Adoption of *Brachiaria* Grasses in Mexico and Central America: A Successful Story

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The XX International Grassland Congress took place in Ireland and the UK in June-July 2005. The main congress took place in Dublin from 26 June to 1 July and was followed by post congress satellite workshops in Aberystwyth, Belfast, Cork, Glasgow and Oxford. The meeting was hosted by the Irish Grassland Association and the British Grassland Society.

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Adoption of *Brachiaria* grasses in Mexico and Central America: a successful story

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Key points

1 Of all cultivars released, grasses from the *Brachiaria* genus currently dominate the market.
2 The main beneficiary from the adoption of *Brachiaria* pastures has been Costa Rica.
3 The main adopters of *Brachiaria* pastures have been dual-purpose farmers.

Keywords: tropical forages, adoption, milk and beef production

Background and strategy

In Latin America and the Caribbean (LAC) there has been a major effort to develop new pastures technologies, to increase livestock productivity for the extensive systems prevailing in the tropical lowlands. This multi-national and inter-institutional effort was initiated through the International Network for the Evaluation of Tropical Pastures (RIEPT, by its name in Spanish), which operated from 1976 to 1996 under CIAT leadership. This network became a platform for institutions to train technicians, share forage material from existing gene banks, study the behaviour of new germplasm under different environments, and established the exchange of scientific information to extrapolate research results (Toledo, 1982). Six hundred and forty five agronomists from 24 countries in LAC were trained by RIEPT, in subjects related to forage agronomy and pasture evaluation. Training was key for the success of RIEPT, because these professionals carried out evaluations of new and improved forages under contrasting ecosystems and provided feedback. In addition, during this period participating institutions in RIEPT released 11 selected grasses as commercial cultivars, most of them from the *Brachiaria* genus, as well as 16 forage legume cultivars (CIAT, 2003). In Central America and Mexico these cultivars were released between 1990 and 1996. Forage evaluation activities in this region continues at present through a joint research agenda between CIAT and ILRI, as well as between CIAT and the private seed sector. Of all pasture cultivars released; grasses from the *Brachiaria* genus currently dominate the market – accounting for approximately 84% of all grass seed sales in Mexico and Honduras, 90% in Nicaragua, 85% in Costa Rica, and 97% in Panama during the last 5 years (Holmann *et al*., 2004). The objective of this paper is to estimate the impact of the adoption of *Brachiaria* grasses released through RIEPT during the period 1990-2003 on milk and beef production and to describe how this was achieved.

Impact

The estimated marginal increase in milk and beef production attributed to *Brachiaria* cultivars was determined by converting seed sales to areas sown (Sáez & Andrade, 1990), and comparing productivity between the traditional and the improved technology (Holmann *et al*., 2004).

Adoption

In each country the pattern of adoption has followed the theoretical lag – rapid adoption – plateau schedule (Figure 1). Producers found out about new options first through the public sector, and later from private seed companies marketing the new products. Producer's interest in adoption was stimulated by an increased domestic demand for milk and beef, and from a decline in productivity from less-well adapted species and degraded pasturelands.

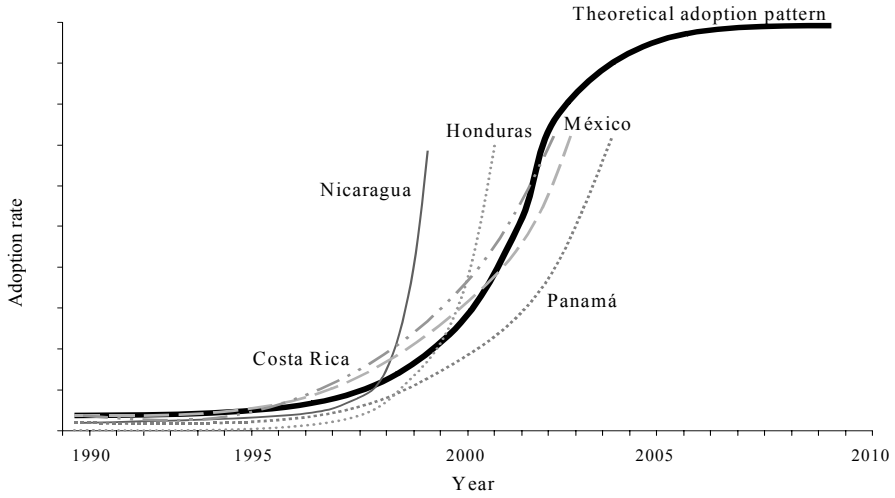

Figure 1 Theoretical adoption pattern of new forage technologies and adoption curves in México and Central America based on *Brachiaria* seed sales (Holmann *et al*., 2004).

Areas planted with Brachiaria grasses

It is assumed that most seed was allocated to renovate pastures in advanced stages of degradation, or naturalised pastures with low productivity. The largest volumes of seed sales and planted areas correspond to Mexico (9,100 million t (Mt) of seed with 2,616,130 ha planted). Costa Rica is the country in Central America with the largest seed sales and planted areas (1,692 Mt of seed and 437,516 ha planted), followed by Honduras (671 Mt and 186,788 ha), Nicaragua (134 Mt and 35,822 ha) and Panama (40 Mt and 10,952 ha). During this period the annual rate of increase in seed sales was respectively 32% in Mexico, 62% in Honduras, 45% in Nicaragua, 39% in Costa Rica, and 54% in Panama. Total area planted with *Brachiaria* cultivars during this period amounts to 6.5% of the total area of permanent pastures in Mexico, 12.5% in Honduras, 1% in Nicaragua, 18.7% in Costa Rica, and 0.1% in Panama.

Additional milk and beef production

In relative terms, the main beneficiary from the adoption of *Brachiaria* cultivars has been Costa Rica because the additional production resulting from the adoption of these grasses is equivalent to 55% of the national milk production (437,000 Mt fluid milk) and 18% of the beef (26,000 Mt) produced in 2003 (Holmann *et al*., 2004). These benefits are followed by Mexico where the increase in productivity from the adoption of *Brachiaria* cultivars is

equivalent to 24% of national milk production and 5% of beef production. In Honduras the marginal increase in milk and beef production is equivalent to 25% and 12% of national production, respectively. In Nicaragua and Panama the adoption of *Brachiaria* grasses has been the lowest in the region. As a result, the additional increase in milk in Nicaragua and Panama amount to 11% and 5% of national production, respectively. In the case of beef production, the additional increase in Nicaragua and Honduras has been 2% and 1% of domestic production, respectively. These figures suggest that adopters of *Brachiaria* grasses are producers oriented toward dairying and to a lesser extent beef. Dual purpose production systems are common in the region (i.e. where approximately 70% of gross sales come from milk and the remainder from the sale of weaned male calves), and it can be argued that the main adopters of these grasses have been dual-purpose farmers.

Success factors

- *Availability of locally adapted cultivars*. The underlying hypothesis was that lack of adaptation of commercial cultivars selected in other continents could be overcome by selection of locally adapted forage germplasm. This in turn required a large effort on multi-locational screening for adaptation to prevailing biotic and abiotic constraints.
- *Involvement of private seed sector*. The region dos not have comparative advantages for *Brachiaria* seed production, particularly in terms of soil and climatic conditions. However, grass seed production is a large commercial activity in Brazil, and much of the *Brachiaria* cultivars were marketed by Brazilian companies and sold regionally through local seed companies.
- *Increased forage seed demand*. The process of adoption of new *Brachiaria* cultivars has been stimulated by the availability at reasonable cost of commercial seed produced in Brazil, and a rapidly expanding regional livestock sector geared towards meeting increased consumer demand for milk and beef.

What could have been done better?

The results presented in this paper indicate that investments of public funds in Central America and Mexico to support a forage evaluation R&D network, paid of in terms of adoption of improved grasses and increased supplies of beef and milk, and staple food commodities for consumers across income levels in the region. In spite of this, RIEPT should have worked more closely with the private sector (i.e. local seed companies, universities, and livestock producer associations), both in terms of people trained and exchange of germplasn, to achieve a faster and greater diffusion of selected cultivars. Most of the effort concerning seed multiplication and dissemination were concentrated on the public sector, which was significantly reduced in size during the 90's which had a negative effect.

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