



## The value of old maps when planning for changing climates

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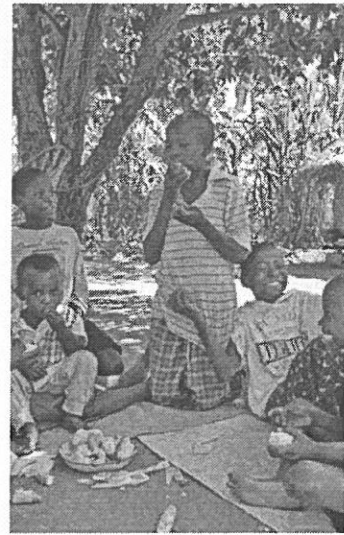
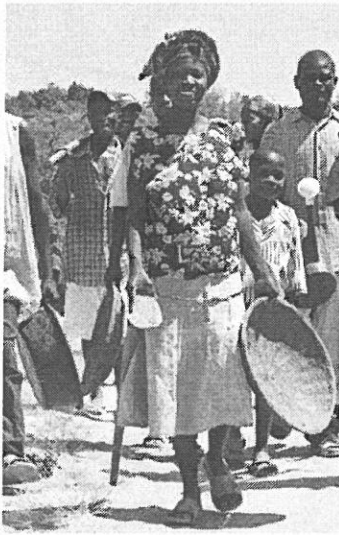
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## Book of Abstracts



*Agroforestry - The Future of  
Global Land Use*

## The influence of a tree-based intercropping system on nitrous oxide emissions compared to a conventional monoculture in southern Canada

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**Session** 21. Mitigation and adaptation to climate change

**Abstract** Agricultural practices to limit N<sub>2</sub>O emissions are sought as a result of the current climate change crisis. One method that has the potential to limit N<sub>2</sub>O emissions from agriculture is tree-based Intercropping (TBI). The objective of this study was to determine N<sub>2</sub>O flux in both a TBI system and a conventional monoculture located at the Guelph Agroforestry Research Station (GARS) in Guelph, Ontario, Canada. The study was a stratified random design, with three pseudo replicates and partially blocked to take into account time series effects on emissions. Gas samples were taken from June 2007 to August 2008 in both a monoculture and TBI system using the chamber method and divided into seasons according to planting and harvesting times. N<sub>2</sub>O flux was 1.07 kg ha<sup>-1</sup> day<sup>-1</sup> and 0.75 kg ha<sup>-1</sup> day<sup>-1</sup> in the monoculture and TBI system, respectively, with no significant difference in emissions between the two systems over all seasons (SE=0.3327, p=0.5281). A correlation between water-filled pore space and residual soil inorganic N with N<sub>2</sub>O flux did occur in both the monoculture and TBI system from summer 2007 to spring 2008 but not in the summer of 2008. Soil temperature did not correlate with flux across all field seasons in both fields. Although these results indicate that emissions are not statistically significant between the two fields, N<sub>2</sub>O flux was numerically lower from the TBI system by 0.32 kg ha<sup>-1</sup> day<sup>-1</sup>. This indicates that with further research, a higher number of replicates and number of samples could show TBI systems as a potential practice for limiting N<sub>2</sub>O emissions from agriculture.

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**Session** 21. Mitigation and adaptation to climate change

**Abstract** Agroforestry can contribute substantially to lifting tropical smallholders out of poverty through diversification of farm practices and products. One of the challenges to leverage agroforestry in promoting sustainable land use is the identification of species that are both useful and well adapted to current and future environmental conditions. Two key questions that need to be addressed are: (i) do we have an adequate understanding of present species and vegetation distribution to predict changes in distribution patterns under changing climates?; and (ii) does our knowledge of tropical woody species' environmental growth requirements allow us to provide practical recommendations to smallholders practising agroforestry? The selection of woody species requires a good understanding of their adaptability to varying conditions – different provenances may perform differently under different environmental conditions. In temperate zones, with relatively few woody species, substantial knowledge has been gained over many years. For most tropical agroforestry species the answers are that our knowledge is woefully inadequate. Only a tiny fraction of tropical species have been studied and for most we have no or limited information on their environmental requirements. Furthermore, data on environmental variation across landscapes are very coarse compared to that of, for example,, European countries. Yet, a largely untapped repository of knowledge is available, which can be used to gain a better understanding of the environmental variation of tropical landscapes and distribution of tropical woody species. In the 1950s to 1980s, botanists mapped the vegetation across Africa, combining information on environmental variation across landscapes and the potential distribution of