Development, conclusions and recommendations from Session 2: "Economics of animal identification and recording/traceability"

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Introduction

The objective of this session was to identify the major costs and benefits of establishing an AIR / T system, and how they are distributed across stakeholders. The discussion session tried to address two main questions; how to optimize the economic efficiency of AIR / T in the context of Latin America and the Caribbean? and how to ensure the equitable distribution of these costs and benefits among the different stakeholders?

Content of the session

Three presentations were programmed in this session. The first one entitled "Economic and financing aspects of introducing and maintaining AIR / T systems in smallholder farming in Latin America" was given by Joaquín Mueller (Instituto Nacional de Tecnología Agropecuaria, Argentina). The second one entitled "Cost and value of animal identification and traceability along the agrifood supply chain" was given by Erik Rehben (Institut de l'Élevage, France). The last one entitled "Economic Analysis of Electronic Identification (EID) of Small Ruminants in Latin America" was given by Gerardo Caja (Universidad Autònoma de Barcelona, Spain). Since these proceedings contain only Rehben's paper, this discussion paper provides an extensive summary of Mueller's and Caja's presentations, and addresses few considerations on costs and benefits of AIR / T with special focus on small ruminants.

Status of AIR/T in small ruminants in the LAC region

Mr Mueller reviewed the status of animal identification in small ruminants in Latin America. In several countries, breeders associations keep 'herd books' but only in few of them and for few breeds, pedigree and performance recording are combined for genetic evaluation. He attributed the lack of AIR / T in small ruminants in general and in Latin America in particular to the absence of market demand, the type of production - mainly small-scale production often for self-consumption and informal local markets - and the relatively low value of sheep and goats compared to cattle. New market requirements and marketing opportunities, Government's decision to strengthen sanitary control, fiscal control, subsidy payment, and farmers' decision to improve management and breeding constitute the main drivers for the development of AIR / T in small ruminants.

Costs of AIR/T

Economists at Kansas State University (2009) estimated the cost of the National Animal Identification System (NAIS) in the United States of America to about 6 US$ per cattle marketed. This is largely due to individual cattle identification. Identification tags and tagging accounted for 75% of the costs. For other livestock species (swine, sheep, goats and poultry), which can be traced using premises and group information, the average cost per animal is much lower, ranging between US$0.0007 for broiler and US$1.39 for sheep. It is worth noting that the costs estimates of national systems, which are reflection of specific assumptions and designs, are not directly comparable.

Major costs components

The costs assessment requires a detailed description of the processes of the AIR / T system, the tasks of the actors for each of the processes in order to evaluate the required amount of labor, the identification system, and the services such as mailing, communication, hosting and management of the database. The main difficulty in the costs assessment is the evaluation of the amount of labor for the different actors.

Using a cost calculator, Mr Caja showed that the cost of identification depends mainly on the type of identification device (visual or electronic), equipment, labor, number of animals, and number of readings and reading conditions (static or dynamic). It also depends on the rate of retagging per year, which may vary from 5 to 10% for eartags depending on the quality of the eartag, the quality of the applicator, the technical support and the farming conditions.

Comparison between conventional and electronic identification

Milan *et al.* (2009), reported by Mr Caja, compared different implementation strategies of the European commission regulation for sheep and goat identification and registration (EC 21 / 2004) in Spain, where the sheep and goat population is estimated at 23.7 million. Strategies were as follows: 1) conventional identification (CID) by two ear tags, 2) electronic identification (EID) by one bolus and one eat tag; and 3) mixed CID and EID strategy (MID), consisting of CID for fattening stock and EID for breeding stock. The total cost per animal identified for all strategies and options varied according to the implementation option, ranging from 2.48 to 4.64 •. EID was the most expensive option. The comparison of costs is flock size dependent; for small flocks (<100 ewes), EID is much more costly than CID. The benefit of EID starts from 1,000 ewes. Similarly, the reading conditions and the percentage of losses of identification devices impact the overall cost of identification and the comparison between strategies. In the case of static reading conditions, the cost of EID is two times higher than that of CID (1.37 versus 0.6 •). For dynamic reading conditions, only EID can be used, and the cost is nearly double compared with the static conditions. The study concluded that the use of MID is an affordable strategy to fulfill the EC regulations. The evolution of the EID transponders' prices for livestock identification in Europe shows a price reduction from nearly 6 • in the early nineties to about 1 • in 2012.

Options for reducing the costs

As indicated by Mr Mueller, there are several options to reduce the costs. Small producers are encouraged to bring their animals to a gathering point, where they are identified and vaccinated. This highlights the need to combine animal identification with other programs (or services) such as vaccination programs. He gave examples of programs, where the cost of the marking and recording was kept low using traditional identification systems (branding, paintings, signals, etc.) and

paper recording. The "Merino Puro Registrado" program in Patagonia, Argentina, which covers +110,000 sheep, uses plastic eartags with systematic running numbers. The farmers pay for the identification and the service.

The cost of animal retagging can be reduced by using a new number instead of using the same number. According to Spanish data (Milan *et al.*, 2009), the cost of retagging is 0.24 • with a new number and 3.22 • with the same number. These figures are based on the assumption of eartags losses of 6%. Using a simulator of identification devices losses, Mr Caja showed that for an annual loss rate of 6%, 31% of animals will lose their identification at year 6. This rate would be only 1.1% with double identification.

When electronic identification is used, costs savings could be made by sharing equipments. With EID, the costs are mainly due to device, equipment and labor, whereas with CID, they are mainly due to labor, device and movement registration.

Cost-benefit analysis

As indicated by Mr Rehben, there are several studies on the costs of AIR / T systems, but few on their benefits. Benefits include Government savings in connection with administration of animal disease control and eradication programs due to the reduction in disease outbreaks, economic benefits from quickly re-establishing markets following a disease outbreak, avoidance of significant losses due mostly to lost export market access, and increased consumer demand resulting from higher confidence in food products.

Benefits of AIR / T can be classified into two categories: primary and secondary benefits. Primary benefits are the main aim of a national animal identification and traceability system that is to improve the ability to identify and isolate exposure to outbreaks of serious diseases. Secondary benefits are related to management and marketing functions. Primary benefits increase as the level of participation in the system increases. However, primary benefits accrue to all producers as system grows, regardless of whether they participate or not. This means that all incentives to adopt an animal identification system rest almost entirely on the secondary benefits. These are difficult to estimate because they vary depending on the type, the size and the needs of animal operations (Butler *et al.*, 2009).

Little information exist about cost-benefit analyses of AIR / T. Cost-benefit ratios vary between stakeholders. Mr Rehben proposed a four-step framework that facilitates the evaluation of costs and benefits for the different stakeholders involved in an AIR / T system. These steps are:

1. Detailed description of the AIT system and the target agrifood sector.
2. Inventory and categorization of the stakeholders of the AIT system.
3. Cost evaluation for each category of stakeholders.
4. Cost-benefit analysis for each category of stakeholders.

Mr Mueller presented two examples of cost-benefit analysis. The first one is related to control of Brucellosis in Albania. The cost of the disease related to human cases was estimated at 1.2 million •. For the livestock sector (cattle, sheep and goat) the cost of the disease was estimated at 241,000 •. The cost-benefit analysis, for which AIR accounts for 50% of the costs, shows a negative rate of return on investment until year 6 and a positive one later on (+8% at year 7 and +15% at year 8). The second example is related to the genetic improvement of wool in Argentina (FAO, 2010). The case study showed a return on investment of 3.5 / 1 US$. The question in this case is: what is attributable to animal identification? Mr Mueller gave a simple

response; it would not have been possible to link the wool analysis to selection candidates. The selection would have been visual, and the resulting genetic gain would have been half.

A cost-benefit analysis of EID was presented by Mr Caja using examples of manual and semi-automated milk recording in dairy goat and sheep. The studies showed that automated performance recording based on EID is a useful tool for increasing reliability of data collection and for saving labor time.

Costs coverage

This raises a policy question; who should pay for the AIR/T system - the producers (and ultimately the consumers), the Government, or both?

The implementation of an AIR/T system involves public and private costs and results in public and private benefits. However, generally, the costs are not equitably shared between all stakeholders. According to the Spanish case study presented by Mr Caja, the costs are mainly covered by the farmers, the Government is covering only a small fraction and the abattoirs are covering only the cost of retrieval of the boluses. The cost-benefit analysis can help in the negotiation with the different stakeholders, especially with those who benefit most from the system.

Conclusions of the presentations

A massive implementation of AIR/T systems in small ruminants in Latin America does not seem a realistic option in the short term. In the medium term, in some countries, when motivated by marketing opportunities and Government/Donor funding, pilot systems could begin using the experience and the resources generated by the cattle AIR/T system.

For sustainable implementation of AIR/T systems, the costs should be shared between the stakeholders (e.g., the database could funded by the Government and the identification devices by the producers). However, to ensure an effective cooperation and co-financing by the producers, it is necessary to consider their interests. The cost-benefit analysis is useful tool in this regard. Since there are substantial economies of scale associated with animal identification, the first to adopt the AIR/T system will be the large producers for whom the total cost per animal is lowest. The cost of EID remains prohibitively high for small producers, due to the costs of readers, software and computers. CID is cheaper but burdensome because of lack of ease of data collection and reporting. Cost reduction options show that the costs for small and medium sized operations can be significantly reduced.

Conclusions and recommendations of the Session

- La IdA&R/T es una herramienta de beneficio público y privado, para cuya implementación es importante determinar dónde se genera el valor añadido en la cadena productiva. Teniendo en cuenta que se trata de un bien público, los gobiernos deberían coordinar esfuerzos y recursos, de manera conjunta con el sector privado.
- Se requieren modelos de IdA&R/T por especie y tipo de producción, así como incentivar la participación de todos los actores de la cadena.
- Es necesario que se creen bases de datos nacionales interrelacionadas, que reflejen las condiciones particulares de los países.
- Para el diseño de los sistemas y su conceptualización es importante desarrollar previamente un análisis integral de opciones, costos, beneficios y riesgos.

- AIR / T system provides public and private benefits, the implementation of which requires determining where the added value is generated in the livestock sector value chain. Given that AIR / T is a public good, Governments should coordinate efforts and resources, together with the private sector.
- There is a need to develop species and production system specific AIR / T models, and to encourage the participation of all actors in the chain.
- It is necessary to create interrelated national databases, reflecting the particular conditions of the countries.
- For the design and conceptualization of AIR / T systems, it is important to develop prior comprehensive analysis of options, costs, benefits and risks.