

Management and Use of Draught Equines by Poor Crop/Livestock Farmers

In the sloping terrain of the mid-Andean hills of Bolivia, the use of draught animals for land preparation is widespread. The high-lift harness described here allows donkeys to pull tillage implements, thus saving the smallholder farmers the need to buy more expensive oxen. Developed within the first two years of the project, this represents highly adoptable technology for farmers surviving in one of the harshest environments in one of the poorest countries in Latin America.



An improved plough tested on farms near Cochabamba, Bolivia.

Background

Small land holdings and a sloping topography rule out tractor-powered mechanisation in many parts of Bolivia's mid-Andean region. Animal traction is widely used for land preparation and other agricultural activities. Farmers have indicated that the main problems associated with draught animal use include inadequate animal husbandry practices and the poor design of tillage implements. Because

of the harsh environment, which is not only high and hilly but also dry and cold, and seasonal shortages of fodder, working oxen often have to be sold at a loss at the end of the tillage season. The use of horses and donkeys is widespread – but mainly for transport – as suitable agricultural implements are not available for these lighter animals.

Research highlights

Using Participatory Rural Appraisals (PRAs) this PROMETA (Proyecto de Mejoramiento de Tracción Animal) project has addressed the need for improved draught animal performance and management, with activities concentrated in six communities in the region. PROMETA has identified a

number of promising technologies/ approaches to improve animal feeding, management and health. These include promotion of sown pastures in fallow land, fodder cereals and forage conservation, use of equines (donkeys and horses) for tillage, and housing for working animals. From the farmers' evaluations, it appears that sown pastures are popular in some locations, and there is general interest in using horses or donkeys for tilling. Health constraints resulting from the regular purchasing and sale of cattle have been identified. Also, some animal health assistants have been trained.

In all six communities, the major demand was for the development of

implements and harnesses that would allow equines to be used for a much wider range of farm tasks. The main problem with equines is that they are light in weight compared

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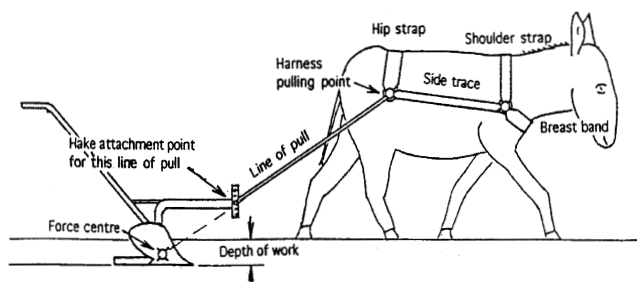
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The high-lift harness increases the angle of pull to reduce frictional forces (for example, friction on the landside and beneath the share) and so reduce implement draught (the horizontal component of the pull exerted).

with oxen, and have less potential to produce the pulling force necessary for tillage implements. However, by applying basic mechanical principles, they can be used to pull these implements by means of simple and comfortable transmission systems such as the high-lift harness. Trials have shown that significant draught force reductions can be achieved by increasing the angle of pull to 40°. Lightweight implements (ploughs, cultivators, ridgers, harrows, seeders, etc.), coupled to a common frame, can then be attached to the harness. Comparisons of the efficacy of indigenous and commercial methods of controlling parasites are included amongst the project's ongoing activities. Other activities in progress address the selection and application of soil and water conservation practices. Diagnostic studies suggested that these should include terrace formation by live contour barriers, tine tillage and the use of reversible ploughs on terraced land.

Uptake

On-farm trials, led by knowledgeable farmers, formed part of an iterative process during which the research team produced prototypes of improved tillage implements, which were subjected to farmer analysis and appraisal before returning to the PROMETA workshop for refinement and re-fabrication. Final prototypes were subsequently subjected to wider farmer appraisal at field days. The PROMETA project has a strong association with the CIFEMA factory, which was already producing a traditional range of ox-drawn equipment; and 40 donkey and horse-drawn implements, to be sold through the

existing group of collaborating retailers, were commissioned. Extensive publicity – illustrated bulletins, radio broadcasts and TV coverage – resulted in the first batch being oversubscribed and a further 200 sets of implements are being manufactured.

Linkages

During the research and in interactions with other organisations, PROMETA staff have provided informal training services to collaborating farmers, university colleagues and other associates. An acknowledgement within parts of the agricultural faculty of the Universidad Mayor de San Simón of the importance of farmer-centred, participatory processes may be attributed, in part at least, to the influence of PROMETA. It seems likely that researchers and extensionists will derive a long-term benefit from their experiences with the approaches used in the project. PROMETA has adopted a networking approach and, as a result, is in contact with a wide range of organisations around Cochabamba. Staff members have participated in various meetings and workshops, including the work of the DFID-supported hillside and veterinary projects. Maintaining this national networking will further promote the exchange of information and enhance prospects for the sustained impact of the project, as will international networking through the Latin American Animal Traction Network (RELATA). RELATA's 1999 Pan-American meeting was hosted by PROMETA. Linkages exist with a Livestock Production Programme project (R7376) on a decision support tool to improve feed management of working ruminants.

Relevance to sustainable livelihoods

Inappropriate tillage techniques on sloping land lead to soil degradation, and resultant falls in agricultural production undermine the livelihood of local people. This situation, combined with population growth, is driving outward (rural to urban) migrations and is causing urban problems in Cochabamba and Santa Cruz. Both of these cities have experienced extremely high population growth rates over the past two decades.

Farmers who have adopted the new implements developed by PROMETA are extremely satisfied with the increased opportunities that are now possible. They no longer have to buy and sell their oxen each year; this saves them several hundred dollars (and their time) in an economy where the average annual income is much less than US\$1000. Such savings have a marked impact on family economies, allowing increased spending on food, clothing, housing and education.

Selected project publications

- Inns, F.M. (1998) High-lift harness and lightweight plough: an efficient low-draught ploughing system. *Landwards* (Spring), 12–16.
- Sanchez-Molero, J. (Ed.) (1999) *Primer Taller Internacional de PROMETA – UMSS. Proyecto Mejoramiento de Tracción Animal*, Cochabamba, Bolivia/Silsoe Research Institute, Silsoe, UK. 146 pp.

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