Outline

• Why animal traceability systems?
• How do they work?
• What are the key challenges/problems?
• Is there a role for digital technologies?
• Ideas for creating an enabling environment...
Why is animal traceability important?

• Animal traceability systems (ATS) are fundamental to:
  • Animal health and disease
  • Food safety and quality
  • Certifying exports
  • Facilitating int’l trade
  • Consumer awareness
How do animal traceability systems work?

1. Animal identification (individual or homogeneous groups)
   - Notches
   - Brands
   - Tattoos
   - Ear tags
   - RFID
   - Implants

2. Data collection
   - Non-electronic IDs use manual data collection and recordkeeping entering manually into database

3. Data registry or database

4. Data exchange
What are the key challenges?

• Animal traceability systems are absent in many parts of the world
  • % of OIE members reporting to have available data on:
    • Animal traceability (28%)
      • of which 57% is in electronic format (88% in EU, 48% in Asia and 28% in Africa)
    • Animal identification (26%)
    • Animal movement (23%)

• Inefficient, insecure and expensive
  • Paper reports and manual database still prevalent
    • Paper reports sent by mail used by 62% of OIE members
  • Electronic centralized database
    • Constraints related to data sharing by owners, confidentiality and security
Is there a role for digital technologies?

Data and information help protect animal and human health, and facilitate trade.

- Accurate product-process links
- Data collection in e-format
- Data sharing fast and securely
- Data analysis for data-driven decisions

Product-process links

- Linking live animals to products to ensure authenticity

Animal identification
- Electronic IDs
- Facial recognition

Product identification

Operational Model

- DNA Sampling
- Verification Sampling
- Sample Analysis

Data Feedback

KPI Data
- Source Verification
- Product Authenticity
- Product Maturation
- Grade Specification
- Trim Specification
• Data sharing to integrate fast and secure communication and exchange between supply chain actors and authorities (blockchain)
Data collection in electronic format

• Data sources (mobile phones, IoT sensors, biosensors, robots and internet)
  • Remote sensors collect data in real-time
    • Animal health and welfare data to detect early signs of animal disease (body temperature, heart rate, animal movements and behaviour, stress levels, animal sounds (like coughing), analytes (e.g. protein and enzyme levels) and detect the presence of disease pathogens)
    • Behavioural data to optimize feeding and animal performance (feeding patterns, movement and animal weight)
  • Manual (and automatic) collection via mobile devices
    • Data for animal disease surveillance and control, food safety risk assessment and certifying exports (animal feed, veterinary medicines, laboratory tests and other information on animal health)
    • Proves product attributes and optimize quality controls (organic, free-range, grass-fed, hormone-free and antibiotic-free)
Data-driven decisions and predictive analytics

• Data analysis to inform data-driven decision making and predict outcomes (artificial intelligence and machine learning, other big data analytics)
  • Monitoring tool to detect disease outbreaks, contaminated products, food fraud and noncompliance with food standards
  • Examples:
    • Motion-sensors to collect behavioural data and AI to detect if cattle are ill, less productive or ready to breed;
    • Infectious disease outbreaks identified from digital behaviour patterns through web search and social media
    • Using data to learn patterns and predict noncompliance for better targeting on-spot inspections
Digital solutions for improved safety and quality

• Blockchain-based animal traceability systems
  • TE-Foods combating ASF by using mobile phones and blockchain to enable direct communication between supply chain actors and authorities

• AgVoice Global: voice-to-data capture

• New detection tools
  • E-tongue using AI and electrochemical sensors to test food products for fraud and adulteration (applicable for liquids and in the future solids)

• Electronic phytosanitary certification (ePhytos)
  • IPPC’s ePhytos Solution Project allows countries without their own national system to produce, send and receive ePhytos in a harmonized format
How do we create an enabling environment?

• **Producers, processors and other private actors**
  • Adopt technologies and new protocols

• **National authorities and private sector**
  • Develop new protocols for using technology in ATS and incentives for stakeholder buy-in
  • Strengthen human capital (extension services, education, training, digital skills)
  • Regulations that enable the adoption of digital technologies in livestock value chains
  • Improve digital and physical infrastructure
  • Facilitate public and private investments to support farmers and startups in livestock value chains.
Thank you!