



**II Congresso Mundial
sobre Sistemas de Integração
Lavoura-Pecuária-Floresta**
100% DIGITAL

AGRICULTURAL PRODUCTIVITY OF A LONG-TERM CROP-LIVESTOCK SYSTEM IN THE CERRADO BIOME, BRAZIL

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Introduction

In the Brazilian Cerrado there are constant periods of water deficit even during the summer which vary in intensity, therefore, the use of available natural resources to enhance agricultural production is a constant challenge. Over the years, the possibilities of crops succession and rotation with the aim to improve soil and water conservation have proved to be important and indispensable, especially considering the time in which these cultivation systems are explored on the farm.

Long-term adaptive research models allowed us to assess how the management strategies conducted enabled gains in crop productivity, even in years of adverse climatic conditions (dry spell).

Objective

The present work evaluated the dynamics of agricultural productivity of an CLS model implemented 15 years ago in Sete Lagoas / MG, Brazil.

Material and Methods

- # Local: Central Region of Minas Gerais, Brazil. Geographical coordinates: 19°29'4.37" lat. S and 44°10'25.66" long. W. Altitude of 755 meters.
- # Site: 4 blocks, 5,5 hectares each one. Starting Cropping Systems Year: 2005/06
- # Cultures: soybean, corn intercropped with *Urochloa* (syn *Brachiaria*), silage sorghum intercropped with *Megathyrus* (syn. *Panicum*)
- # Cropping systems: rotation between cultures and blocks. After corn and forage sorghum harvest, the pastures are used by the animals in the off season

	Gleba 1	Gleba 2	Gleba 3	Gleba 4
(2005-2006) Ano 1	Soja	Milho grão + M. maximum cv. Tanzânia	Sorgo Pasto + M. maximum cv. Tanzânia	Sorgo Silagem + M. maximum cv. Tanzânia
(2006-2007) Ano 2	Sorgo forrageiro + M. maximum cv. Tanzânia	M. maximum cv. Tanzânia	Soja	Milho grão + M. maximum cv. Tanzânia
(2007-2008) Ano 3	M. maximum cv. Tanzânia	Soja	Milho grão + M. maximum cv. Tanzânia	Sorgo Silagem + M. maximum cv. Tanzânia
(2008-2009) Ano 4 (2012-2013) Ano 8 (2016-2017) Ano 12	Soja	Milho grão + Urochloa	Sorgo forrageiro + Megathyrus	Megathyrus
(2009-2010) Ano 5 (2013-2014) Ano 9 (2017-2018) Ano 13	Milho grão + Urochloa	Sorgo forrageiro + Megathyrus	Megathyrus	Soja
(2010-2011) Ano 6 (2014-2015) Ano 10 (2018-2019) Ano 14	Sorgo forrageiro + Megathyrus	Megathyrus	Soja	Milho grão + Urochloa
(2011-2012) Ano 7 (2015-2016) Ano 11 (2019-2020) Ano 15	Megathyrus	Soja	Milho grão + Urochloa	Sorgo forrageiro + Megathyrus

■ Rotação de cultura nos três primeiros anos ■ Modelo de rotação adotado no quarto ano até os dias atuais

Scheme of cultures in each Block every crop year (Gleba, in portuguese) during the experimental conduction

Summarized Results

Productivities	-----Soybean-----		-----Corn + Grass-----		-----Grain-----		-----Silage-----		Silage Sorghum + Grass	
	Mg ha ⁻¹	t	Mg ha ⁻¹	t	Mg ha ⁻¹	t	Mg ha ⁻¹	t	Mg ha ⁻¹	t
Maximum	4.11	22.6	9.01	35.2	53.0	291.5	53.0	291.5	53.0	291.5
Minimum	0.85	4.67	5.14	44.9	21.2	116.6	20.1	110.5	20.1	110.5
Average	2.56	13.15	7.39	35.0	39.3	216.1	38.3	210.6	38.3	210.6
Accumulated [€]		197.3		245		1.729	574.8	3.161		

Conclusion

The diversity of plants and the rotation of crops between the plots adopted in the CLS allowed us to infer that, in 15 years of implantation of the system, agricultural productivity, even in situations of moderate and severe water restriction, increased the resilience of agricultural crops and allowed, at least, incremental improvements to the CLS over time

Acknowledgments

To the CLFS Network Association for the financial support and Brazilian Agricultural Research Corporation (Embrapa) for maintaining the CLS where the research was carried out.