Realizing the benefits of cover crop legumes in smallholder crop-livestock farms of the hillsides of Central America



to study nitrogen (N) fluxes under those two options

makes a significant N input through symbiotic N₂ fixation

to evaluate on-farm the productivity of the crop-livestock system when

This study is done with 11 farmers and their families in Santa Teresa,

Canavalia brasiliensis is used as green manure or as dry season feed

Crop and livestock productivity decrease









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what we ask ...

Does Canavalia, (partially) removed or not, increase the N input in a maize/Canavalia rotation, compared to the traditional maize/bean rotation?

water losses smaller in a maize/Canavalia Are rotation, compared to the maize/bean rotation?

Does Canavalia increase milk production ?

What are farmers' perceptions about including Canavalia as green manure or as forage?

• is highly drought adapted (stays green during 5 months of dry season)

Yields:

Maize grain yield in the first rainy season 2007 ranged from 520 to 5300 kg/ha.

evaluated when cut in January 2008, was highly variable between and



· Identify soil properties affecting the biomass production of Canavalia.

2nd rainy season 07 1st rainy season 07 dry season 08 А S O N D E maize maize

Canavalia in a farmer's field

Objectives and methods:

Compare yield and quality of milk from cows grazing maize stover alone (i.e. what is left in the dry season after the maize-bean rotation) and cows grazing maize

stover followed by the maize plots with Canavalia. Each treatment lasted eight days, with four days of adaptation and four days of data collection.

- · Canavalia increases available forage biomass and augments milk production in the dry season.
- The positive effect on milk production is recognized by the farmers and they show a clear interest in continuing with this new technology.
- The first results of the green manure experiments will become available and provide more insight in the feasibility to include Canavalia brasiliensis in the maize-bean system of the hillsides of Central America.
- Knowledge sharing and capacity building: farmers, researchers and extentionists held a workshop in Nicaragua in February 2008. One MSc and one BSc student from Switzerland and two BSc students from Nicaragua are doing their theses within the project. The project is regularly presented at national and international meetings.



Planting of Canavalia resulted in a significantly higher milk production of about one liter milk per day. No effect was found on milk quality. Differences between farms were due to different lactation stages of cows.







1st rainy season 08 2nd rainy season 08 D

maize maize maize

Condega, Nicaragua.

Canavalia brasiliensis

what we know ...

underutilized

what we guess...

1st rainy season 07

1 Α S

maize

decreases water losses

2nd rainy season 07

bean

canavalia

O N D E

green manure trials **Objectives and methods:**

maize

removing different proportions (resp. 0, 50, 75 and 100%) of Canavalia during the dry season.

- The budgets are estimated as
 - soil surface balance = $(N_{fertilizer} + N_{seed} + N_{fixed}) (N_{harvested products})$

Symbiotic N₂ fixation by Canavalia and beans is estimated using the ¹⁵N natural abundance

Design: 3 farms, 0.35 ha plots, 3 to 5 cows per farm

Design: 5 farms, 3 replicates per farm (completely randomized blocks), 100 m² plots

dry season 08

50 %

75 %

100 %

FMAMJ

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maize

maize

maize

maize

maize

A S O N

· is a perennial herbaceous legume, native from Central America, and