

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

Oswaldo 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 management. 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 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.



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

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

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)
- 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).

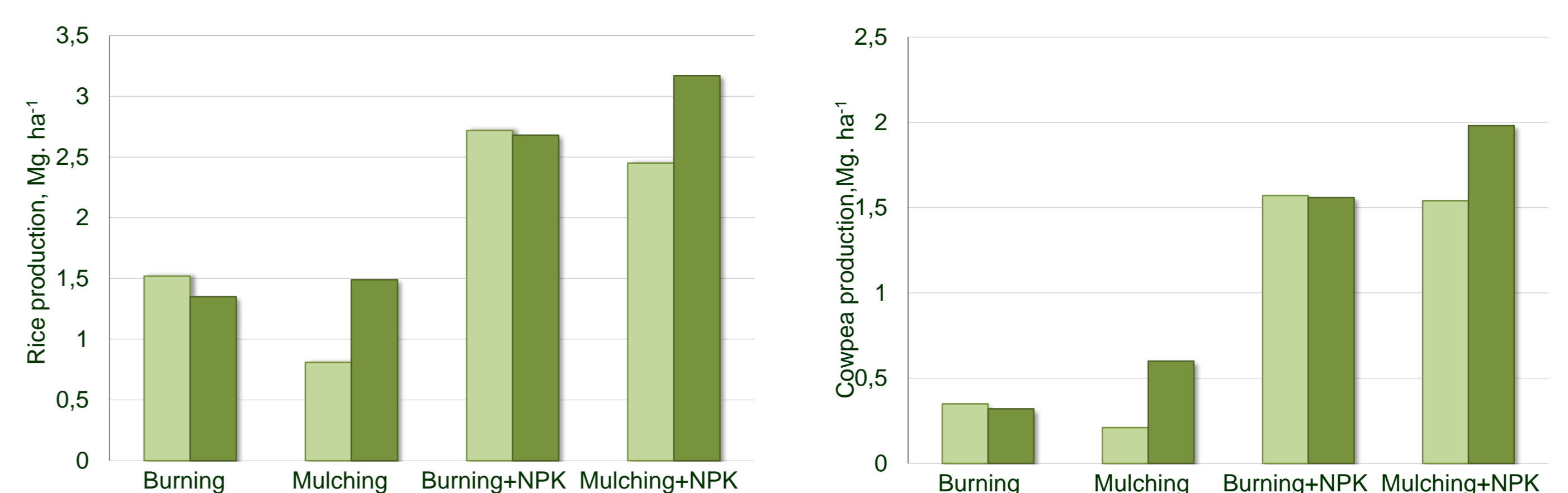


Fig. 3. Rice and cowpea yields (Mg ha⁻¹) in two successive periods following different land preparation methods of a 4-year-old fallow vegetation, with and without fertilization (DENICH *et al*, 2005).

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.



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.

REFERENCES

- DAVIDSON, E. A., SÁ, T. D. D. A., CARVALHO, C. J. R., FIGUEIREDO, R. D. O., KATO, M. D. S. A., KATO, O. R., ISHIDA, F. Y. An integrated greenhouse gas assessment of an alternative to slash-and-burn agriculture in eastern Amazonia. *Global Change Biology*. v.14, p.1-10, 2008.
- 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.

