

Decision Support System for Smallholder Milk Producers in Bolivia

Extensive data on available resources, management practices and socio-economic aspects, collected from over 400 dairy and dual-purpose farms in Santa Cruz Department, were used to characterise Bolivian cattle production systems. Based on these and using the decision support system developed by the project, a methodological framework to identify options for sustainable increases in livestock production was produced.



Cattle grazing Brachiaria pasture at the forest margin.

Background

Effective livestock production from forages depends largely on the efficiency of converting the forages into livestock products. The success of the production system will, therefore, depend on the quality and quantity of forage produced, the animal's capacity to eat and utilise it, and on the ability of the farm household to manage the farm's resources. As a result, increasing the farm's managerial capacity will improve the chances of the enterprise being both productive and sustainable. Due to the complex linkages amongst the components, an understanding of the production system as a whole is required in order to understand grazing systems at the level required for this kind of planning. This holistic approach can be facilitated by the use of computerised decision support systems (DSS).

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In the Bolivian lowlands, the livestock production system is practised within the milkshed (the area which supplies significant quantities of milk to a particular city or town) range of major cities. This system is based on both dual-purpose (using cross-bred Criollo/Fresian/Nelore cows) and intensive (upgraded and pure Fresians and Holsteins) milk production systems. A general shortage of dairy products in Santa Cruz Department means that there is currently a need to improve the efficiency of these units.

Research highlights

To achieve the overall goal of this project – to contribute to the strengthening and sustainability of Bolivian cattle production systems – an appropriate decision support model was developed that could be used to improve the management and utilisation of local resources.

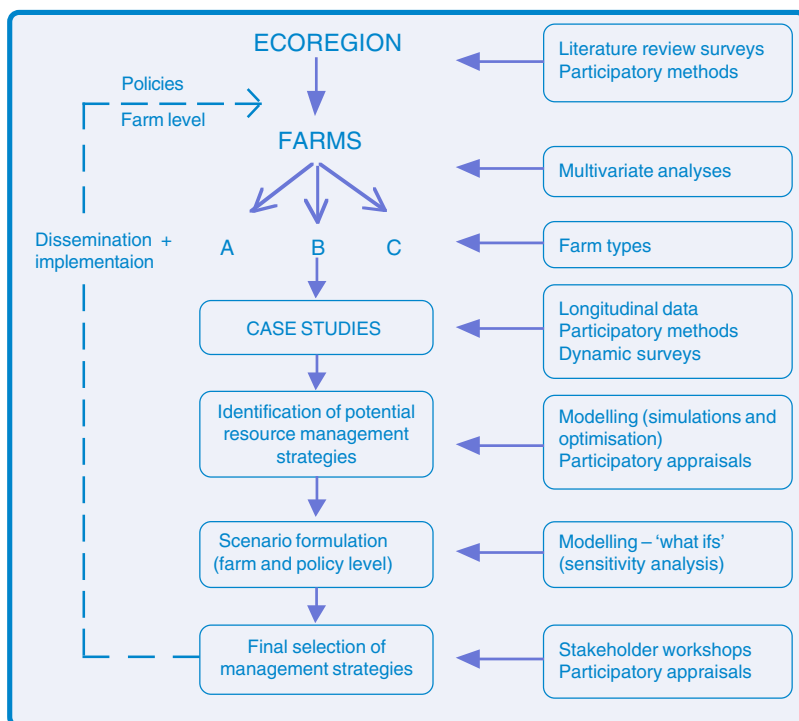
A structured systems methodology (see diagram overleaf) was used to address the problem of improving the efficiency of the dairy units. Initial activities focused on characterisation of 418 dairy and dual-purpose farms in the main milk producing regions of Santa Cruz. Data were collected on available resources (land, animals,

pastures, crops, etc.), management practices (feeding, herd management, pasture management), and socio-economic aspects (family structure, labour, education, access to facilities, etc.). Further data to produce a set of case studies were based on participatory methodologies and conducted longitudinally (i.e. farmers were asked the same questions on a number of separate visits) on 65 farms over a period of two-and-a-half years. This study produced records for more than 3000 complete lactations.

These characterisation data-sets have allowed a better identification of target groups of farmers. In Santa Cruz Department, 41 per cent of smallholder dairy farmers are living under the \$1 per day income threshold. On-farm trials have demonstrated that simple feed supplementation interventions provided increased economic benefits to these target farmers providing them with as much as \$60 per month in additional income.

Uptake

The project successfully stimulated the establishment of a self-financing Regional Livestock Monitoring Unit within CIAT which is currently monitor-



Methodological framework for the application of decision support systems to the analysis and solution of farmers' problems.

Relevance to sustainable livelihoods

Increasing the contribution of cattle to the livelihoods of Bolivian smallholder farmers, through increased milk and beef production, is an option which presents important opportunities for improving the standards of living of farmers and for reducing poverty in the region. In the past, the option has been constrained by deficient feeding and management strategies. This project has developed tools that will assist in meeting this need as they can, potentially, be used to address the impacts of seasonal availability and quality of forages and supplements.

Selected project publications

- Thorne, P.J. and Herrero, M. (1998) The role of livestock in natural resources management. pp. 87–94. In: *Food, Lands and Livelihoods: Setting Research Agendas for Animal Science. Proceedings of an International Conference, KARI Conference Centre, Nairobi, Kenya, 27–30 January 1998.* BSAS Occasional Publication no. 21. British Society of Animal Science, Edinburgh, UK.
- Herrero, M., Bernues, A., Solano, C., Ugarteche, J., Fernandez, W. and Rojas, F. (1998) Caracterización de los sistemas de producción pecuaria en las provincias de Ichilo y Sara, Santa Cruz, Bolivia. In: *Taller Internacional sobre Metodologías de Investigación en Sistemas de Pequeños Productores.* Santa Cruz, Bolivia.

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ing and advising 60 dairy farms. The milk producers association in Santa Cruz Department, FEDEPLE (Federación de Productores de Leche), and several large NGOs have endorsed the use of the DSS generated by this project. Correspondence received from interested parties in Bolivia has confirmed that the project outputs have been taken up nationally. A further example of its impact is that farmers are now enthusiastically employing livestock records to assist them in taking management decisions.

Linkages

A number of links with institutions in the international, governmental and non-governmental sectors have been

made during the course of this project. Many of these have been designed to ensure the sustainable application of its outputs. For example, CIAT has implemented institutional agreements for further dissemination and use of outputs. One agreement is with NGOs working to reduce poverty in rural areas of Santa Cruz. A second – and potentially more wide-ranging – agreement has been reached with Winrock International and relates to the promotion of smallholder dairying in coca producing regions of El Chapare. It is anticipated that the DSS produced by the project will eventually be used by these organisations in support of their developmental activities.