Soil and water conservation practices by indigenous Chorotegas in Totogalpa, Nicaragua

### GENERAL INFORMATION

| Sources of information of the practice | Field experience, documentation produced by the Latin American Center for Rural Development (RIMISP) |
| Relevant contacts | Luis Alberto Álvarez Alvarado, Instituto de Promoción Humana (Institute of Human Promotion) (INPRHU_Somoto) |
| Useful links | Chorote Ingineous village Community Action, Totogalpa (PICHTAC) Tel: + (505) 6438486 or + (505) 6545214 |

### LOCATION OF THE PRACTICE

| Region | Central America and the Caribbean |
| Country | Nicaragua |
| Province, Districts, Villages | Department of Madriz, Municipality of Totogalpa, Comarca Cayantù |
| Climatic zone | Dry semi-arid |

### Other descriptive information

- Largely uneven zone with slopes as steep as 45° and fragile soils on a rocky base
- Clay-sandy terrain with large quantities of fragmented limestone
- Average annual rainfall: 900mm; unevenly distributed erratic rains between June and October. October sees the heaviest rains
- The temperature oscillates between a minimum of 24°C during December and January and a maximum of 38°C during March and April
- Division of land into mini-exploitations
- Distance to the nearest Departmental town: 35km

### INFORMATION ABOUT THE PRACTICE

| Practice category | Managing natural resources sustainably |
| Practice type | Technology for improving farm productivity sustainably |
| Sector | Crop production system management |
| Type of product or service | Technique for improving maize and bean crop production through a combination of soil and water conservation strategies to reduce soil erosion, maintain humidity and reduce damages caused by pests. |

| Institutions fostering the practice | Research institution: Universidad Campesina UNICAM (Farmers University) Non-governmental Organisation (NGO): INPRHU |
| Both are members of the programme Agricultura Sostenible en Laderas de América Central (Sustainable Agriculture on the hills of Central America) (PASOLAC) |

| Users and beneficiaries of the practice | Indigenous Chorotega farmers who are traditionally basic grain producers and are in the process of exceeding the subsistence economy thanks to the introduction of agro ecological practices. |

| Natural resource used or accessed (if applicable) | Poles or canes to level off the land, rocks for their weight and appropriate plants to make living barriers and land. |

### BRIEF DESCRIPTION OF THE PRACTICE

**Background/problem statement**

The Chorotega indigenous farmers cultivate in marginal areas with eroded soil and steep slopes. The majority own very little land to cultivate. They are subsistence producers who have to emigrate either to coffee producing farms during the coffee harvesting season or abroad. (Initially these farmers appeared to be without any form of soil protection). For this reason the soils suffered from devastating erosion, above all in October when torrential rains tore up the crops, leaving the soil even more degraded and unprotected. Consequently, production levels were reduced to the limit.

Faced with this reality, it was necessary to implement soil conservation strategies that were easy to learn and that took local characteristics into account.
account. In this area it is not possible to find rocks to make barriers and dykes. The terrain is composed of a very unusual mixture of clay and sand; as well as red clay, large quantities of fragmented limestone can be found.

Implementation of the practices began in 1999 after Hurricaine Mitch. The unprotected soil had suffered significantly from the natural disaster leaving many families without any cultivatable land.

#### Approach followed

Following a participatory thought and learning process that put emphasis on practical learning (visits to observe impact in other communities, internships, for the promoters, filed days for the dissemination of lessons learned etc.) the indigenous farmers began to implement the practices in the following way:

- a. Ground cleaning at the end of the harvest. The stubble is left to blend into the soil in due time.

- b. An important part of the practice is the NO BURN rule which means leaving the stubble to either blend into the soil or be used as dead barriers.

- c. A base line is traced from the highest to the lowest point. On this baseline, points indicate where living barriers will be planted. (Barriers must be placed more or less one and a half meters apart depending on the slope. If the slope is 25%, the barriers will be 6 meters apart).

- d. Once these points are defined on the baseline, a contour line is traced using an “A” apparatus or a similar tool.

- e. Living barriers are then planted on top of the contour lines which can be jack beans, guinea grass (*Panicum maximum*), maicello, pineapple or any other plant that can serve as a barrier to avoid soil erosion.

- f. Contour lines are continually traced for the planting of maize, beans or other sewing crops. This is done using a pole for each curve from each living barrier.

- g. After the contour lines are traced, for sewing seeds, a pickaxe is used to farm the exact line that will be sewed upon, or better still, only where the seeds will be deposited, leaving the rest of the soil intact.

- h. Once minimum tillage has been carried out, organic fertilizer is spread with the seeds only in the farmed part of the soil. The seed is buried and left until it germinates.

- i. Subsequent work such as cleaning or *aporque* (hilling technique by which small embankments are placed to control the irrigated water) is carried out in the traditional way.

#### Innovative elements

Living barriers are made with *Vitiver*. This provides excellent livestock feed and is also in demand as a medicinal plant on international markets. It thus helps diversify farmers sources of income.

#### Impacts on natural resource base

**Actual**: The soil is protected, preserved and enriched. It maintains a certain degree of humidity and allows the harvesting of basic grains in areas that previously had little or no harvest.

#### Impacts on livelihood of the practice users

**Actual**: Farmers family incomes increased through increased basic grain production per cultivated area. In this way it has been possible to regain production levels of the 1970s.

#### Other impacts

**Actual**: More and more producers are implementing these practices.

#### General success factors

- A simple practice to learn and implement
- Horizontal transfer of knowledge as a working methodology
- Easy to implement with moderate use of tools
- Little external inputs

**Technology success factors**
- Address farmer needs, priorities and management
- Increase farm production and/or stabilizes it

**Institutional success factors**
- Access to inputs and resources

**Problems remaining to be resolved**
- Cultural problem: persistence in practicing stubble burning by some producers and farmers who are not part of any support programme and who insist on using the traditional slash and burn approach. In order to resolve this problem, community sensitization is underway from primary school to adult producer levels. Furthermore, the municipality is taking measures to prohibit and penalize those who burn their fields.

**Keywords**
- Agriculture, minimum tillage, green manures, agricultural development, soil conservation, household consumption, training, farm management, wind protection, food production, crop production, terrace cropping, land use, natural resources management, organic compounds, soil conservation, soil fertility, water conservation, water resources.