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ABSTRACTS

RESUMOS

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Improvement and Management of Fallows in the Senegalese Groundnut Basin.

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An explosion in population, the need for currency which lies behind monocrop peanut farming, and poor cultural practices have rapidly led to overexploitation of the land. Today, decline in soil fertility and degradation of vegetation cover are problems mentioned insistently by farmers. Therefore, in the management of natural resources, some actions have been initiated by the forestry commission for preserving the soil and water and for enriching pasture land through introduction of forage species with high nutrient value. Over the years, economic and socio-cultural constraints have affected the pertinence of many traditional practices such as the communal fallow being the subject of consultation between bordering territories where each territory is obliged to create a livestock access corridor. At the individual level systems of temporary stabling are practiced in farming concerns sometimes the subject of contracts between farmers and cattle breeders. For this reason, certain of these practices are once again justified and merit being improved and their value reasserted.

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Canola Production in Analogous Agro-Climatic Zones: SW Siberia and the Canadian Prairies.

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Many regions in the U.S.A./Canada and Russia are analogous with respect to soils and climate. Adaptation of proven technologies between these zones may effect fast and efficient improvements in agricultural production. This study developed a methodology involving geographic information systems to identify analogous agro-climatic zones. It also evaluated the transferability of crop cultivars from the Canadian prairies and northern U.S.A. to an analogous zone in SW Siberia using a field experiment and modeling simulations in EPIC (Environmental Policy Integrated Climate). Analogous zones were determined to have similar soils and long-term average monthly temperature and precipitation regimes. The performance of 10 high-quality canola (*Brassica napus L.* and *B. rapa L.*) cultivars from the Canadian prairies and northern U.S.A. at three locations in SW Siberia was evaluated. Despite droughts in 1998 and 1999, yields of the Canadian and U.S. canola cultivars grown in SW Siberia averaged 1.7 and 2.4 Mg/ha, respectively. The yield, as well as protein, oil and erucic acid, but not glucosinolate, contents were equal to or better than those of standard cultivars grown on the Canadian prairies. Canola cultivars from the Canadian prairies and northern U.S.A. appear to be well-adapted to the analogous agro-climatic zone of SW Siberia.

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The Role of Plant Nutrients in Food Security and Conservation of the Resource Base.

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History has shown that if nutrients removed in agricultural products are not replenished, soil nutrient depletion results in reduced agricultural productivity and eventual land degradation. Prior to the availability and use of mineral fertilizers, various techniques including shifting agriculture, extensive use of animal manure, and the growth of legumes were utilized in attempts to replenish nutrients removed by crops. Despite these techniques the cropping systems were not sustainable, farming was inefficient and vast numbers of people were tied to the land. Today, similar practices continue in much of the world where increased food demands combined with the lack of arable land and external nutrient inputs, are forcing farmers to mine soil nutrients while simultaneously reducing fallow periods. These actions are accelerating nutrient depletion of low fertility soils and promoting encroachment on marginal lands that are extremely susceptible to degradation. Fertilizers will be very important for halting this downward spiral of soil nutrient depletion and land degradation and the resulting increase in food insecurity and poverty. Three case studies will be reviewed to assess how nutrient inputs or the lack of has affected food security and resource conservation.

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Soil Management for Alfisols in the Semi-Arid Tropics.

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Globally, the Alfisols comprise some 33% of soils in the SAT and are subject to low productivity and soil degradation. Large human populations are reliant on these soils for food and cash crops. We will report on experimentation to identify the key factors in Alfisol fallow management, including tillage, organic additions and crop rotations, to improve productivity and reduce land degradation. Management to optimise the components of the water balance is central to any fallow management for sustainability. The findings of this work are currently being extrapolated to on farm environments both in India and Australia using action learning principles.

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Conflicting or Complementary: Food Security and Soil Fertility Management Issues in the North Rift Region of Kenya.

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Small scale farmers prefer green manure cover crop species that have multiple uses. Edible species are especially attractive. In the north Rift region of Kenya, farmers involved in developing a green manure system for maize have shown greater adoption of *Lablab purpureus* than *Mucuna pruriens* because *lablab* has edible grain and leaves. Data from on-farm and on-station trials are presented to highlight the potential benefits and limitations of the system vis a vis soil management and food security issues in the region.

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Study Abroad in Brazil.

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The objectives of the first Study Abroad in Agriculture and Ecology done by University of Georgia in Brazil was to study tropical agroecosystem diversity in Northeast Brazil, examine differences between tropical and temperate ecosystems, gain insight about a different environment and culture. The students examined differences between natural and agricultural ecosystems along a rainfall gradient from the high precipitation (Brazilian Atlantic Rainforest) to the semi-arid (Caatinga) of Pernambuco, Brazil. Field trips to Center of Tropical semi-arid EMBRAPA, Petrolina) and IPA (Goiana) where the students had the opportunity to visit from low-input agriculture to fruit production (mango) to be exported to Europe and USA. This program is in cooperation with Universidade Federal Rural de Pernambuco. www.ecology.uga.edu/Brazil.html

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A Research Concept for the Development of Fire-Free Fallow Management Techniques in the Eastern Amazon Region.

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Scientific improvements in small-farmer land-use systems often fail to address the true system problems or concerns of the farmers. Therefore, in our search for improvements in the traditional fallow system of Eastern Amazonia we opted for field experiments carried out in farmers' fields, but managed by the researchers, to identify the critical needs for improvement. The diagnostic studies focused on nutrient dynamics, fallow regeneration, and fire prevention. Instead of designing a completely new system, we replaced only the components recognised to be harmful to the traditional system itself and offered additional components to further improve the system. Alternative technologies were developed as a set of modules including fire-free land clearing, enrichment planting, shifts in cropping sequence and modern low-input crop varieties. Adoption of these modules is flexible, leaving the farmer in control of the process. To achieve our objective we followed a phased plan: (i) diagnostic research, (ii) technology development and prototype evaluation and (iii) impact-oriented research. The last phase is currently underway. It is participatory and multidisciplinary in nature and seeks to develop implementation strategies aiming at the diffusion of the farming system improvements.

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