

Animal Identification – New developments and future possibilities

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Recently the world has been challenged by epidemics and most recently a human pandemic. This has disrupted the global economy and caused heartache for millions of people. Through this period of uncertainty, new ways to track people were developed using a carried smart phone that enabled check-ins, registrations, and proximity alerts. The threats today and of the future are the same for animals and an improved system(s) is required now.

Animals roam remotely and gather intensely; most animals though are where traditional communications are absent. They can't carry a device or recharge a smart phone. Yet globally, challenges of disease biosecurity and consumer traceability demand is intensifying. Therefore, the identification and traceability technology of the future needs to be dual operated in unlimited range and intense environments, reliable, automated, auditable, ubiquitous, interoperable, secure high integrity data, recording real time location and activity plus adaptable between intensive and extensive operations. The technology of now and the future should go further and record their impact on the ecology, environment, feed efficiency for genetic traits and health/welfare to determine if changes are required through management practices or other means to meet ESG expectations of the future from the supply chain to the consumer. The technology of now and the future should also incorporate one touch recording of transfers, providing information for the entire life of the animal.

However, there has been billions spent around the world on existing RFID systems. Therefore, if we disrupt and cause radical change too fast we will leave those investments obsolete or unable to serve out their lifetime. Instead, a transformative future technology needs to be introduced that is interoperable with existing infrastructure while rewarding those transferring to a new automated remote way of gathering information that is beyond an RFID number and includes real time behaviour/activity, location and proximity history of the animals during their lifetime. Transformative commercial technologies exist, and the approval processes are already dictated by international standards like ISO and international communication protocol requirements. Approval should only consider information collected and the way in which the technology interacts with the animal for ethical and welfare consideration. Long national approval processes should be removed and instead a centralised approval from a single body (ICAR) to assess so that these platforms may transparently operate to democratise the information about the food consumed globally.

Abstract

Innovation is fast outpacing regulation. An international framework of global requirements to enable future rapid adoption of improved technologies for identification, traceability and activity are required now or risk substandard renegade schemes and technologies that operate outside of required biosecurity needs.

Keywords: Identification, traceability, transformative, interoperable, automated, biosecurity, regulation, standards, technology, ethical, animal welfare, democratise, international.

Introduction

Today we are faced with the frequency of biosecurity threats at an increasing rate. The current systems, regulations and standards implemented by nations, however proud of what they have, are insufficient to cope with biosecurity incursions of now and the future. We will see new biosecurity devastation from diseases, viruses and bugs that we had never previously known about or had been lax to their incursion. Nations must be flexible and allow for new processes to be implemented quickly to cope with an ever-changing dynamic that had evolved as the world has become more global and movements more frequent between borders. Even then, as climate change continues to evolve, we will see diseases cross borders through insects or through airborne movement. These threats are very real with many current and recent examples of how quickly things may evolve. Nations can no longer put their head in the sand and pretend that the systems they have today will hold them in good stead for generations. There are many examples where generational change is necessary to implement new ways of doing things, new technologies and new frameworks. We can not afford to sit on our laurels of past and hope for the best.

Double this requirement when considering the consumer who has never known less but wants to know more about where their food comes from for provenance, animal welfare, sustainability, food security and safety.

So how do we achieve all of these demands without stifling the food production system through regulation and outdated systems and processes?

There has been very few, if any new types of identification traceability systems implemented for decades in any country. Those nations that implemented RFID systems have led the world for traceability for decades however they are now struggling with the process changes required when considering the new environment in which the world operates. They stand by what they have previously achieved and a mindset that "if it ain't broke, don't fix it", completely impervious to what is required now and in the future. Those nations set the benchmark and toiled to gain acceptance of the system at the time that satisfied the limited need of the past and subsequently are unable to shift mindset that those capabilities are now insufficient and outdated to today's desperate requirements.

Ironically, it is nations without current identification systems that have the opportunity to implement a fresh mindset and leapfrog the current leaders for world leading traceability and competitive advantage. These nations and those willing to accept that the status quo is insufficient and requires change, will be the new leaders in food security and food safety and create a distinct competitive advantage.

New dynamic frameworks with centralised assessment and clear interpretation of what must be achieved from any technology must be available to ensure that regulation keeps pace with innovation. These frameworks become less how things are done but rather the parameters they provide to achieve the needs of the changing environment. These new technologies or processes should also be transparent enabling national systems and/or consumers to access if desired or required. This type of thinking is

novel for regulators who have previously had success with outdated systems and who are reluctant to change to meet the demands of today's producers and consumers to automate and democratise information critical to the supply of food and associated products to an ever growing and more demanding global population.

Technologies are evolving that can do many things and to prescribe a single methodology is both limiting and perhaps careless. Today and in the future, we face challenges of speed to face biosecurity challenges, identification traceability and consumer demands.

There are a range of technologies currently available from facial recognition, RF frequency identifiers, bolus, injectables, drones, satellite trackers and other types of markers and monitoring. Most of these have prescribed purposes and require infrastructure to be established to operate making them expensive to implement, manual to operate and limited to particular purposes.

Regardless, this should not limit their applicability if they have the ability to reliably provide the information prescribed at every stage of the supply chain or if an animal was to only stay at the particular stage of the supply chain and never leave where that technology is able to be applied.

Scalability remains the primary challenge of most technologies and the ability to implement with existing systems while transitional activities occur. That is, the next stage of provenance proof will need to be transformative incorporating existing ways of identification traceability while building future automated multi-times daily reporting systems to display and record insights of the animal during its lifetime.

The operations of animals during their lifetime also transition between extensive operations, often required for breeding, sustainability, and animal welfare purposes to the intensive food production environments. Technologies that operate in one environment, often do not operate in the other creating a limiting effect to their usability in a supply chain.

While software systems are good for management, visualisation and blockchain, they do not create the data from which those platforms are populated. They are necessary but by themselves, not a solution.

Currently there is only one such transformative technology that incorporates satellite technology that can transition to Bluetooth that is interoperable in an intensive and extensive environment providing identification traceability and biosecurity contact tracing capabilities as well as performance monitoring. While others excel in their particular field, the adoption rate will be limited making it difficult to prescribe in national cases unless every sector of the supply chain is considered. Other technologies only target a sector of the market however large or small, and require additional input or technologies to transition data from one platform to another and most operate a closed rather than interoperable ecosystem.

Technologies

ICAR and National Traceability Systems

ICAR provides the guidelines that some nations adopt as their national requirement to operate while others prescribe additional requirements that take many years, are not practical nor are they consistently repeatable and appear to be a block for any transformational or improved technologies due to potential commercial changes and replacements. The latter are usually nations with existing standards that find it difficult to improve from methodologies implemented decades ago with incumbent suppliers who are very well known, comfortable with the status quo. The reason to change often receives pushback for commercial preferences rather than for the betterment of the industry. Some individual national programs, however great or small in their differences, have resistance towards change as individual interests of committees and sub committees can take precedent over the intended good for systems that were implemented decades ago which may no longer be able to manage the threats and purpose of today.

The continuation of resistance to change or to adopt improved technologies that increase speed to market while providing increased quality control, only increase the likelihood of renegade new platforms to enter the space, this has happened in other industries such as Social Media platforms to traditional media or rideshare to the taxi industry.

The guidelines for traceability, especially for exporting markets, should be flexible enough to incorporate new technologies and governed by principals of a central body assuring which ever technology is able to provide the necessary information needs. This would increase the international competitiveness for supply of animal products and ensure that the required information is able to be supplied in an automated timely nature with minimal input required from the producers themselves. The information should be democratised, automated, fluid and transparent for regulators and consumers to see.

Consequences of not adopting new technologies

Adoption of new technologies also increases the rate of digital transformation so that storage for historical and traceability purposes can be done in a reliable, efficient, fast, compact and cost effective way. Currently so many national traceability systems are paper based with digital options. The paper systems are where information is lost, unreadable or sometimes frauded. Existing systems are often manipulated, only inserting tags at the final moment between movements with no way of knowing where the animal originated or any of its history.

Biosecurity threats and incursions are coming more into focus as international movement via ships, planes and road based transport systems that carry animals or animal products which may be carrying diseases or parasites across borders into other nations or regions. When this occurs, at best we currently only have passive systems to rely on to provide the information required and this is only valid if all of the paper based systems were correctly completed, submitted and considered. This reliance on humans to do the right thing or do things correctly every time in every place is a massive risk to the world and our ability to feed a growing population safely and reliably.

Only automated technologies that can demonstrate the ability to operate without any additional infrastructure and with the capability to report across borders can be considered for any serious implementation at scale or in nations where export is part of their drivers for production.

Never before have we seen such significant threats take hold around the world and cause such devastation to the global food supply. Examples are African Swine Fever where approximately 50% of Chinas' swine supply was decimated, Mycoplasma Bovis

in New Zealand or currently the Foot and Mouth and Lumpy Skin Disease in Indonesia threatening to jump the border into Australia, one of the worlds largest exporters of beef products.

The damage done from these incursions reaches into the billions of dollars, lost market access and reputation plus a major deployment of resources to manage the situation, placing people, eco-systems and animals at risk for no economic or social gain.

The intense systems are not likely to escape these incursions in many supply chain systems with breeding in extensive operations and then feeding into the intense operations where a single infected animal can cause hundreds or thousands to be infected in a relatively small space and short timeframe. The animals in the extensive production systems are also exposed to wild animals that may be carrying the diseases and are able to move beyond boundaries providing the interconnectivity to spread from one animal to another. The movement along supply chains will also spread biosecurity incursions rapidly, with no illegality intended, often operating with the innocence of those who do it as their way of life, without full engagement of inspection and often in remote locations. For this reason, we need to have notifications both on the animal that can alert through an LED or similar and to alert digitally when an event occurs for the early detection and then subsequent contact tracing to determine the extent to which the incursion has occurred and its origins, most likely through genomic sequencing.

The deployment of Animal Identification technologies to support digital transformation cannot be ignored, swept away or pretended not to exist. They are real and available now in multiple countries. The current traceability systems are not robust enough to protect for tomorrow's challenges and provide the information required for protection or to inform a growing inquisitive population on where their food comes from. International frameworks must be derived and deployed as soon as possible so that regulation may keep pace with innovation, or the market will create their own principles and acceptances to operate seeking forgiveness rather than permissions that are irrelevant to today's needs and opportunities.

There are technologies that can provide all of the needs of the future with unlimited range and machine learning to continually update to the needs of tomorrow, that is scalable, reliable, interoperable and critical to the future of the animal recording. These technologies will have others join them in capability in the future to ensure they also have competitiveness and challenge to continually improve.

New frameworks are required now, technology development is moving at a rapid pace. If agencies and nations are not ready, producers will rely on ways to get their products to market. The industry is undergoing a significant demographic shift and the future generations will not wait. Allowances and guidelines that speak to outcomes rather than methodologies are required if we are to support digital transformation across livestock production and build a prosperous and effective safe food future to feed a rapidly growing population.

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Biosecurity threats

Conclusion

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