

# Agro forestry systems and food security among smallholder farmers of the Brazilian Amazon: A strategy for environmental global crisis<sup>1</sup>

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## Abstract

*The Amazon is known for its environmental importance for the climatic equilibrium, for its abundance and richness in biodiversity and its preservation is important to reduce global heating. Nevertheless, little research has analysed the possible positive role of the local farm population for environmental conservation. The paper investigates the possibility to conciliate the environmental conservation with the small farming expansion in the Amazon, to build agrobiodiversity, and at the same time improve food security. This social practice consequently would contribute to the reduction of deforestation and could thus falsify the old diagnosis of incriminating the poor farmers for forest and soil destruction. The study was conducted by the Associação de Produtores Alternativos, localized in territory of Ouro Preto d' Oeste, Rondônia, in the Southwest of the Amazon. The study documented a number of forest preservation and agroecological methods used and concludes that institutional support to strengthening of social organization and local sustainable development projects is fundamental for the consolidation and amplification of the ecological experiences in the Amazon.*

## Introduction

Among several Brazilian Amazon localities, there are emergency of agroecological experiences, having as basis the support to the development of agroforest systems, henceforward AF. The Amazon is inhabited by different social categories many of which are types of small farmers or forest people, such as cattle breeders and farmers, riverine people, rubber tappers, Brazil nut collectors and quilombolas. Because of unsustainable land use with monoculture and annual crops leading to soil depreciation farming populations have continuously moved on to clear more forest, leading to one of the classical problems of Amazonian deforestation (Fearnside, 1990). However, such negative experiences during the 1990'ties led some farmers in Ouro Preto d'Oeste, Rondônia, Southwest Amazon to experiment with agro-forestry practices combining a diversity of livestock, annual crops with cultivated trees and use of wild forest for products such as cacao, cupuacu, acai, pupunha (reference..). Along with this a number of products collected from the wild forest have been certified as

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organic and/or fair trade and –together with certified crops- contribute to the families' income. If such practices are more sustainable in terms of stability in food production and preservation of soil fertility these systems may help reduce the deforestation of Amazonian forests. The conversion process is fruit of the emergence of a critical environmental consciousness based upon in an ecological ethic, motivated by multiple elements: strong organization of political group previous experience with environmental problems, social necessity of survivorship, and ecological appeal realized by the small farmers during the interaction process with ecological entities articulated with global society. The development of the agroforest systems was conducted with the support of the Catholic Church entities non-governmental organizations and local public institutions. Since 2004, this governmental program recognizes and predisposes to remunerate the environmental services rendered by small farmers through the stimulation of the adoption of the sustainable production systems, valorization of environmental services rendered by small farmers community and forest recuperation. The environmental services can be of diverse nature: reduction of deforestation and land burning, reconstruction of devastated areas, protection with revegetation of hydrological resources and others. The aim of this paper is to assess the degree of food self sufficiency and variation in food utilisation and agro-biodiversity among organic agro-forestry farmers in Amazonia and to discuss how this type of farming may contribute to the preservation of natural forests in Amazonia.

## **Material and methods**

After almost a decade of experiences with agroforest systems development, our research covered the biodiversity of small farmers established in Ouro Preto d'Oeste, Rondônia. More than 250 families are presently members of and association of alternative producers and 1000 others are in conversion. The collected material is the result of field survey conducted in several occasions: in 2005 a questionnaire was administered to 50 households, and following this, tape recorded interviews with 28 farmers, heads of associations and local environmentalists and politicians were conducted in 2006 and 2007. Tables containing the list of annual and perennial cultures conducted by the farmers were elaborated, as well as those related to animals raised in the production unities. The area with annual cultures and the number of plants of each species of perennial cultures and the number of each livestock species were established from the questionnaire. The food produced and consumed by the families was listed. The items belonging to feeding these farmers were compared with food items of riverine people from several localities of Acre, Amazon and Pará states using literature surveys. Comparisons were also made with the diet and the agrobiodiversity of the rubber tappers living in two protected in the Acre state: the *Reserva Extrativista Chico Mendes* and inhabitants of *Parque Nacional da Serra do Divisor* and surroundings.

## **Results and discussion**

These two dimensions (the speech and practices), we classified the ecological sensitivity of the social agents according to the table below:

TIPOLOGY OF THE SOCIAL PERCEPTIONS AND PRACTICES IN THE TERRITORY	SENSITIVITY TO SUSTAINABILITY PRINCIPLES
	<b>Low sensitivity</b> (Productivist).
<b>Modern activity</b>	Cattle rancher's vision: Economy oriented to activity expansion and wealth accumulation. There is no adhesion to sustainable development.
	<b>High sensitivity</b> (Modern and Ecological)
<b>Modern activity</b>	Issue is an opportunity to production valorization
	<b>Low sensitivity</b> (Productivist)
<b>Traditional activity</b>	Conscious of environmental question as a market opportunity and to income augmentation.
	<b>High sensitivity</b> (Modern and Ecological)
<b>Traditional activity</b>	Behavior based on ecological tradition compromised with Logic ecological.

Source: Field data collection, Abreu & Watanabe (12/2007).

In this work we point out the familiar farmer's contribution who use low impact technology and with reduced utilization of external inputs. The farmers classified as of traditional activity and of high ecological modernity are those who cultivate 22 vegetable species and 26 fruit species, what guarantee a diversified food source. This social group needs institutional support in order to advance in terms of agroecological transition. They sell the surplus for fair trade system.

We observe that the productive activities types in Ouro Preto do Oeste, thus most of the families (98%), use some portion of their land for different types of agroforestral production often in combination with pasture and livestock. While most of the farmers actively preserve wild forest for environmental protection along rivers and around lakes following a public programme "Pro-ambiente", 50% of the families explore the wild forest for products used for home consumption and marketed as organic or fair trade products.

The most cultivated annual species in Ouro Preto d'Oeste were: rice, beans, maize, cassava, pineapple and sugar cane. Perennial cultures most frequently cultivated were: banana, citrus, mango, cashew, cocoa, coffee, papaya, avocado, *açaí*, *pupunha*, *cupuaçu*, coconut and others. A major proportion of the annual species are cultivated by women near their homestead and the fruit trees are cultivated around the houses or collected in the forest and are destined for domestic use. Fruit surplus like banana, papaya, *pupunha*, *cupuaçu* and coconut are destined for commercialization. The coffee and cocoa are typically cultivated for income generation. The major part of the annual cultures is cultivated for their home consumption, like cassava flour, rice and beans. The major part of maize production is destined for feeding domestic animals or consumed by the families as fresh (green) maize; the grain surplus are commercialized with neighbors or exchanged (escambo) with other products or with other local services.

The small farmers from Ouro Preto d'Oeste have as a difference from the other local communities, the insertion in the global market. The APA's products like honey, heart of palm, native fruit juices are commercialized in local farmers markets, in the Brazilian

organic market (Sao Paulo, Rio de J) and overseas exported through Alter Eco (an international organization).

From the observed agrobiodiversity in the annual and perennial cultures, in the animal raising, and in the destination of these products for consuming (besides that ones destined to market), it indicates that these small farmers community enjoy a rich and diversified food, and are almost 100% self sufficient in food and only purchase items such as sugar and salt.

Another part of grain production is precariously stored in rustically-constructed granaries as seeds for next cultivation season. Because of these practices the small farmers, riverine people and rubber tappers of the Amazon have important role as guardians and perpetuators of a rich variety of germplasm of the cultures like cassava and other species destined to feeding (Amorozo, 2002).

The present study is part of a thematic research whose scope involves several localities of this country, aims to understand the Brazilian agrarian ecologization process, where it is studied the diversity of social models of production recognized by Brazilian legislation of 2003: Organic, biodynamic, permaculture, agroforests, etc. (Bellon & Abreu, 2005). It was observed that it is needed to deepen and qualify the contents of the different styles of ecologically based farming, aiming to understand their functionalities, related to food sovereignty, to the contribution to agrobiodiversity or linked to environmental conservation and environmental service rendering.

## Conclusions

Amazonian rural populations depend upon, for their feeding, the products from annual and perennial cultures, products collected from the forest, products from animal raised in the production unities and hunting.

Thus, the small farmers cultivate diversified agroforestry systems, which express synchronously cultural values based in an ecological ethics, in the search of food security and finally they are providing environmental services. Moreover, they share with the global ecological society the principles of social development and ecological respect following the principles of organic agriculture as defined by IFOAM. Thus, reduction in deforestation and local landscape reconstruction can be reached with the development of diversified agroforestry systems and amplification of food security. The possibility of marketing part of the forest products as fair trade and certified organic add to the economic viability of these systems but the environmental services should be paid by the governmental organizations.

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