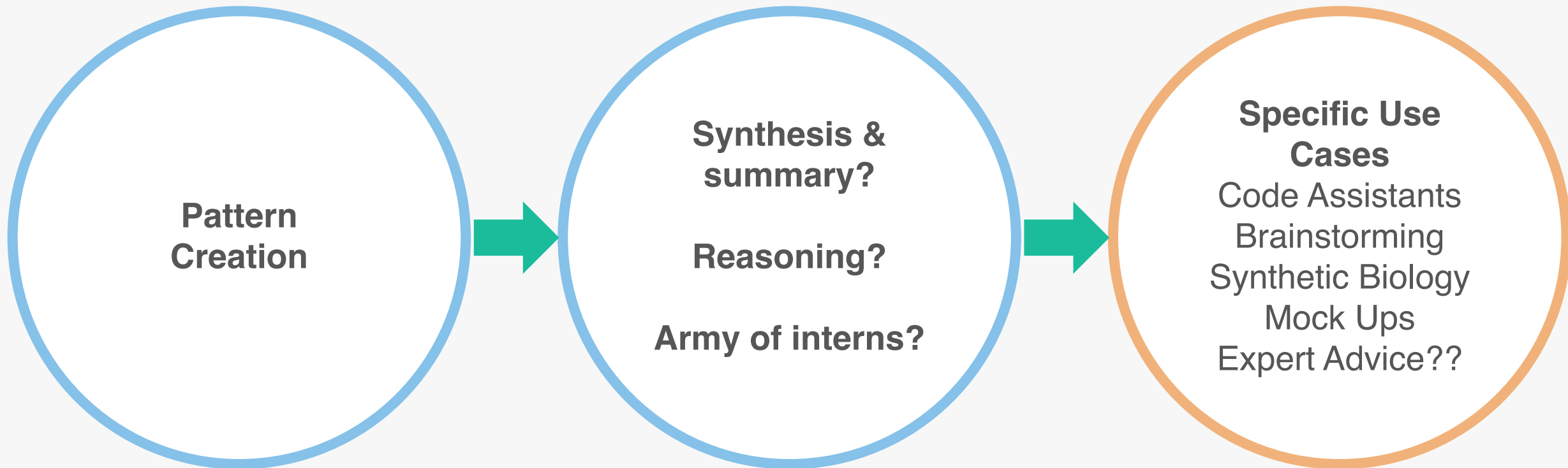
Video

Audio



# Large Language Model = Understanding & Generation

An advanced AI model that **analyses vast amounts of textual data** to understand **language patterns, context, and semantics**, enabling it to **generate coherent, contextually relevant text** and perform tasks like **translation, summarisation, and question answering**. Every text box on the Internet could end up with an LLM!



# Generative AI = Creation

Methods or algorithms designed to generate new content or data by learning from a diverse set of multi-modal data inputs, such as text, images, video, and audio.

Produces novel outputs that are derived from but **NOT identical** to the original data amalgamated in a corpus of data.



You

Tell me about the Basic Payment Scheme in Ireland.

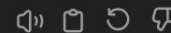


Farm Schemes GPT from IFA

The Basic Income Support for Sustainability (BISS) Scheme has replaced the Basic Payment Scheme (BPS) as the primary direct payment support mechanism for Irish farmers, aiming to bolster their ongoing sustainability and viability. To qualify for BISS, farmers must have eligible hectares to match each of their Payment Entitlements, hold a registered herd number, be an active farmer, and meet minimum direct payment requirements. Payment under BISS is based on the size of the holding (number of eligible hectares) and the number and value of entitlements held by the farmer.

The BISS aims to ensure a stable income for farmers, supporting the continuity of a secure food supply. It's structured around payment entitlements, where each farmer must declare an eligible hectare of land for each payment entitlement to qualify for payment. The scheme includes a convergence mechanism, which adjusts the value of entitlements toward a national average, influencing the payment amount each farmer receives based on their specific entitlements and declared eligible hectares.

Farmers interested in the BISS must apply online by specific annual deadlines, ensuring that all the declared lands are correctly accounted for in their applications. The scheme underscores the need for farmers to maintain the declared land as agricultural land throughout the year, aligning with the scheme's eligibility requirements.



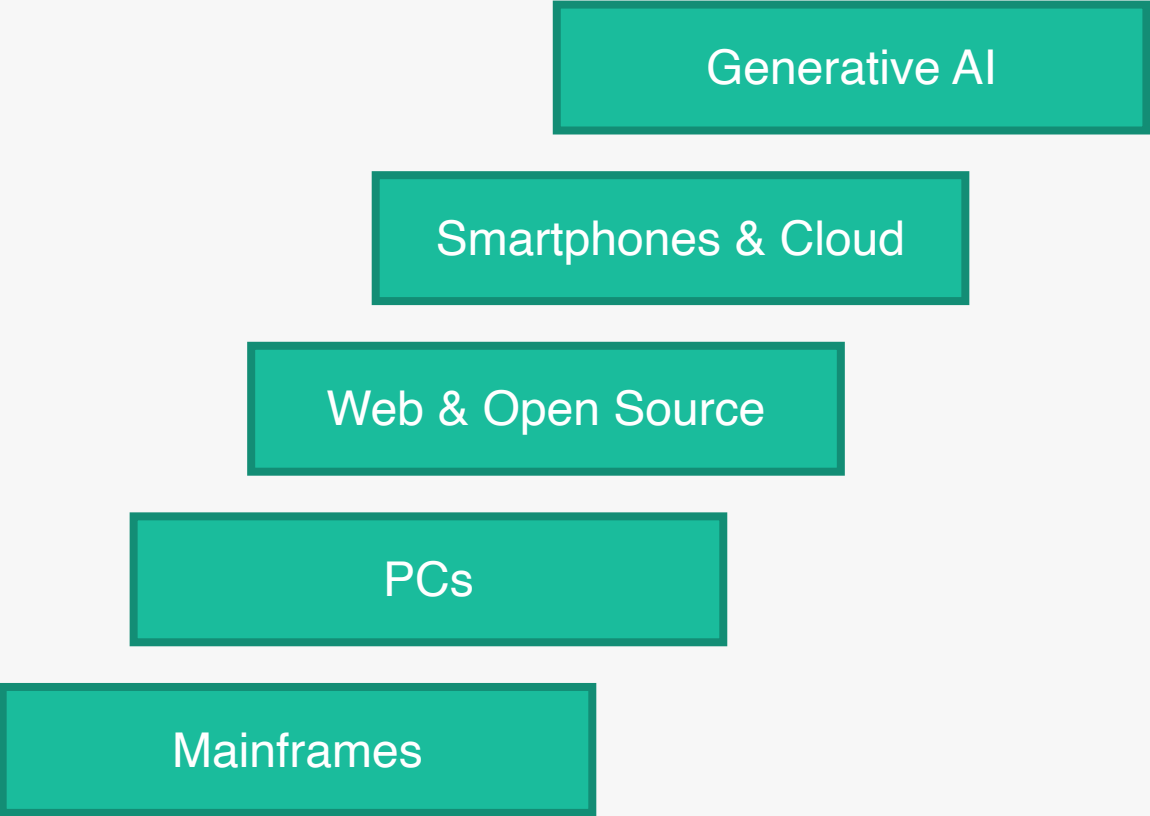
Message Farm Schemes GPT from IFA...



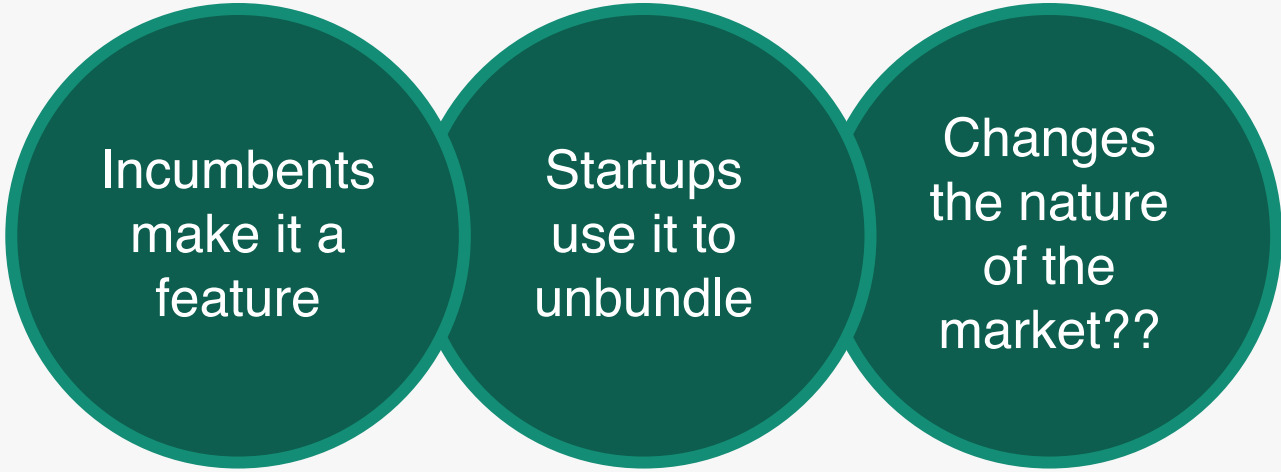


# Generative AI is a Platform Shift

Tech moves in platform shifts  
(every 10 – 15 years)



How is **value** captured in a **platform shift**?  
Is this **occurring** in **agriculture**?

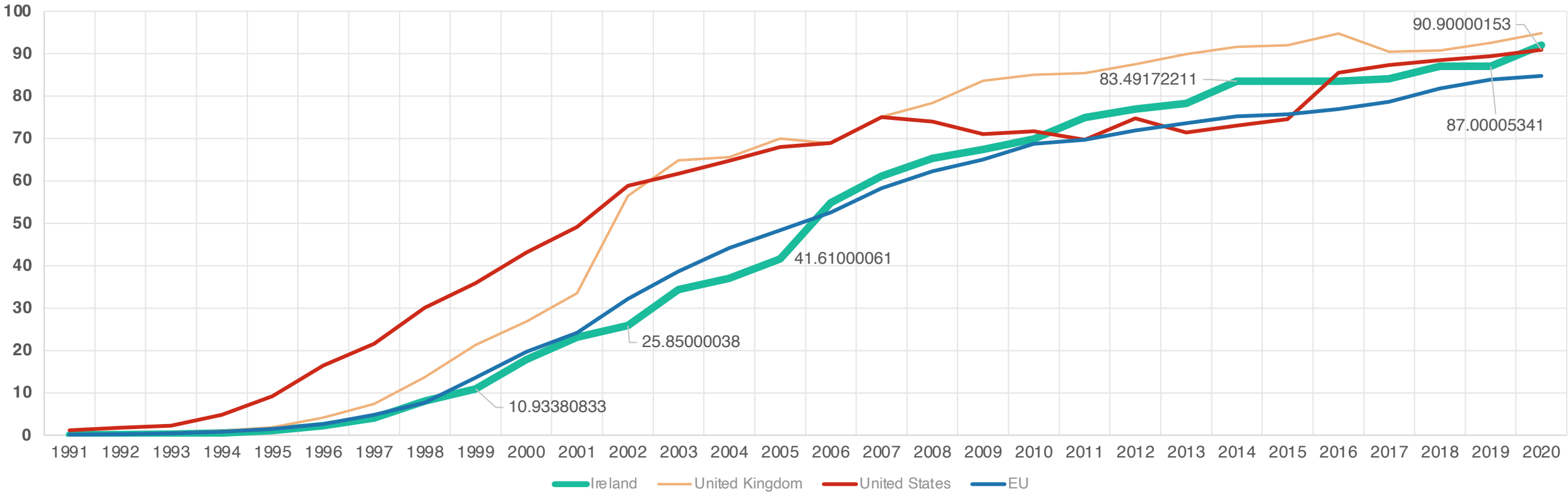


AI is **great**, but... what can  
we do with it in **agriculture?**

# Are we all connected?

From the few to everyone.

### Individuals using the Internet (% of population)



Source: Eurostat Internet Use

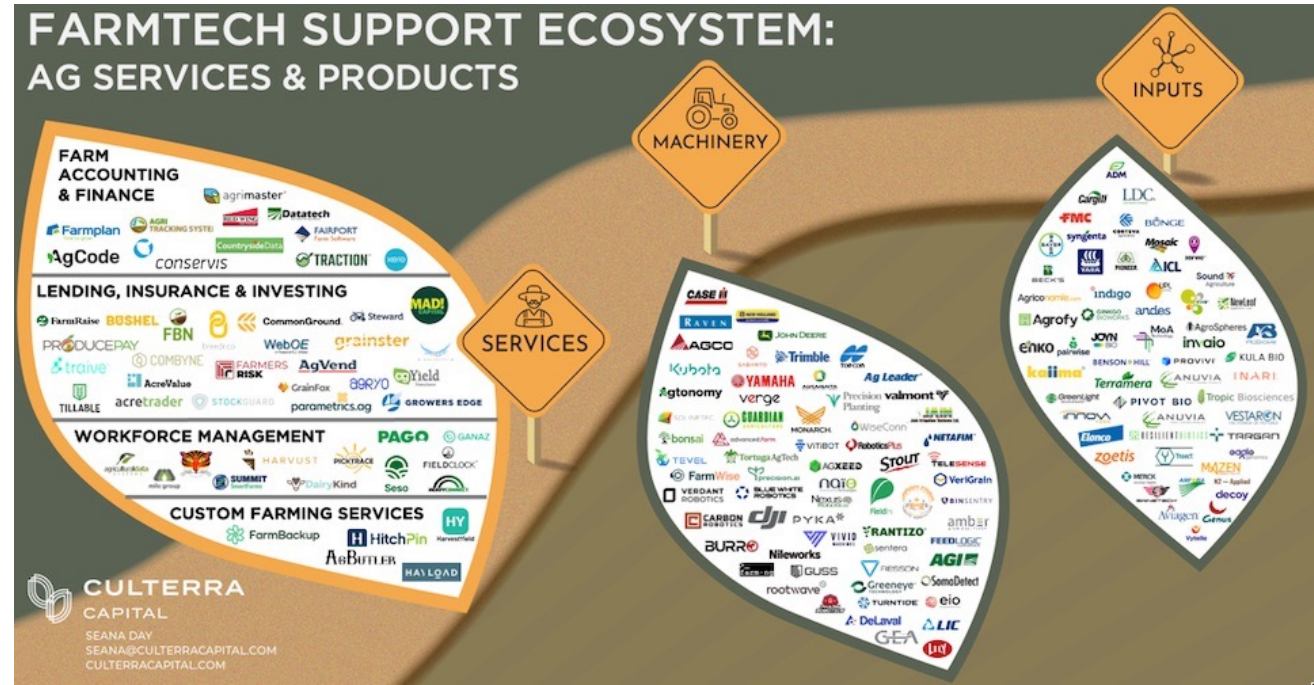
# Are we all participating?

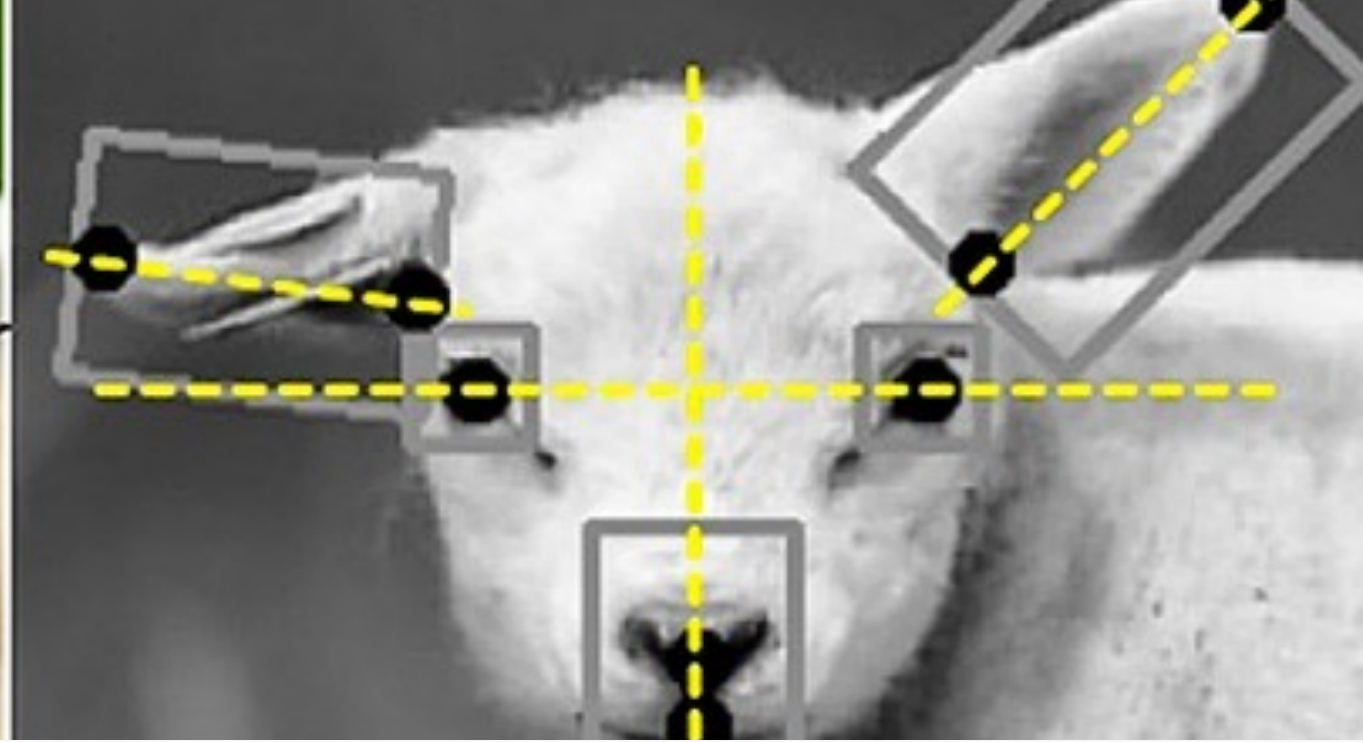
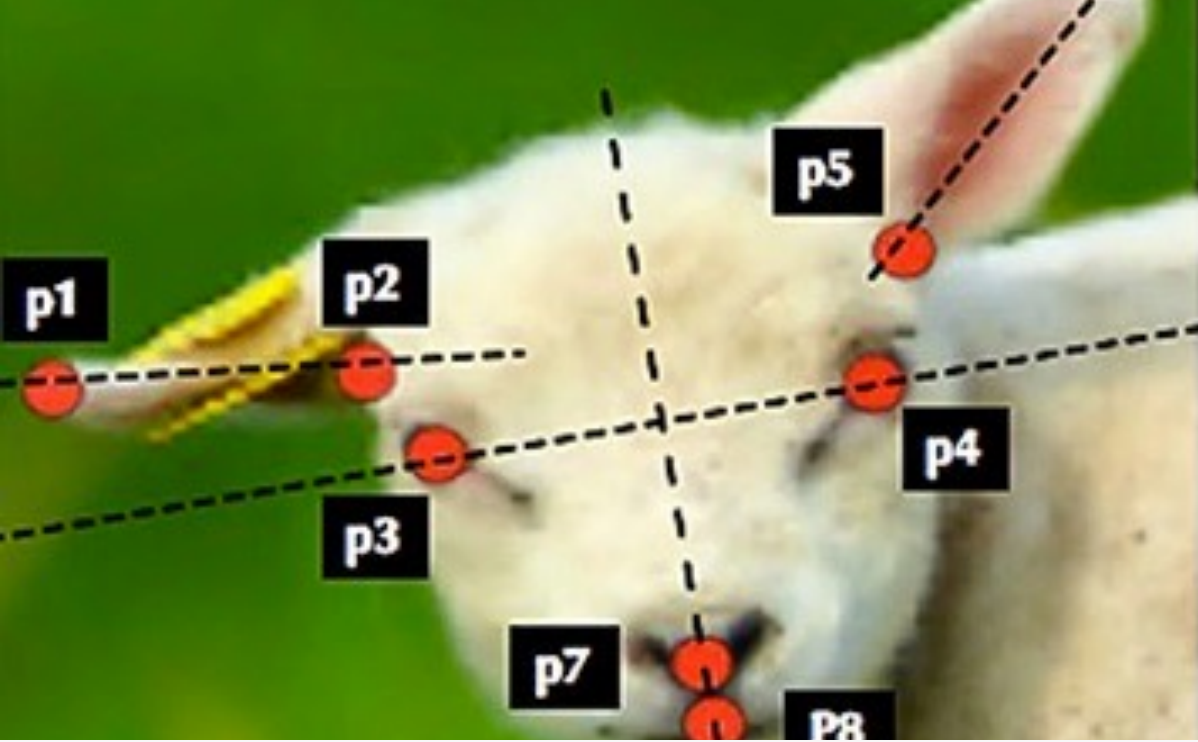
Consumer and Enterprise Technology embedded in everything we do.

5bn+ people have access to smartphone/personal computer.

The pandemic converted offline habits to online habits.

Every market and value chain is being remade around the Internet ...including **agriculture**.





“Five main things happen to a sheep's face when it is in pain -- its eyes narrow, cheeks tighten, ears fold forward, lips pull down and back, and the nostrils change into a V shape”

Researchers **trained their model** using about **500 photographs** of sheep. It could **estimate pain levels** with about **90% accuracy**.



Using **computer vision** and **smart machines** to **detect**, **identify**, and make management decisions about **every single plant** in the field.

**Personalise** treatment of each **individual plant**, applying **herbicides** only to the **weeds** and **not** to the **crop** or **soil**.

# Providing Expert Advice

Large Language Models (LLM) can be trained on vast amounts of agricultural data, including information about soil conditions, nutrient levels, geographic topology, weather patterns, livestock genomics, animal health factors & economic contexts.

**Potential** to provide farmers with personalised recommendations and advice on how to optimise production, reduce losses etc... **BUT**

The screenshot displays a mobile application interface for agricultural management. On the left, a list titled "Fields" shows a total of 10.4 ha out of 61.8 ha planted. Below this, several field entries are listed with their respective areas and crop status:

Field ID	Area (ha)	Crop	Value
8. Field	2.3	No crop	0.28 ↓
8. Field	10.4	Wheat hard, winter	0.43 ↑
Field	17.9	No crop	0.46 ↑
Field	2 5.5	No crop	0.44 ↑
Field	3 2.8	No crop	0.37 ↑
Field	4 6.9	No crop	0.48 ↑
Field	5 1.5	No crop	0.48 ↓

The central part of the interface features a satellite map with a yellow and green vegetation index overlay. A specific field is highlighted in yellow and labeled "Feb 9". Below the map, there is a "Current weather" section for 12:11 pm, showing a temperature of +11°C, wind of 8 m/s, humidity of 82%, dew point of +8°C, and pressure of 750 mm. A "Weather forecast" section indicates a temperature increase of +10°C and a 50% chance of precipitation tomorrow. On the right side, a sidebar for "8. Field, 2.3 ha" shows "No crop" and provides "Actions" and "Edit info" options.

At the bottom of the screen, a navigation bar contains several icons: a server rack, a control panel, a globe with "WWW", a microchip, a code editor, and a list icon. Below these icons is a horizontal timeline with six circular markers.

The image features a monochromatic green color scheme. The background is a composite of several elements: a close-up of a hand holding a corn cob on the left, a field of corn plants on the right, and abstract digital patterns like concentric circles and lines overlaid on the scene. The text 'AI ACT' is centered in a bold, white, sans-serif font.

**AI ACT**



# EU Data Governance Acts & Regs

Digital Europe Programme:  
European Strategy for Data, 2020

Directive 2007/2/EC  
Infrastructure for Spatial  
Information in European  
Community INSPIRE

Agricultural census  
[(EU) 2018/1091 ]

1306/2013 (current CAP  
Horizontal Regulation)

Rural Development Plans -  
common indicators  
[(EU) 1305/2013 ]

Directive (EU) 2019/1024 on  
OPEN DATA and the RE-  
USE of public sector  
information (a

Directive 2003/98/EE of  
reuse of Public Sector  
Information (PSI)

Integrated  
Administration  
& Control  
System (IACS)

Data Sharing  
Legislations

AI  
Act

European  
Agriculture  
Data  
Spaces

GDPR

Digital  
Markets  
Act

European  
Partnership  
Agriculture of  
Data

Act on HVD  
Sets

Data  
Governance  
Act

Data  
Act

Digital  
Services  
Act

# AI Act

The **AI Act** proposes **harmonised rules** for AI, aiming to ensure a high level of **protection** for **health, safety, and fundamental rights**, including **democracy, rule of law, and environmental protection**.

The Act seeks to address **risks** associated with AI, establish a **framework** for **high-risk AI systems**, and **promote innovation** and the uptake of trustworthy AI in the EU.

**High-risk** AI systems will be assessed **before** being put on the **market** & throughout their **lifecycle**. People will have the **right to file complaints** about AI systems to **designated national authorities**.

**Prohibits** certain AI practices considered **harmful/abusive**.

Introduces **transparency** and **safety requirements** for **high-risk AI systems**.

Mandates **compliance** and **enforcement mechanisms**, including penalties.

Encourages **innovation** and **support** for AI development within the EU.

Establishes **governance structures**: AI Board & AI Office.

The AI Act becomes law by May/June:

**6 months later** - countries will be required to ban prohibited AI systems;

**1 year later** - rules for general-purpose AI systems will start applying;

**2 years later** - the whole AI Act will be enforceable.

# AI Act Risk Levels



Risk  
Regulatory  
Levels

**Unacceptable**

**FORBIDDEN:** Social Scoring, Face Recognition, Dark Patterns, Subliminal Manipulation. Real-time Remote Biometric Identification (except in exhaustively listed and narrowly defined situations ... for law enforcement).

**High Risk**

**CONFORMITY ASSESSMENT:** Biometrics, *Critical infrastructure*, Education & Vocational Training, Employment, Essential Private Services & Essential Public Services & Benefits, Law Enforcement, Migration, Asylum & Border Control Management, Justice Administration & Democratic Processes.

**Potential High Risk**

**FUNDAMENTAL SAFETY & TRANSPARENCY REQUIREMENTS:** General Purpose AI Systems, Generative AI (LLMs such as ChatGPT, Google Gemini).

**Limited Risk**

**TRANSPARENCY OBLIGATION:** Refers to the risks associated with lack of transparency in AI usage e.g. Chatbots, Emotion Recognition System. People made aware that they are interacting with a machine so they can take an informed decision to continue or stop and AI-generated content is identifiable and *data sources identified*.

**Minimal Risk**

**NO OBLIGATION:** Includes applications such as AI-enabled video games or spam filters. The majority of AI systems currently used in the EU fall into this category.

# AI Act: Agricultural Impact

There is one explicit mention of agriculture in the latest version of the EU AI Act, with a general cross-cutting reference to social and environmental benefits (Article 54 (2))

- (3) Artificial intelligence is a fast evolving family of technologies that contributes to a wide array of economic, environmental and societal benefits across the entire spectrum of industries and social activities. By improving prediction, optimising operations and resource allocation, and personalising digital solutions available for individuals and organisations, the use of artificial intelligence can provide key competitive advantages to companies and support socially and environmentally beneficial outcomes, for example in healthcare, farming, food safety, education and training, media, sports, culture, infrastructure management, energy, transport and logistics, public services, security, justice, resource and energy efficiency, environmental monitoring, the conservation and restoration of biodiversity and ecosystems and climate change mitigation and adaptation.

# AI Act: Agricultural Impact

- (a) AI systems shall be developed for safeguarding substantial public interest by a public authority or another natural or legal person governed by public law or by private law and in one or more of the following areas:
- (ii) public safety and public health, including disease detection, diagnosis prevention, control and treatment and improvement of health care systems;
  - (iii) a high level of protection and improvement of the quality of the environment, protection of biodiversity, pollution as well as green transition, climate change mitigation and adaptation;
  - (iiia) energy sustainability;
  - (iiib) safety and resilience of transport systems and mobility, critical infrastructure and networks;
  - (iiic) efficiency and quality of public administration and public services;

Overreach?

Unintended Consequences?

Data Bias?

Skewed Optimisations?

**Resource Allocation:** AI systems **optimise resource allocation** for environmental protection/public health **prioritise resources** away from **agricultural** areas.

**Land Use Decisions:** AI applications in **land management** could favour **land use change** limiting **farmland** availability & **food security**

**Health Systems Optimisation:** AI aimed at improving public **health** systems could **prioritise urban** over **rural areas** affecting **healthcare access** for farmers and rural communities.

**Economic Implications:** AI-driven policy decisions that **favour industrial** or **urban** development **over rural** development.

# AI Act: Agricultural Impact

AI Act lists **high-risk** AI systems (Annex III) including **Critical Infrastructure**, but this point does **not** reference **food production** or **agriculture**.

2. Critical infrastructure:

- (a) AI systems intended to be used as safety components in the management and operation of critical digital infrastructure, road traffic and the supply of water, gas, heating and electricity.

The ongoing crisis in food supply chains because of the Russian invasion of Ukraine should highlight to regulators the need for food production to be included as critical infrastructure in the high-risk category.

EU Barometer on Agriculture and the CAP further highlights the importance food production security with 49% of respondents selecting a stable supply of food in the EU at all times to be the main objectives of the EU in terms of agricultural policy

# AI Act: Points of Concern

Demonstration of hyper-specificity and un-specificity simultaneously

## Critical Infrastructure

“serious harm to the provision of basic supplies to the population...”



AI Act does not explicitly classify agriculture as critical infrastructure, which might limit the focus on agricultural-specific risks & oversight.

## Data Collectivisation

AI Act combined with Data Gov Act, Open Data Act, HVDS Act etc.



Regulatory demands for the collection and sharing of large amounts of farmer-originated data at a national and European level.

## Data Bias & Data Asymmetries

Potential for bias and asymmetries in AI systems producing outputs



Data bias that favour some sectors & farms over others (size, location etc.)  
Asymmetries due to machinery, equipment, service providers training on farmer data and accruing all the €

# AI Act: Real Risks

**Falling behind** other regions in **AI** innovation and **practical application** to **agriculture**

e.g. **Precision Agriculture**

**US** ~ 70 - 80% adoption

**Europe** ~ 40 – 50% adoption

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Looking at **wrong level** of **abstraction**.

- Do we regulate databases, spreadsheets and software?
- UK Post Office scandal
- Content moderation, deepfakes, dis/misinfo – AI or humanity problem? Both?!



Coillte says it hopes to 'enable the creation of 100,000 hectares of new forests by 2050, half of which will be native woodlands'.

Mon Mar 18 2024 - 15:45



An article published in the Business section of [irishtimes.com](https://www.irishtimes.com), headlined: “Coillte commits to planting native tree species only from 2025 on”, attributes an incorrect policy to Coillte and was published in error.

The State forestry company has not committed to planting only native tree species. The article also attributes incorrect quotations to a Coillte executive.



A hand is shown holding a tablet computer. The entire image is overlaid with a semi-transparent green filter. The text 'ethancleary@ifa.ie' is centered in white. The background shows a person's hand holding the tablet, with the screen displaying a blurred image of a person's face.

**ethancleary@ifa.ie**