



## XVII<sup>th</sup> World Congress of the International Commission of Agricultural and Biosystems Engineering (CIGR)

Hosted by the Canadian Society for Bioengineering (CSBE/SCGAB)  
Québec City, Canada June 13-17, 2010



### INTEGRATION OF CROPS, LIVESTOCK AND FORESTRY EDUCATIONAL PROGRAMS IN ZONA DA MATA IN MINAS GERAIS, BRAZIL

R.G. VIANA<sup>1</sup>, L.R. FERREIRA<sup>1</sup>, R.J. GOMES<sup>1</sup>, A.T.C.P. COELHO<sup>1</sup>, W.F. DOS REIS<sup>1</sup>,  
G.L. FERREIRA<sup>1</sup>, V.A. GONÇALVES<sup>1</sup>

<sup>1</sup> R.G. VIANA, Av. PH Hofls, SN. Viçosa-Minas Gerais, Brazil. CEP: 36570-000, rafaelgomesviana@yahoo.com.br.

<sup>1</sup> L.R. FERREIRA, lroberto@ufv.br.

<sup>1</sup> R.J. GOMES, rogerio@vicosa.ufv.br.

<sup>1</sup> A.T.C.P. COELHO, alextcpcoelho@hotmail.com.

<sup>1</sup> W.F. DOS REIS, williwf.reis@ufv.br.

<sup>1</sup> G.L. FERREIRA, giselle.lima@ufv.br.

<sup>1</sup> V.A. GONÇALVES, valdinei.goncalves@ufv.br.

#### CSBE100111 – Presented at Section II: Farm Buildings, Equipment, Structures and Livestock Environment Conference

**ABSTRACT** With 65% of the area occupied by pastures, the Zona da Mata in Minas Gerais (Brazil) has many dairy farms, although most of the pastures are degraded. The Integration of Crops, Livestock and Forestry (ICLF) is an interesting alternative for the recovery of these pastures. The technique consists in planting corn or beans with grass and eucalyptus, via no-tillage. In the first year, the producer has the income from corn or beans. Grass is also available to support animals and provide income from livestock. In the seventh year, the producer has extra income from wood, with minimal environmental impact (no soil disturbance, increased water infiltration, reduced erosion and siltation of streams and rivers). The methodology is to use experimental units and educational programs (2nd circuit ICLF). Producers can follow the phases of deployment of this technology in different regions from Zona da Mata. The objective of the 2nd circuit ICLF is to disclose this technique in Zona da Mata from Minas Gerais. The demonstration units were installed in 2008/09, in partnership with the EMATER, UFV, SEAPA, CNPq and local authorities in 21 municipalities. The choice of areas, collection of samples for soil analysis, planting, and all cultural treatments were carried out by producers who were supervised by staff from EMATER, UFV teachers and trainees of the project. Field days (one in each county) totalling about 1,900 producers were conducted. Due to good acceptance by producers, coupled with good publicity that helped mobilize medias (newspapers, radio, television), new areas are being implemented in the agricultural year 2009/2010, with this planting technique in the region.

**Keywords:** Small farmer, Dairy, Pasture, Environment, Technology transfer, Experimental unit, Degraded areas.

**INTRODUCTION** The Zona da Mata Mineira is located in the southeast of Minas Gerais. It occupies an area of 36,058 km<sup>2</sup>, corresponding to 6% of the state. Is composed of seven micro-regions and 142 municipalities. It has a population of 2,104,364,

representing 11,2% of the population of the state. The topography of the region is characterized by a relief that ranges from rolling to hilly, generally showing elevations, ending in flat valleys of variable width. The irregular topography reduces the chances of cultivation a large area, the majority of farms belonging to small farmers with crop and livestock production, generally familiar with the use of rudimentary techniques that promote low productivity and land degradation primarily from pasture cultivation. Currently, 64.7% of the area is considered pasture, which makes this system great importance to the region, but about 80% of the pasture in the Zona da Mata is in an advanced stage of degradation

The degradation of pastures is the most important factor, at present, which jeopardizes the sustainability of food production, and can be explained as a dynamic process of degeneration or loss on productivity (Jakelaitis et al., 2004, 2005a, 2005b). Among the most important factors related to the degradation of pastures include the inadequate animal management and lack of nutrient replenishment. The over-stocking, without adjustments for an adequate carrying capacity, and lack of maintenance fertilization has been the accelerators of the degradation process. The reversal of these frameworks fall of sustainable production has been observed by the use of key technologies such as no-tillage (NT), which covers not only the minimum tillage, but also the practice of crop rotation, and integration crop, livestock and forest systems (Freitas et al., 2005).

For the Zona da Mata Mineira, dominated areas of greatest slope, ICLF system had to be adapted to suit seeking it at the characteristics of the region mainly by the limitation imposed by the relief. This paper highlights the role of the Federal University of Viçosa through the Department of Crop Science, which works through the research units and also on farms, made the necessary adjustments, thus allowing for the Zona da Mata deploy ICLF in no-till. From these studies, EMATER-MG (Technical Assistance and Rural Extension Company of Minas Gerais State) and the Federal University of Viçosa, have performed a work of dissemination and training of technicians and producers to analyze the technology and assess its viability. For the region the priority has been the recovery of degraded pastures through the planting of crops, forage (pasture) and forests via no-tillage. The integration of crops and pasture is a practice that has been widely used in the past so this is a rescue of this technique with the updates and developments in the research developed.

The object of this work is divulgate the educational program: 2<sup>nd</sup> circuit Integration Crops Livestock and Forest in the Zona da Mata in Minas Gerais-Brazil.

**MATERIAL AND METHODS** The educational program is part of a larger plan which includes research conducted at the Federal University of Viçosa and subsequent dissemination of scientific results in scientific journals and conferences, as well as development of teaching materials and presentations at field days with the farmers, with technical training of the most effective for the employment of the integration of crops, livestock and forestry, according to the diagram in the figure 1. The educational program: 2<sup>nd</sup> Circuit ICLF was prepared as a unit of experience and/or trial of a new technology and approach to teaching the practice of participatory methodology where the objective was that the producers try and evaluate new knowledge for a knowledge prior incumbent. In the aspect of technology, the name itself indicates the interdisciplinary nature of the ICLF system where it is necessary to interact with knowledge in the areas of training and management of pastures, the grain yield in no-tillage system, the introduction of the ranking component in the system and management of animals in this system.

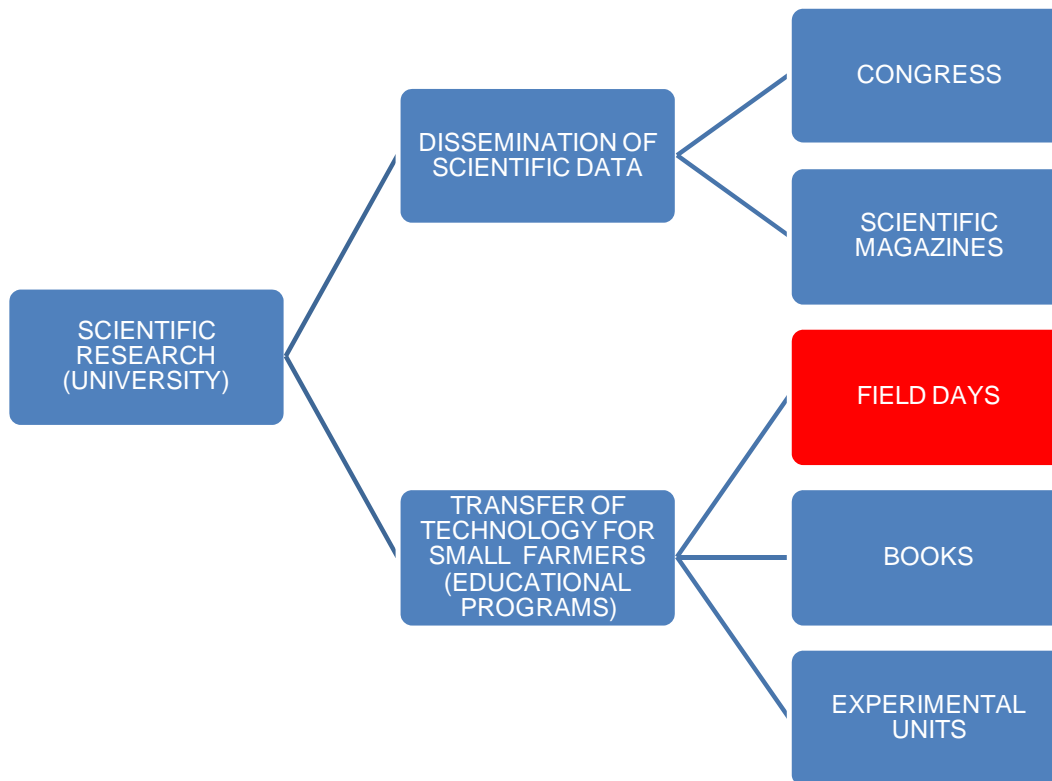


Figure 1. Diagram of strategies for training farmers and dissemination of scientific data.

Units Experiments were implemented on properties of farmers at the option of choosing the community itself, with the criteria, ease of access to the largest number of farmers, the choice of a grazing area representative of the community and region and a property that conditions had to develop the planned activities. Expenditures on labor for deployment of the units were the responsibility of the community. Producers along with the coaches made a first meeting to discuss the situation of pastures and the alternatives to the time for recovery. This meeting presented the technology to producers of crop-livestock integration will be analyzed in unit testing. In addition to producers and technical representatives of the public will be asked to attend these meetings.

We selected 25 properties in different municipalities of the region's forest area of Minas Gerais. In the properties was chosen for a meeting on site to be discussed and analyzed in view of producing a technical proposal for recovery of the area (this was the time to record the perception of farmers with regard to technology that is to be accompanied). The steps related to technology are: Soil analysis; total weed control; planting corn or beans and pasture (performed with the aid of machine-till animal traction); to reduce the effects of competition of weeds with corn, beans and forest was used herbicides; other cultural practices were performed according to the need of intercrops. Was used integration between beans, pasture and eucalyptus or corn, pasture and eucalyptus.

Throughout the duration of discussions were held on the development of unity and development of intercrops. At the time of maize harvest assessment was carried out with farmers in a field day to discuss the results. After harvest they were managed as recommended technique and were followed, along with the community to a process of continuity in the assessment of technology experienced.

From March to July 2009 the 2<sup>nd</sup> Circuit ICLF educational program, was conducted with the aim of disseminating technical ICLF in 25 counties in the Zona da Mata in Minas

Gerais. Contents of the field days were: training on agricultural machinery, plant selection, planting philosophy of integrated environmental, cultural and marketing of the crop. Costs for the preparation of field days and supplies were subsidized by the UFV, CNPq (National Council of scientific and technological development), local business and EMATER.

**RESULTS AND DISCUSSION** Were trained 1895 farmers in 25 municipalities of the Zona da Mata in Minas Gerais, as shown in Figure 2. The producers were past these very important information so they can install the system ICLF and thus able to enjoy the social, environmental and economic benefits of the ICLF system. The number of participants varied according to population size of localities

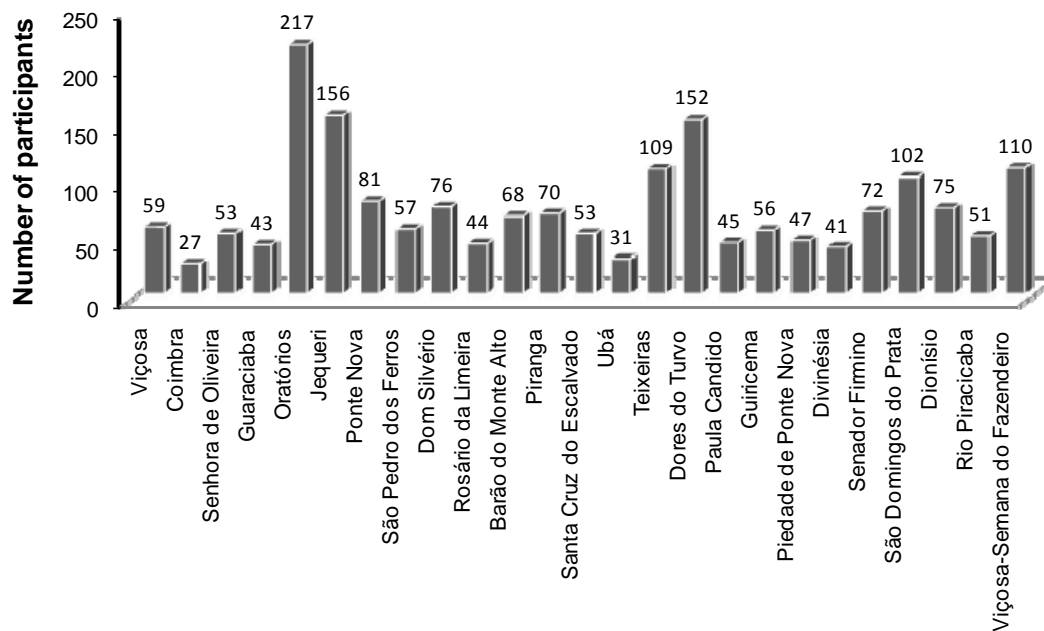


Figure 2. Number of participants in each field day represents in cities in Zona da Mata.

The producers had the opportunity to see machines in operation (Figure 3 A), an appropriate choice of seeds and varieties adapted to the regions, planting techniques, security in the application of agrochemicals (Figure 3 B), collection of soil samples and notions of soil, air and water environment. In some localities, where there was more time in the adoption ICLF, was shown in figures economic and environmental gains in adopted the ICLF system (Figure 3 C).

In order to encourage producers in adopting the system ICLF, the 2<sup>nd</sup> circuit ICLF in Zona da Mata, were awarded the best producers who obtained best crop productivity with the previous ICFL system and best gain in dairy cattle (Figure 3 F). In the next years the awards will be adopted for gain of wood.



Figure 3. Presentation of the machines to farmers (A), machines and security in the application of agrochemicals (B), View area of forest and pasture (C), harvested maize

with pasture (D), producer with a bean plant in an area of ICLF (E), awards farmer who adopts ICLF (F) and area with eucalyptus and pasture (G).

In the coming years is expected to increase the number of participating municipalities and to thus increase the number of properties to adopt the system ICLF. Economic, social and environmental gains are constantly monitored in experimental and demonstration units, so as to enable future strategies to demonstrate the benefits of the system ICLF.

**CONCLUSION** The 2<sup>nd</sup> circuit Integration of Crops, Livestock and Forestry (ICLF) in Zona da Mata promoted a great number of training farmers, who are distributors of the technology locally. A multidisciplinary, cohesion and dialogue between the involved institutions are essential for the transfer of technology and professional training of the rural men.

**Acknowledgements.** To CNPq, UFV and EMATER.

## **REFERENCES**

- Freitas, F. C. L., L. R., Ferreira F. A., Ferreira, et al. 2005. Formação de pastagem via consórcio de *Brachiaria brizantha* com o milho para silagem no sistema de plantio direto. *Planta Daninha* 23(1): 49-58.
- Jakelaitis, A.; A.A. Silva, L. R. Ferreira, et al. 2004. Manejo de plantas daninhas no consórcio de milho com capim-braquiaria (*Brachiaria decumbens*). *Planta Daninha* 22(4): 553- 560.
- Jakelaitis, A.; A. F. Silva, A. A. Silva, et al. 2005a. Influencia de herbicidas e de sistemas de semeadura em *Brachiaria brizantha* consorciada com milho. *Planta Daninha* 23(1): 59-67.
- Jakelaitis, A., A. A. Silva, L. R. Ferreira, et al. 2005b. Efeito de herbicidas no consorcio de milho com *Brachiaria brizantha*. *Planta Daninha* 23(1): 69-78.