Costs and Benefits of Traditional and Improved Dry Season Feeding Systems of Dairy Cattle for Smallholder Farmers in the Peruvian Andes

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Abstract

During the dry season, lack of precipitation reduces growth and quality of non-irrigated forage resources in the central Peruvian Andes, resulting in a reduction of milk yield and milk quality. In four Andean communities, 56 farmers were interviewed every three months over a period of one year. Information linked to agriculture and livestock farming such as activities, inputs (labour, means of production, capital) and outputs (milk, cheese, meat, animals, crops) were recorded using a closed-ended questionnaire. Furthermore, samples of supplements for dairy cattle were analysed for their contents of crude protein (CP), fibre (NDF) and net energy for lactation (NEL). The most common supplements during the dry season were a home-made concentrate (with flour and bran of oat and barley as main components), oat hay and straw (from barley or oat), which contained on average, per kg of dry matter (DM) 119, 57 and 40 g of CP, 324, 572 and 731 g of NDF, and 7.7, 5.5 and 4.1 MJ of NEL, respectively. The communities were divided into two groups with high (CH) and low (CL) level of dependence on income from milk production. On average, each household owned 4 and 0.5 dairy cows producing 550 and 750 kg milk/cow/year, in CH and CL groups, respectively. Values derived from the survey were introduced into a simulation model which optimised household income through linear programming. The model was used to compare the traditional dry season feeding system, consisting of supplementation of dairy cows with hay and straw from oat and barley, cut ryegrass (Lolium sp.) and small amounts of cereal bran with an improved system introducing the hay of improved forage varieties (Avena sativa var. Mantaro 15, Hordeum vulgare var. UNA 80, Triticosecale Wittmack). The best land use solution proposed by the model was a combination of fertilised Lolium sp., fertilised Hordeum vulgare var. UNA 80 and native pasture. Farm income from livestock would rise with this new system from 199 to 211 US$/ha/year for CH and from 32 to 277 US$/ha/year for CL, demonstrating clear improvements achieved by small changes in land use and animal feeding practices.

Keywords: Dry season feeding, household model, milk production, Peru

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