

Production technologies: Animal production

:: Feed supplementation for ruminants

Synopsis: Feed supplementation is to make up for ration deficits ingested by ruminants by adding a food supplement high in energy, nitrogen or minerals. The aim is to satisfy requirements for maintenance and production of the herd to make the livestock more economic. Supplementation comes in two complementary ways which compete to improve the energy, nitrogen and mineral nutrition of the herd: a) significant specific additional nutrients to the animal; b) improved efficiency of microbial flora in the rumen to digest forage.

Detailed description of the technology

Most livestock areas on natural rangelands, prairies or in agro-pastoral areas show great variations of quantity available and quality of forage resources in both space and time (seasonal or inter-annual) distribution. The capacity of animals to sort out in the grazing land to feed themselves, thanks to their mobility and feeding behaviour, and their physiological ability to utilise and reconstitute their body reserves, is not always sufficient to ensure their continued good health, their reproduction capacity or the productions expected by the farmers. Recourse to supplementation therefore occurs in a context of well defined animal husbandry objectives.

In tropical regions, forage is very frequently deficient in nitrogen and certain minerals, particularly phosphorus, copper and zinc (and in certain areas sulphur, selenium or cobalt). Sodium is also deficient but farmers often have traditional practices for adding salt. It should also be noted that in semi-arid and arid regions, farmers practise salting for preservation: There is a seasonal transhumance to an area where the animals find minerals naturally, either deposits in the soil, in the water with a high mineral content, or in halophytic plants which, as well as sodium, can supply sulphur and magnesium.

The choice of a supplement depends on sufficient knowledge of the forage calendar and the quality of rations, particularly the diagnosis of qualitative and quantitative imbalances between the herd's resources and its requirements. It also rests on an inventory with calculations (quantities, price of return for the farmer) of food resources of accessible supplements, and if possible, references obtained in similar conditions making it possible to predict livestock response to supplementation.

The priority is to ensure adequate addition of nitrogen and minerals of rumen microbes, an addition from which the host animal of course benefits. Nitrogen supplement can be supplied by any protein food such as oil cakes, cotton seed, brewery dregs, etc., the quantity to add depending on the content of digestible nitrogen matter of the product. These foods also add energy. Nitrogen can also be added in the form of non protein nitrogen, generally urea. Its use is optimised when the urea is limited to easily digested energy such as molasses: different forms of molasses-urea mixture and licking minerals (licking wheels) or solid blocks are currently used in countries producing sugar cane.

More generally, nitrogen and mineral supplementation is linked to energy supplement if the objectives require an energy supplement: this is particularly the case for ploughing, milk production and intensive meat production.

One then links oil cakes or seeds, which themselves supply energy, with non protein nitrogen, either from cereals (rarely the seeds themselves) or large quantities of molasses. Supplementation also includes utilisation of crop residue or forage crops specifically managed to provide a food supplement to specific animals at critical periods: vegetable leaves, forage stocks of legume bushes (*Leucaena* sp., *Gliricidia* sp., *Calliandra* sp.) or large grasses such as Elephant grass (*Pennisetum purpureum*).

Mineral supplementation can also be done with forage by using fertilisers: this is especially the case for phosphorus, including by using phosphates of mediocre quality which slowly

become soluble (natural phosphates). Otherwise, minerals are added directly to the animals in licking stones, or for oligo-elements (copper, zinc) in pellets put in the rumen. Introducing minerals to drinking water carries the risk of poisoning.

Global farming systems: [Coastal Artisanal Fishing](#)

(javascript:openPage('fs_descr.asp?fs_id=7',300,350))		Dualistic
(javascript:openPage('fs_descr.asp?fs_id=6',300,350))		Irrigated
(javascript:openPage('fs_descr.asp?fs_id=1',300,350))		Smallholder Rainfed Dry/Cold
(javascript:openPage('fs_descr.asp?fs_id=5',300,350))		Smallholder Rainfed Highland
(javascript:openPage('fs_descr.asp?fs_id=4',300,350))		Smallholder Rainfed Humid
(javascript:openPage('fs_descr.asp?fs_id=3',300,350))		Urban Based
(javascript:openPage('fs_descr.asp?fs_id=8',300,350))		Wetland Rice Based
(javascript:openPage('fs_descr.asp?fs_id=2',300,350))		

Technical, economic, financial, social and environmental attributes of the technology: Generates income within acceptable limits of risk | Improves efficient utilization of scarce resources | Integrates crops, livestock, trees and fisheries |

Factors underlying success:

Source(s): <http://www.lead.virtualcentre.org/en/dec/toolbox/Index.htm>
(<http://www.lead.virtualcentre.org/en/dec/toolbox/Index.htm>)

Author: Mauricio Rosales

Email: mauricio.rosales@fao.org

Additional external resources:

Documentalist: mwandemere

Partner/Group: TECA

TECA Technology for Agriculture | teca-editor@fao.org © FAO, 2006