



Improving small farm production and marketing of bananas under trees: Resource partitioning, living soils, cultivar choice and marketing strategies

Biodiversity International

Country/Region:	Costa Rica, Honduras, Nicaragua, Peru
German participation	Universities of Bonn, Goettingen, Hannover and Kassel
Leading scientists:	Charles Staver
Duration:	March 2009 - February 2012

Initial situation

Research and development efforts to improve productivity have focused largely on banana monocrops, although bananas grown in high-input monocultures account for only 13% of world production. Meanwhile, millions of small farm households throughout the tropics and sub-tropics produce numerous different types of banana in low-input mixed cropping systems for home consumption and sale in local markets. In many of these farming systems, *Musa* is grown with other perennial crops, such as coffee and cacao, with or under trees. The yields of bananas and plantains in agrobiodiverse systems fall short of those achieved in full-sun monocrops, but these mixed systems offer other benefits, including low labour costs, dietary diversity and food security, ecological and economic resilience, soil conservation, carbon sequestration and habitat for wildlife.

Approach of the project

We focus on *Musa* grown with coffee under trees in four countries in Latin America to better understand the biological and ecological principles for improving *Musa* productivity and quality in association with trees. We want to identify niche and high-value markets for *Musa* diversity and, in partnership with small growers, to develop models for improving the production and marketing of higher value agroforestry bananas through short food supply chains and labelling based on sustainability and diversity. We are implementing complementary research techniques and approaches at different levels. At the landscape level we use GIS to map current areas planted to coffee with *Musa* and identify homologue zones for extrapolating production and marketing experiences. At the plot level we work in



farmers' fields and controlled experiments with advanced ecophysiological instrumentation to measure the shade response of *Musa* cultivars. We use modelling to

explore complex and long-term interactions between tree species and *Musa* cultivars. Participatory farmer research focuses on defining improved production strategies, the fit of *Musa* into the farm enterprise and the targeting of promising higher value markets.

Major results achieved

At the half way point in grant implementation, in-depth understanding of current production and marketing approaches has been established through a survey of 150 coffee growing households and studies of current banana marketing chains in five pilot zones in Costa Rica, Honduras, Nicaragua and Peru. Seven farmer experimentation groups are being facilitated by national scientists. Participating farmers have completed diagnostic studies of coffee, banana and tree distribution and potential productivity, light distribution among coffee, banana and trees, nutrient balances and ground cover. In each group, a delegation of farmers carried out a market reconnaissance. With these inputs, farmers and scientists agreed on a research agenda to improve light distribution, increase the nutrient contribution of trees to banana and coffee, reduce the spread of Panama disease and prepare a pilot strategy to increase the market value of bananas to growers. Students from German universities at Bonn, Göttingen, Hannover and Kassel have contributed to the studies. Students at CATIE from Honduras, Nicaragua and Ecuador have completed or are completing MSC research.



Expected impact

The results of this research grant have direct application to over 3000 farm households in the immediate vicinity of the farmer experimentation groups and to over 25000 farm households under similar agroclimatic and market conditions. The experiences will allow growers' associations to pursue greater added-value, through increased productivity, improved quality and group marketing. The principles, tools and methods for managing more productive *Musa* in association with trees will be useful to scientists and field organizations working in other regions where *Musa* are frequently grown with trees, including Amazonia, Central America, the Caribbean, sub-Saharan Africa and the humid tropics of Asia.

Collaborating Institutions: Organic Growers' Association of Turrialba and University of Costa Rica.

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