

# FEASIBILITY FOR ECOLOGICAL LIVESTOCK PRODUCTION IN THE SUBHUMID PAMPAS REGION, ARGENTINA

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## Background

In the Pampas region (Argentina), extensive meat production systems are developed on native and cultivated forages with a small use of agrochemicals. Ecological agricultural products normally provide extra incomes for agriculture and allows to the reduction in production costs but, not always provide a large sales benefit compared with conventional products, especially meat. Livestock production has a major role in organic agriculture creating a harmonious balance between crop production and animal husbandry. The emphasis of organic livestock production is to optimize production systems in order to avoid animal health problems and to optimize, rather to maximize meat production. Crop production in organic systems is characterized by a diverse cropping sequence operating in a close system for nutrients and organic matter. However many extensive meat production systems in Argentina are not far from organic regulations, ecological livestock production systems are not generalized in the subhumid Pampas region and field research to evaluate the feasibility of this kind of production systems is required.

## Objective

Our objective was to provide a research and experimental ecological meat production system for the subhumid Pampas region and to compare meat production indices between ecological and conventional commercialized systems.

## Methods

The study was performed at the Agricultural Experimental Station of the National Agricultural Technology Institute (INTA) in General Villegas (Buenos Aires, Argentina). The climate in the region is temperate subhumid with dry season during winter and an annual rainfall of 860 mm.

In 1970, a 209 ha conventionally managed meat production system was established on a deep loamy Typic Hapludoll with medium to high soil extractable P levels (mean Bray I P = 26 ppm). In 1991, the system started to be managed under ecological regulations under conventional commercialization regulations, after 1995 the system was approved for organic (ecological) commercialization standards. In general, the system included a crop rotation is based on 82.3% under forages [alfalfa (*Medicago sativa* L.) and fescue (*Festuca arundinacea* L.) pastures and triticale (*Triticum x Secale*)] for meat production and 17.7 % for confectionary sunflower (*Helianthus annuus* L.) and maize (*Zea mays* L.) grain production. Alfalfa based pastures are intensively grazed (2 to 2.5 utilization days) using rotational practices every 28 to 30 days and 90 days during spring-summer and fall-winter, respectively. A preventive animal infections and parasitic sanitary program is applied based on strategic vaccinations and deparasitic treatments under integrated annual and pluriannual pastures grazing practices. Chemical weed control was performed under the conventional system and mechanical (mowing and pre-plant and plant tillage) practices were used under the ecological regulation. Soil fertility status is yearly evaluated before annual or perennial crops planting.

Annual meat production and economical indices (animal stocking rate, daily weight gain, stock efficiency, meat production, purchase:sales ratio, net income and system profit) were compared between conventional and ecological commercialization systems performing a t test.

## Results and discussion

Meat and crop productivity under ecological regulations and conventionally managed were similar. For example, mean conventional meat production (1970 to 1990) was 500 kg/ha and organic meat production (1991 to 2000) was 557 kg/ha. However, net income under ecological management practices was greater than under conventional practices, 234 US\$/ha and 70 US\$/ha respectively. The system profit was also greater under organic than under conventional regulations, 5.87 and 3.50 %, respectively. The differences in net income and profitability are attributed to the reduction in production cost and basically to the improvement in the sales price under organic regulations of confectionary sunflower.

Soil extractable phosphorous levels under intensive grazing management are still high enough to provide adequate nutrition for alfalfa establishment and production. The short time crops sequence in rotation with 4 to 5 years of alfalfa based pastures provide an efficient use of soil organic matter and nitrogen. Thus, no fertilization practices were used under the conventional (1970 to 1990) and the organic (1991-2000) production systems.

Chemical weed controls during the conventional production period (1970-1990) keep a small weed pressure for crops and pastures allowing to an adequate weed management under mechanical practices during the ecological production period (1995-2000). However, a little perennial weed development can be observed after 10 years of ecologically managed pastures requiring special attention for their management.

In Table 1 it is shown that no significant differences in meat production indices were observed during the ecologically managed period (1991-2001). However, the profit of the system was significantly improved when organic commercialization regulation were approved since 1995 (Table 2). Basically, organic certification allowed for confectionary sunflower commercialization and the improvement in the net income of the production system. Yields of confectionary sunflower were similar to conventional sunflower crops (approximately 1700 kg/ha).

These results confirm that in the subhumid Pampas region ecological extensive agricultural production systems are feasible improving producer's economic benefits and preserving environmental quality. Major contributions of the organic livestock production are related to commercialization benefits and the biological sustainability of the systems due to the maintenance of meat and crop production yields compared to conventionally managed systems. Further research is required for avoiding perennial weeds development under organic pastures and for developing integrated pest controls allowing adequate annual crop yields.

**Pertinent literature**

- Gonella, C.A. 2002. Producción de alimentos ecológicos en sistemas extensivos en la República Argentina (Ecological food products in extensive systems of the Argentine Republic). In: Sarandón, S.J. (ed), Ediciones Científicas Americanas, La Plata (Argentina), in press.
- Hamm, U. 1997. Organic trade the potential growth. Proceedings of the Future of Organic Trade. Oxford, England, Sept.14-27.1997.
- Racca, R.; Collino, D.; Dardanelli, J.; Basigalup, D.; González, N.; Brenzoni, E.; Hein, N.; Balzarini, M. 2001. Contribución de la fijación biológica de nitrógeno a la nutrición nitrogenada de la alfalfa en la region pampeana (Boilgical nitrogen fixation contribution for the alfalfa nitrogen nutrition in the Pampas region). Ediciones INTA, Buenos Aires (Argentina), 56 pp.
- Servicio Nacional de Sanidad Animal (SENASA). 1993. Producciones ecológicas de origen animal: Normativas (Ecologacal animal production: norms). Buenos Aires (Argentina), 29 pp.
- Stockdale, E.A.; Lampkin, N.H.; Hovi, M.; Keatinge, R.; Lennarstsson, E.K.M.; Macdonald, D.W.; Padel, S.; Tattersall, F.H.; Wolfe, M.S.; Watson, C.A. 2001. Agronomic and environmental implications of organic farming systems. *Advances in Agronomy* 70: 261-325

Table 1. Meat production indices for conventional and ecologically commercialized systems in Drabble (Buenos Aires, Argentina)

| Commercialization system | Stocking rate<br>(kg/ha) | Daily weight gain<br>(kg/animal/day) | Stock efficiency<br>(%) | Meat production<br>(kg/ha) |
|--------------------------|--------------------------|--------------------------------------|-------------------------|----------------------------|
| Conventional             | 905 a                    | 0.494 a                              | 57.1 a                  | 518 a                      |
| Ecological               | 930 a                    | 0.519 a                              | 63.6 a                  | 596 a                      |

(different letters, within a column, indicate significant differences,  $P < 0.05$ )

Table 2. Economic indices for livestock production under conventional and ecologically commercialized systems in Drabble (Buenos Aires, Argentina)

| Commercializataon system | Purchase:Sale ratio | Net income<br>(US\$/ha) | Direct costs<br>(US\$/ha) | Profit<br>(%) |
|--------------------------|---------------------|-------------------------|---------------------------|---------------|
| Conventional             | 1.19 a              | 169 a                   | 107.2 a                   | 3.53 a        |
| Ecological               | 1.16 a              | 299 b                   | 110.0 a                   | 8.21 b        |

(different letters, within a column, indicate significant differences,  $P < 0.05$ )