



## Towards sustainable parasite control practices in livestock production with emphasis in Latin America

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### ABSTRACT

Endo and ectoparasites of domestic ruminants directly or indirectly contribute to reduce sustainability affecting food security in subsistence or small scale farming systems, food safety (food borne diseases and pesticide residues), environment (pesticides, pollution and ecotoxicity) and farmer's equity (limited or uneven access to relevant technical information/training). This is especially true for some regions of Latin America where there still are huge areas of natural grazing land for cattle, sheep and goats. Sustainable parasite control is not an absolute concept given the different regions and productive systems of the world and therefore, could have different levels of adoption and impact on farmers. This article develops a conceptual framework to better understand where each region or country is situated in terms of attaining a reasonable increase in animal production while preserving sustainability. Within this context the capacity to prioritize the target parasite species for control according to local epidemiology and production systems, the early diagnosis and monitoring of parasite resistance as well as the availability of well trained field professionals acquire a major role, creating an enabling environment for present and future decision support system approaches. Until new and different means of controlling parasites become available; the challenge is to utilize Good Animal Husbandry Practices and Integrated Parasite Management (IPM) principles in a pragmatic way allowing the rational use of pesticides.

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### 1. Introduction

During the second half of the 20th century and the beginning of the present, the world has experienced an accelerated modernization process with unsustainable long-term growth. Parasites of domestic ruminants directly or indirectly contribute to reduced sustainability affecting food security in subsistence or small scale farming systems, food safety (food borne diseases and pesticide residues), environment (pesticides, pollution and ecotoxicity) and farmer's equity (limited or uneven access to relevant technical information/training).

At present and despite success in the development of pesticides (i.e., insecticides, acaricides, anthelmintics) endo and ectoparasites of domestic ruminants continue to pose one of the greatest production problems in grazing livestock systems. At the same time the center of gravity of livestock production is moving south, and some developing countries are emerging as powerful new players on the global market (FAO, 2006) creating new challenges for the maintenance of traditional parasite control practices. This is especially true in some regions of Latin America (LA) where there still are huge areas of natural grazing land for cattle, sheep and goats.

Sustainability rests on the general principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. The use of sustainable practices of control

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means not only that practices or skills should be effectively maintained over time (technical sustainability) but the certainty that they will not cause adverse effects in the environment (environmental sustainability) and human (socio-economic) sustainability (Peter et al., 2005).

Sustainable parasite control is not an absolute concept given the different regions and productive systems of the world. Indeed the objectives and technological possibilities to implement sustainable practices for commercial farming systems in France or USA are not the same for a resource-poor livestock producer under subsistence farming systems in a remote Andean area in South America or in sub-Saharan Africa. Therefore, it is necessary to have a conceptual framework to better understand how far is each region or country from applying rational practices of parasite control while increasing animal production in a sustainable way.

This article discusses the risks for preserving sustainability of current endo and ectoparasite control practices in ruminants with emphasis in LA. It also aims to propose future pragmatic solutions, taking into account the dilemma of maintaining or increasing animal production without affecting sustainability.

## 2. Conceptual general framework

For the purpose of this article four different groups of countries/regions with different developing phases, can be distinguished, where the application of sustainable practices of parasite control could have different level of feasibility, adoption and impact:

Phase 1: Countries with low levels of income and economic development and a large involvement of smallholders in the livestock sector. The overriding objective is to maintain and further develop the livestock sector as a source food supply (food security), for marginally productive rural people. Serious public and animal health issues of livestock and veterinary drug registration are not vigorously addressed. It is difficult to determine here whether the lower apparent problem of pesticide resistance is due to lack of diagnosis, less use of pesticides (import and price) or the use of more resistant animals adapted to the environment. There is substantial evidence on the need to develop novel practices of control that are feasible for application against endo (FAO, 2003; Torres-Acosta et al., *in press*) and ectoparasites (FAO, 2004) under non-commercial subsistence farming systems.

Phase 2: Countries in early phases of industrialization, more attention tends to be given to Good Animal Husbandry Practices (GAHP) accepted by governments, but poorly apply in practice. Social objectives still are of overwhelming importance due to the need to increase food supply to growing cities and peri-urban areas. Sometimes there is no sustained import of pesticides and adequate veterinary drug regulation, which in turn promotes the use of artisanal products, smuggling or poor quality pesticides. This is recognized by some commercial companies that take advantage of these markets for pesticide registration.

Phase 3: Countries moving forward into the industrialization phase usually have a legal framework for

environmental and food safety objectives as the urban consumers and export requirements begin to attract the attention to policy-makers. At this stage, livestock industry becomes a profitable business and registration and permanent quality control of pesticides is reinforced. For several decades pesticide use, to increase animal production, has produced a never-ending array of parasite resistance. Thus, the tendency for the future is to move from the sole use of pesticides to the inclusion of alternative methods under Integrated Parasite Management (IPM) for endo (FAO, 2003; Torres-Acosta et al., *in press*) and ectoparasites (Nari, 1995, 2008; FAO, 2004).

Phase 4: Countries with full industrialization, where environmental and public health objectives take predominance. Industrialized countries generally have a growing population of alternative agriculturalists, commonly characterized as “organic farmers”. They represent a unique challenge because they have minimized the use of synthetic chemicals and drugs on their farming practices. In contrast these countries also drastically reduce the area and time for natural grazing of livestock. The “factory farms” have become an important system for raising meat production where the huge concentrations of animals produce the inevitable atmosphere and groundwater contamination. Parasite resistance is not seen as a serious problem at farmer or pharmaceutical industry level. The application of the above mentioned objectives has a strong influence on trade between countries; especially for those that are exporters of livestock products (phase 3).

Most of the Latin-American countries are in phases 2 and 3 although some of them are highly diverse and heterogeneous (i.e., Brazil and Mexico) and can have within their territory huge areas of productive systems in any of the foregoing situations. Whatever the situation, the adoption of sustainable practices of parasite control will be influenced by the level of farmer economic development, management practices, level of stockholder involvement, training and awareness level, prospects for livestock exports, and level of local market development (FAO, 2006).

## 3. The problem. Sustainability versus current control practices

The false assumption that parasite control is easily accomplished by the use of chemical means alone, was promoted for decades. After all it is much easier to treat animals with readily available pesticides than to apply more laborious control practices. Therefore, it is not an easy task to convince the livestock producer and sometimes his technical advisor that short-term actions (i.e., indiscriminate use of pesticides) could have long term consequences (unsustainability).

Nowadays there is a general consensus that pesticides will be essential in the short and medium term but will not offer a sustainable solution for the future control of endo and ectoparasites. There are some factors related to parasite control that conspire with the outcome of present and future sustainable control practices.

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