

# **Deutscher Tropentag 2001**

**Conference on International Agricultural Research**

## **One World**

**Research for a better Quality of Life**

October 9-11, 2001  
University of Bonn

Book of Abstracts and  
Proceedings on CD-ROM

### III.2 Land-use in a mulch based farming system of small holders of the Eastern Amazon

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Burning is a commonly used method to clear land for cropping, especially in regions with shifting cultivation. Mostly it is combined with shortening of fallow periods due to population growth. Both factors are the principal causes of declining soil fertility, and they are symptomatic for Eastern Amazonian agriculture. Within a project of ZEF, University of Bonn and Embrapa Amazônia Oriental, Belém, Brazil, alternatives to counteract these problems are being developed. Yet, shifting cultivation as a whole is to be maintained as a system. Motor mechanized mulching technologies were developed with which land clearing is done without burning; by cutting and chopping the tree-rich fallow vegetation and leaving behind a mulch layer of chips, mostly smaller than 2 cm. Besides the primarily desired preservation of organic matter and mineral nutrients, land preparation can be carried out at any time of the year, because mulching does not depend on the dry season, as burning does. Enriching the fallow vegetation with fast growing trees is supporting the effect of mulching. As compared to a natural fallow, with a biomass accumulation of about  $10 \text{ t ha}^{-1} \text{ year}^{-1}$ , the accumulation rate of enriched fallow vegetation is more than doubled during the first 2 - 3 years. Putting the technologies into practice the demand on differently behaving nutrient dynamics in mulch-based systems has to be met on one side; on the other side alternative ways of land utilization are offered, due to the acquired flexibility by fire-free land preparation. New crop-fallow scenarios emerge from both, whilst the basic principles of shifting cultivation are kept: I) Fallow biomass increase by enrichment reduces the fallow period from 4 - 6 years to 2 years. II) Slowly released nutrients of the mulch layer allow an additional cropping period. This reduces the act of land preparation by half. III) Highly demanding crops can be planted at the end of the cropping period if low mineral fertilizer input is desired. IV) The detachment of the dry season permits planting of crops more ideally with view to climate and to market demands. V) Semi-permanent cash crops can be integrated into the crop rotation.