7 Agriculture and Farming

Agriculture and farming form one of the oldest organised sectors of human activity, with roots in subsistence and community life. From early domestication and irrigation systems to the mechanised agriculture of the 20th century, the sector has continuously evolved through technological and organisational change. Today, agriculture exists within a complex network of food production, environmental stewardship, and global trade, influenced by climate variability, regulation, consumer expectations, and digital transformation.

Despite this evolution, the sector retains structural characteristics that distinguish it from industrial or service-based domains. Many agricultural operations remain small to medium-sized, often family-owned or cooperatively structured. Others are part of large agribusiness conglomerates with integrated supply chains and global market exposure. These divergent realities coexist, and governance frameworks must accommodate both traditional and industrial farming models.

7.1 GRC in Agriculture (with Focus on IT)

Governance, risk, and compliance (GRC) in agriculture are shaped by land ownership, seasonal cycles, subsidy regimes, environmental policy, and food safety standards. Risk management often includes weather events, disease outbreaks, commodity price fluctuations, and regulatory shifts related to pesticides, land use, or water rights.

Information systems increasingly support both operational and strategic decision-making in the sector. Applications range from satellite-based monitoring and precision agriculture tools to supply chain traceability and regulatory compliance platforms. While large actors may use advanced systems for yield forecasting and logistics optimisation, many smaller producers still rely on informal or legacy tools. This asymmetry affects digital maturity and shapes the role of CIO- or CTO-like figures, where present.

In contexts where cooperatives or public agencies support fragmented producers, IT governance includes service standardisation, subsidy tracking, data reporting, and cyber-risk mitigation across distributed, low-infrastructure environments.

7.2 Subdomains and Strategic Issues

Agriculture comprises multiple subdomains, each facing distinct technological and governance challenges:

- **Crop Farming** – Includes grains, vegetables, and industrial crops. Technology use includes soil monitoring, irrigation control, and pest management, increasingly supported by IoT and remote sensing.
- **Animal Farming** – Ranges from dairy to meat, poultry and fish. Systems support animal health tracking, feed optimisation, genetic records, and regulatory reporting for health and welfare standards.
- **Agroforestry and Water and Land Management** – Integrates ecological and commercial practices. Information systems may monitor biodiversity, carbon capture, and land use regulation compliance.
- **Agri-Food Processing and Distribution** – Interfaces with manufacturing and retail sectors. Systems support traceability, quality control, and cold chain logistics.
- **Agricultural Finance and Insurance** – Manages exposure to environmental and market risks through tailored financial products, supported by weather data, geolocation, and remote assessments.

Cross-cutting concerns include climate adaptation, land tenure transparency, cross-border trade standards, and access to funding or training for digital transformation.

7.3 A Few Keywords…

- **Precision Agriculture**: Data-driven optimisation of inputs (water, fertiliser, pesticides) to maximise yield and minimise environmental impact.
- **Farm Management Information Systems (FMIS)**: Tools to plan, monitor, and analyse farming operations and finances.
- **Traceability and Food Safety**: Ensuring products can be tracked from origin to consumption, supporting health and compliance.
- **Agritech**: Emerging field of technology solutions tailored to agriculture, including drones, sensors, and AI-based advisory tools.
- **Rural Connectivity**: Digital infrastructure remains uneven, posing barriers to innovation and data integration.
- **Climate Risk and Resilience**: Growing need for adaptive strategies and risk modelling, often under public policy incentives.
- **Subsidy and Compliance Management**: Key in public sector contexts, especially in EU CAP (Common Agricultural Policy) frameworks.