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The Mexican Animal Identification System: Current Situation, Problems, and Potential

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Mexico initiated a federal animal identification (ID) system (SINIIGA) in 2003. The program is administered by an agency of the federal Department of Agriculture (SAGARPA) and has been used primarily to support a federal subsidy program for livestock producers. The program is conceptually well designed, but implementation thus far falls short of the potential and needs, most importantly in animal disease management. Although substantial numbers of animals have been tagged, relatively little progress has been made in developing a usable animal ID information system. Animal health officials currently are not actively involved in the development and use of the system.

Key Words: Mexican animal ID system, livestock, Mexico

JEL Classifications: Q13, Q18

Concerns about animal health and food safety issues in domestic and international markets have prompted many countries to implement some sort of animal identification (ID) program in recent years. The types of systems and approaches used vary considerably from country to country and the success is widely varied as well. This article summarizes the current animal ID system in Mexico and some of the related plans and considerations of various agencies and entities at the federal and state levels.

General Objectives of Animal ID

In many cases, and logically, animal ID programs are implemented to facilitate control and management of animal health programs. The effectiveness of animal ID systems to meet this principal objective depends on the design characteristics of the system and the extent to which the system is implemented and managed effectively. Questions of whether the system should be mandatory or can be voluntary are important and often contentious. The nature of animal health programs as part of the broader human health and food safety systems means that there is considerable public nature to animal ID programs. This strengthens the argument for public investment in animal ID systems as well as strengthening the argument for a mandatory system that meets certain minimum requirements, including level of adoption.

In addition to these regulatory needs, animal ID programs may contribute to a variety of other public and private benefits. Animal ID systems facilitate a variety of international trade and marketing benefits. In many cases, the core database for animal ID will need to be expanded to accommodate these additional benefits. The efficiency, and therefore the potential for these value-added marketing opportunities, depends on the ability to augment the basic animal ID

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data included in the core information database. Thus, by adding, for example, age information to the animal ID data, age and source verification can be efficiently realized. Additional information such as verification of various production processes can facilitate access to value-added markets such as natural beef, organic beef, or grass-fed beef. Increasingly, access to international markets depends on the extent to which a country has a credible animal ID system to verify source, age, and sanitary and phytosanitary requirements.

Animal ID systems are often developed in a couple of stages that may be required to meet any of several objectives. At the most basic level, an animal ID system simply identifies the source of animals. This may be useful to document the source for domestic or international marketing purposes (country, region, or state of origin) or it may be used to support various domestic programs. For example, the current Mexican animal ID program is primarily used in the implementation of the PROGAN program.[1] At this basic level (assuming the ID information is available to health officials), the system may be of some help in animal health programs by promoting faster identification of the source of diseased animals. Usually the animal ID for origin is tied to a system of retiring the tag numbers when animals leave the system at slaughter or exportation. This is the so-called "bookend" system that captures both ends of the animal's life but does not account for movements in between.

Second, an animal ID system may be part of a comprehensive traceback system that not only identifies the source of animals, but provides a record of animal movements and exposure with other animals. This second level is not possible without the first level but represents a significant additional step in information system requirements and program implementation. A complete traceback system provides a greatly enhanced capability for animal health and food safety programs and thus significantly reduces the threat of human health or economic impacts of animal disease outbreaks or food safety incidents. A traceback system may provide enhanced market value by facilitating process verification or other quality assurance programs that increase animal and product value in specific markets.

Economic Considerations of Animal ID Systems

Implementation of an animal ID system has proven to be politically difficult in many countries in large part because of the multidimensional economic considerations that must be considered to fully evaluate the costs and benefits of the system. In some cases, historical success in preventing disease has led to a tendency to underestimate the threat and potential impact of animal disease outbreaks. The difficulty is exacerbated by varying social and cultural perspectives within which the systems are viewed. Important economic considerations include public good and free rider issues; public vs. private costs and benefits; trade; bioterrorism threats; and risk as related to optimal disease prevention/eradication vs. control.

Implementation of an animal ID system involves both public and private costs and results in both public and private benefits. The total social benefit of animal disease control exceeds the individual private values of producers resulting in the public good dilemma of private market underinvestment in disease control. The effectiveness and value of animal ID in disease control is dependent on a high percentage of producer participation making the free rider problem particularly acute. The economic impact of disease outbreaks is directly related to several factors, including the severity of the disease; the difficulty of controlling the outbreak; and the length of time that markets, especially export markets, are interrupted as a result of restricted trade (Paarlberg et al., 2008). The additional public health implications of zoonotic diseases further increases the public good nature of animal ID as a central component of animal disease management.

The public good nature of animal ID systems is exacerbated by the fact that the value of animal ID in disease management is probabilistic.

[1] PROGAN is the Programa de Estímulos a la Productividad Ganadera, a federal government program of financial support for livestock producers.

An animal ID system does not prevent disease outbreaks but is expected to lower both the probability of disease introduction as well as the cost of controlling an animal disease event. Animal ID systems facilitate faster detection as well as faster and more effective control measures, which reduce the direct costs of controlling a disease and reduce the length of market disruptions (Zhao, Wahl, and Marsh, 2006; Schroeder and Pendell, 2007). Much of the value of an animal ID system is in the ex ante preparedness to reduce the risk of disease outbreaks; thus, producers often have difficulty evaluating the uncertain benefits of animal ID relative to the certain costs.

Different disease characteristics may impact the optimal mix of ex ante preparedness vs. ex post response measures; however, an effective animal ID system is important for both. In general, slow-spreading (less contagious) diseases favor ex post response programs over ex ante preparedness unless the probability of disease introduction is quite high (Elbakidze and McCarl, 2005). However, highly contagious diseases favor ex ante preparedness with emphasis on prevention and early detection, even with low probability of introduction. Animal ID plays a key role in both early detection and monitoring in the ex ante sense as well as rapid traceback for ex post response. Animal ID systems therefore play a fundamental role in comprehensive animal disease management programs, which inevitably are concerned with a variety of diseases with varying characteristics.

In addition to animal disease management, animal ID systems often facilitate other values that may be captured in varying degrees by producers acting individually. For example, animal ID has direct management value for livestock production in such things as production records and animal health treatments. This explains the use of separate ID systems on farms and ranches. There is, however, increasing potential for additional market values for such things as age and source verification or other process verification programs. These may be done with separate ID systems, but the cost is higher and returns lower than would be true if a single uniform animal ID system and information database were used in the industry.

Animal ID is an increasingly valuable component of international trade. Sanitary and phytosanitary standards and requirements have always created challenges for health assurance and verification of health status that are prerequisites for international market access. Thus, not only do animal ID systems play an important direct role in the effectiveness of animal disease management programs, but they are also increasingly valuable as an indicator of credible sanitary and phytosanitary programs necessary to reassure trading partners. The lack of a credible animal ID system may well restrict international market access in the first place and will almost certainly extend the time required to reopen markets after a disease event.

The risk of animal disease introduction is not constant and historical success in the absence of comprehensive animal ID systems provides little assurance of future success. Growing international markets and increased global mobility in general suggest that the threat of unintentional disease introduction is increasing. Added to that is the growing threat of bioterrorism in food systems. The agricultural sector is one of the most difficult infrastructures to protect in any country and becomes an ever more attractive target as security is enhanced in other sectors of the economy (Department of Homeland Security, 2007). The very existence of an animal ID system likely has considerable value as a deterrent to bioterrorism attacks because it reduces the perceived vulnerability of the livestock sector.

The Mexican Animal ID System

The National Livestock Individual Identification System (SINIIGA) emerged from the Livestock Productivity Enhancement Program (PROGAN) with rules developed in 2003 (PROGAN, 2003).[2] PROGAN and SINIIGA are administered under the office of the director general of livestock in SAGARPA.[3] Chapter

[2] SINIIGA is the Sistema Nacional de Identificación Individual de Ganado, the national animal ID program.

[3] SAGARPA is the Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, the federal secretary of agriculture.

V, Article 12 from the operation rules of PROGAN anticipate the SINIIGA implementation "as an indispensable tool to achieve nationwide in the middle term with an update to the census, an effective control of animal health campaigns and products and byproducts traceability, production records and progeny identification as well as an important support against cattle robbery." This part also mentions that the SINIIGA system should eliminate other animal ID systems currently in use. Section 3, Part C of this chapter mentions that the tags used for SINIIGA must meet the quality standards for retention and durability under a wide range of climatic conditions. Section 2 of Article 13 mentions that financial support for SINIIGA is part of PROGAN. SINIIGA, as a component of PROGAN, provides tags relative to the cattle enrolled in the program and the producer must buy the additional tags to identify the rest of the herd.

The administrative and operational structure of SINIIGA is demonstrated in Figure 1. The structure includes a board of directors that have overall policy control of SINIIGA. This board includes representatives of SAGARPA, including both the director general of livestock and SENASICA, the national cattlemen's association (CNOG), and the national commission on livestock genetics resources (CONARGEN).[4] There is also a technical committee with members from the same agencies and organizations. This committee works with the office of the director general of livestock in SAGARPA to provide administrative control over the operation of SINIIGA. SINIIGA operations are carried out by CNOG.

SINIIGA, as a component of PROGAN, is a voluntary program with participation required to receive benefits under the PROGAN program. Although SINIIGA has a stated objective of becoming the only animal ID program in Mexico and thus incorporating other programs such as animal ID used for animal health campaigns, there has been only moderate success in implementing SINIIGA within PROGAN and almost none in expanding it beyond PROGAN.

According to an assessment of SINIIGA published in 2006, the number of cattle covered by PROGAN is 11.1 million head (Universidad Autónoma Chapingo, 2005). This represents approximately 48% of the estimated 23.3 million head of cattle in Mexico (Peel, 2009). Of that, approximately 7.8 million are cows to be tagged under SINIIGA (approximately 33% of total cattle). Through the first two phases of SINIIGA implementation, approximately 5.8 million cows were registered in the PROGAN and approximately 4.5 million were tagged with SINIIGA tags. Thus, the number of animals tagged under SINIIGA is roughly 19% of all cattle in Mexico.

The tags are issued with an information card on which the owner is supposed to provide information about the owner, the location of the cattle, and the type of cattle. Theoretically, these cards should be transferred to new owners and the information updated when cattle are sold. In reality, many of the cards are not returned to SINIIGA or are returned with incomplete information. At the time that SINIIGA was developed, the decision was made to include bar codes on the SINIIGA dangle tags. It appears that the bar codes have never been used, not even to capture the tag information electronically when issued, not to mention any subsequent use of the bar code technology for tracking or retiring tags. An important step in improving implementation of SINIIGA is to upgrade the tags to electronic radiofrequency tags (RFID) and use tag readers to capture tag information electronically.

The result is tremendous delays in entering information into the SINIIGA database and to date, only approximately 30% of the animals tagged have been entered into the SINIIGA database. A variety of problems contribute to this, but the biggest problem is lack of complete information on the producers and the cattle included in the program. Initially, the

[4] SENASICA is the Servicio Nacional de Salud Animal, Inocuidad y Calidad Agroalimentaria, the federal animal health agency; CNOG is the Confederación Nacional de Organizaciones Ganaderas, the national cattlemen's association; and CONARGEN is the Consejo Nacional de los Recursos Genéticos Pecuarios, the national council on livestock genetics resources.

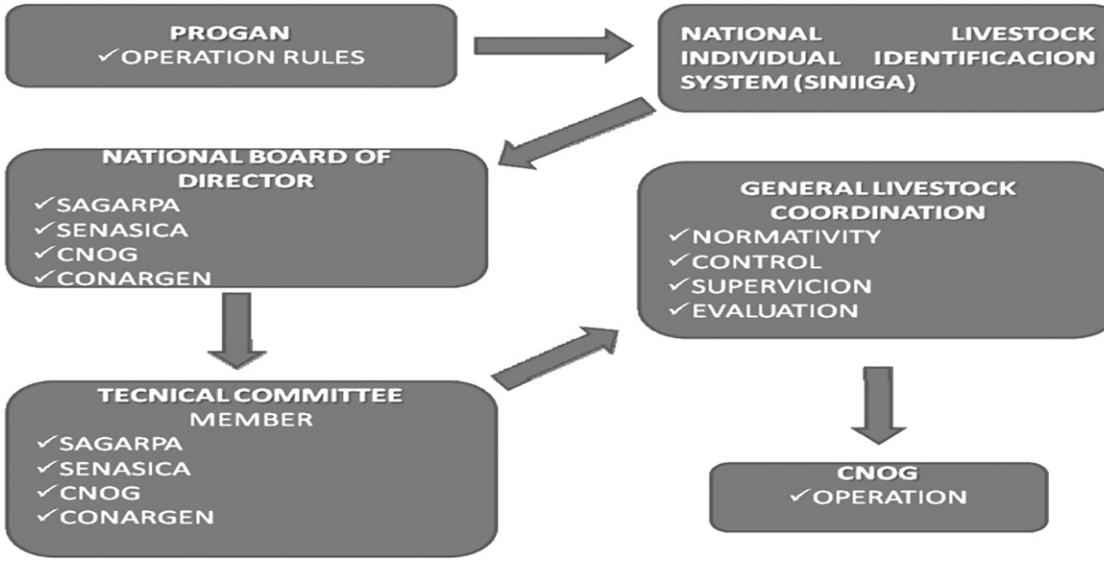

Figure 1. Structure of the National Livestock Individual Identification System (SINIIGA) (Source: SINIIGA)

tags distributed to producers with less than 30 head, which represent almost 62% of all the cattle covered by PROGAN, were issued without series numbers and thus the information for the database must be recreated by hand by regional SINIIGA offices. SINIIGA has had moderate success in tagging animals but little success in the development of a usable information database.

Other Initiatives and Considerations: Federal

The primary federal agency responsible for animal and plant health is SAGARPA-SENASICA. SENASICA is also involved in food safety programs, which fall largely in the purview of the Secretary of Health. Within SENASICA, the animal health division (DGSA) is primarily responsible for implementing federal animal health rules; disease outbreak management; laboratory diagnostic and surveillance testing; and determining regional animal health status. SENASICA does not currently have a comprehensive animal ID system in place but is proposing to build and implement a system to trace all movement of animals and animal products along with a system to register animal input products (feeds and feed ingredients; pharmaceuticals; and chemicals).

SENASICA conducts animal health campaigns, monitors the health status of states and regions, and responds to disease outbreaks working with the state-level animal health committees. With respect to cattle, two important animal health campaigns are those for tuberculosis (TB) and brucellosis. Each of these campaigns uses animal ID tags and databases specific for each disease.

Although SENASICA is represented on the board of directors for SINIIGA, management of SINIIGA is entirely under a separate SAGARPA agency, the livestock director general, and there is little coordination between the agencies. The current Mexican animal ID system (SINIIGA) is not connected in any meaningful way with SENSICA and there appears to be little likelihood that the two systems will be integrated despite the fact that the proposed SENASICA animal movement system would necessarily incorporate all that the current system does and more. The current system is of essentially no value for animal health or disease management because SENASICA does not have operational access to the information.

Animal ID and International Trade

The USDA-APHIS does not recognize the SINIIGA program of animal ID (nor indeed the SENASICA TB tag) for trade purposes.[5] At the current time, Mexico has states and regions in a wide variety of health status, especially with respect to bovine TB. It is essential, therefore, that herd of origin be confidently established to permit exportation of Mexican feeder cattle to the U.S. APHIS developed, in conjunction with Mexico, a system of blue ear tags that are used in conjunction with appropriate paperwork to authorize the exportation of feeder cattle to the U.S. Because of continuing problems with TB in exported cattle, APHIS has implemented a strategic plan with the Mexican government to significantly reduce the prevalence of TB, improve testing and monitoring, and enhance the TB status in all parts of Mexico by 2012.

Other Initiatives and Considerations: Regional, State, and Local

Some states have moved well ahead of the federal programs for both animal ID and animal health programs. In the case of feeder cattle, the principal exporting states, mostly in the North, have taken the initiative to ensure access to the U.S. market.

For example, in the state of Chihuahua, the state government, in conjunction with the cattlemen's union and the state animal health committee, has developed a comprehensive system of animal ID for animals whose origin is Chihuahua. This system (using a green ear tag) is used in conjunction with the blue tags (required by APHIS) to document the origin of animals for export and ensure access to the U.S. market. The system uses database software that provides control and credibility about the distribution of green origin tags and blue export tags and the origin of animals presented for export. Several other exporting states use a similar approach to ensure access to export markets. The Chihuahua system appears to be a useful model and pilot approach that could be evaluated for adoption at the federal level.

The result is a confusing set of duplicative identification programs that appears to create even more doubt about the credibility of any of the programs. For example, it is quite possible that a steer could arrive for export at the border in the state of Chihuahua with a yellow SINIIGA tag, a silver SENASICA TB tag, a green Chihuahua origin tag, a blue APHIS export tag, and a producer's own management tag. Such a situation represents considerable inefficiency and additional cost for producers. There is a glaring need for development of a single animal ID concept built on the correct principals that can be applied at the national and international levels and integrate the efforts of the various states.

Summary

The current Mexican animal ID system, SINIIGA, has failed to create an animal ID system that is useable for tracking animals. Although many animals have been tagged, there is no information database that can be functionally accessed for any purpose. Very little of the information has been entered into the system and none has been updated or retired from the system. SINIIGA is operated by an agency that appears to have little incentive or direction to actually make the program functional and serve the various purposes for which it was conceived. The system is of no value for animal health programs because it is not functional and not accessible by animal health officials in SENASICA.

Producers have little incentive to use the current system beyond the required participation to receive PROGAN payments. There is little likelihood that SINIIGA will integrate and ultimately replace other animal ID systems being used and SINIIGA is not recognized by APHIS for documenting animal origin for export. Although SINIIGA is reasonably well designed in concept, there is a severely deficient implementation effort and considerable question as to whether the current administrative responsibility of SINIIGA has the motivation to correctly implement the animal ID

[5] APHIS is the Animal and Plant Health Inspection Service of the USDA.

system to provide the needed support for animal health programs and other uses for which was intended.

Producers perceive that SINIIGA is a good program and the main strength is that it is operated by a cattle industry organization, in this case, CNOG. Producers would like to use only one animal ID system. They recognize that SINIIGA could be a good solution to replace other federal and state animal identification efforts, but SINIIGA should have the legal authority for operation and enforcement according to its own rules.

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