



## Kuxur rum agroforestry system against natural hazards in Guatemala

Integrating agricultural production with agroforestry to build resilience during heat wave season in Ch'ortí region



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### → Context

The rural population in Guatemala's eastern Dry Corridor – an area with the highest population density and rates of absolute poverty – is extremely vulnerable to food insecurity. The Ch'ortí region in particular struggles with erratic rains, water constraints and low yields of traditional grain crops. Crops are grown on dry slopes about 600 to 1 000 metres above sea level, and the soils are shallow, steep and stony. The intensive cultivation of corn, beans and sorghum has degraded the land, making it increasingly less suitable for agriculture. Against this backdrop, a practice known as *Kuxur rum* – a set of soil, crop and forestry management technologies – is being used in Ch'ortí region to build people's resilience to natural hazards

### → Challenges

The *Kuxur rum* practice addresses:

- Lack of land and land tenure insecurity;
- Decreased amount of land to grow staple grains;
- Entrenched beliefs around traditional cultivation strategies (slash, burn, removal);
- Progressively intense heat waves each year;
- Increasing severity of climate change;
- Distrust in institutions; and
- Social conflict.

### → Methodological approach

- Raising awareness of the challenges and what *Kuxur rum* offers;
- Keeping (rather than burning) stubble from the previous cycle;
- Following the terrain and alternating crops;
- Tracing contour lines using the level type "A";
- Staking and establishing terrain furrows following the contour lines;
- Collecting seeds or vegetative matter of the Madre Cacao, a native leguminous tree (*Gliricidia sepium*);
- Planting Madre Cacao forest species, averaging six plants between rows and one metre between each plant;
- Planting landraces or improving maize and/or beans;
- Defining a fertilization plan for maize and bean cultivation; and
- Pruning Madre Cacao plants during the second cycle.

**Key facts and data** → *Kuxur rum*, meaning "my wet soil" in Ch'ortí, is a system used by families to grow crops on drought-prone slopes, with positive effects on natural resources.

**Implementation** → Since 2003, *Kuxur rum* has been implemented in five departments and 25 municipalities in Guatemala's eastern Dry Corridor. To date, 7 629 families have benefited – 6 471 men and 1 348 women – and 456 local leaders have been trained.

**Impact on food security and nutrition** → Increase of 55% in maize production (an increase of 4.5 months in food grain reserves). Up to 46% increase in bean production (an increase of 2.5 months in food reserves).



### What is the *Kuxur rum* agroforestry system and how does it contribute to increasing the resilience of livelihoods?

*Kuxur rum*, an agroforestry system meaning "my wet soil" in Ch'ortí, is based on traditional systems native to this area. It is being adapted throughout Guatemala's Dry Corridor. The system integrates agricultural production with agroforestry systems, using a set of soil, crop and forest management technologies, combined with alley cropping, to restore forest landscapes. The same piece of land can produce both wood and grains, reducing household vulnerability.

## → Impact

- Improves soil quality and reduces erosion by protecting slopes;
- Retains soil moisture (10 to 12 percent increase), improving drought resistance: 15 to 20 days of moisture in the soil during heat waves;
- Contributes to the recovery of landscapes by planting 1 000 to 2 000 trees per hectare, reducing soil, water and wind erosion;
- Fixes atmospheric nitrogen in the soil (28 to 30 kg per hectare per year) and captures carbon dioxide (due to wholesale vegetation);
- Stabilizes and regulates river sedimentation in the lower parts of the basins;
- Improves the microclimate of the plot;
- Allows nutrient extraction and recycling from the soil's lower layers;
- Improves water absorption to groundwater layers;
- Increases vegetation coverage;
- Reduces expansion of agricultural frontier by improving soil productivity, preventing an increase in deforestation;
- Increases oxygen production and improves the carbon-nitrogen ratio; and
- Reduces greenhouse gases by eliminating slash and burn practices.

## → Sustainability

The project responds to a demand from the population and has been validated through a participatory process. The agroforestry system has been institutionalised and incorporated into the "Forestry Incentives Program for Small Landholders without Legal Certainty" (PINPEP), promoted by the National Forestry Institute. The project is locally relevant and uses family labour and local materials. It also promotes food and environmental sustainability through plot diversification and use of the different spaces. The practice has been well received by the population and shown positive impacts on food security.

## → Replication and upscaling

The practice needs to be contextualized and adapted when replicated in new intervention areas. Introducing the system gradually can help garner acceptance by the local population. Strong partnerships with local organizations involved in the project from the beginning and working in this area for a minimum of three years will help ensure monitoring along with local technical assistance.

### Data source:

- Programa Agroambiental Mesoamericano MAP CATIE y Mancomunidad Copan Chortí, 2010
- Programa Especial de Seguridad Alimentaria PESA - FAO Guatemala, 2008

*The total cost of implementation of the Kuxur rum is of USD 1 916.60 per hectare. One hectare is sufficient to provide a family with a staple crop. The biggest investment is done in the first year, and maintenance cost in the following years is reduced to 30%. The materials used are local and is implemented with family labour.*

*An analysis of the implementation of this system in FAO projects in the municipalities of Rabinal and Santa Cruz El Chol shows that in a population of 2 000 families the adoption rate is 100% in 6 years (2009 - 2014).*

## TESTIMONY

"Kuxur rum helped us a lot the last two years we had without rain. Using planting sticks and leaving the stubble on the ground kept the water in the soil, and our corn and bean crops always produced a harvest."

*Celia Ramírez*

Community Escobillal, Jocotán municipality, Department of Chiquimula, Guatemala.



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## → More information

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### References:

- <http://teca.fao.org/read/8852>
- [www.fao.org/in-action/pesa-centroamerica/historias-de-exito/historia-de-exito-10/en](http://www.fao.org/in-action/pesa-centroamerica/historias-de-exito/historia-de-exito-10/en) (in Spanish)

### On resilience good practices:

- [resilience@fao.org](mailto:resilience@fao.org)
- [www.fao.org/resilience](http://www.fao.org/resilience)
- [www.fao.org/3/a-as547e.pdf](http://www.fao.org/3/a-as547e.pdf)