

Eastern Amazon

Tipitamba Project: Fire-free land preparation as an alternative to slash-and-burn agriculture in Amazon, Brazil

Osvaldo R. Kato, Anna C. M. Roffé Borges, Maurício K. Shimizu, Lucilda M. S. de Matos, Débora V. Aragão, Thais Nagaishi, Grimoaldo B. de Matos, Célia M. B. C. Azevedo, Tatiana D. A. Sá.

Embrapa Eastern Amazon, Belém, Pará, Brazil. E-mail: osvaldo.kato@embrapa.br, anna.roffe@embrapa.br, mauricio.shimizu@embrapa.br, lucilda.matos@embrapa.br, debora.aragao@embrapa.br, grimoaldo.matos@embrapa.br, celia.azevedo@embrapa.br, tatiana.sa@embrapa.br.

INTRODUCTION

In 1991 Embrapa Eastern Amazon and German Government initiated a technical-scientific cooperation to study a sustainable future for family farming in Amazon, recovering degraded areas with fallow manegement. Thus was born Project "Tipitamba", which means fallow in language of Tiryós indian.

The main objective of this project is propose technological, economic and environmentally sustainable alternatives to fire elimination and efficient use of

ADVANTAGES OF FIRE-FREE LAND PREPARATION

- Accelerate biomass and nutrients accumulation and positively influences physical, chemical and biological soil properties;
- Promotes nutrients cycling processes and prevents nutrients and leaching losses;
- Preserves biodiversity;
- Intensifies crop production and provides flexibility in crop calendar (DENICH et al, 2005)

natural resources.

TRADITIONAL METHOD OF LAND PREPARATION IN AMAZON

In Brazilian Amazon most of family farmers traditionally use slash-and-burn practice of land preparation. It is a practice questioned due nutrients losses by burning, harmful gases emissions into atmosphere, risk of accidental fires and deforestation increase.



Slash-and-burn land preparation

Fallow (2 to 7 years)

Fig. 1. Traditional land preparation in Amazon (Photos by Osvaldo R. Kato)

 Improves carbon balance and capture with CO₂-equivalent emissions at least five times lower in chop-and-mulch compared with slash-and-burn system (DAVIDSON *et al*, 2008).



Fig. 3. Rice and cowpea yields (Mg.ha⁻¹) in two successive periods following different land preparation methods of a 4-year-old fallow vegetation, with and without fertilization (DENICH *et al*, 2005).

PARTICIPATORY RESEARCH

Currently, Tipitamba Project has develops a participatory research based on agroecological principles in states of Brazilian Amazon with approximately 150 family farmers. It has also contributed to transition from traditional method to fire-free land preparation promoting implementation of annual crops in natural or enriched fallow and agroforestry systems.



FIRE-FREE LAND PREPARATION: CHOP-AND-MULCH TECHNOLOGY

The deforestation increase has promoted large areas of secondary vegetation (fallow). These areas have an ecological importance to biomass accumulation, hydrologic benefits and biodiversity.

One possibility to improve food production is enrich the fallow with leguminous trees during the cropping. At the end of fallow period, the biomass accumulated is chop and spread as mulch over soil to release nutrients after decomposition.



Fig. 4. Participatory research and training (Photos by Anna C. M. Roffé Borges)

CONCLUSION

Chop-and-mulch technology is a sustainable alternative focus on fire elimination and efficient use of natural resources for crop production in family farming in Amazon, including social, economic and environmental benefits.

Fig. 2. Bush chopper, mulch, no-tillage and maize with fire-free land preparation. (Photos by Osvaldo R. Kato)

REFERENCES

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DENICH, M.; VLEK, P.L.G.; SÁ, T.D. DE A.; VIELHAUER, K.; LUCKE, W. A concept for the development of fire-free fallow management in the Eastern Amazon, Brazil. **Agriculture**, **ecosystems and environment**, v.110, p.43-58, 2005.

1991 – 1994: Exploratory Research	1995 – 1998: Solution-oriented Research	1999 – 2002: Implementation-oriented Re	search
 Brazil and Germany technical-scientific cooperation: Program SHIFT (Studies of Human Impact on Forest and Floodplains in the Tropics) Studies of biodiversity, biomass, regeneration and nutrient dynamic 	 Tecnology development: mulching, bush chopper (Tritucap I), enrichment plantings Prototype evaluation: fallow management "Nutrient input-output budget of shifting agriculture in Easter Amazon" (Nutrient Cycling in Agroecosystems, 1997) 	 Incentives Economic evaluation Farmer's reaction and involvement 	 Prototype: Tritucap II (1999) Test with Ahwi Forestry Mulcher FM 600 (2000) Project Tipitamba: SHIFT and complemetary projects (2001)
 2011: Participatory Research Petrobras Biofuel began using the technology to palm oil producting in state of Pará, Brazil. Approximately 150 family farmers adopted the slash-and-mulch tecnology in Amazon 	 2007 – 2010: Participatory Research The technology improves carbon balance and capture, with CO2-equivalent emissions at least five times lower compared with slash-and-burn system "An integrated greenhouse gas assessed alternative to slash-and-burn agriculture in Amazon" (Global Change Biology, 2008) 	nent of na n Eastern C • Technology validation with farme in Igarapé-açu and Marapanim , state of Pará, Brazil.	 rch • Projects "Raízes da Terra" and "Agropará": agroforestry systems and systematization of agroecological experiences • Implemantation of demonstrative units in 6 states in Amazon



Fig. 5. Project timeline











