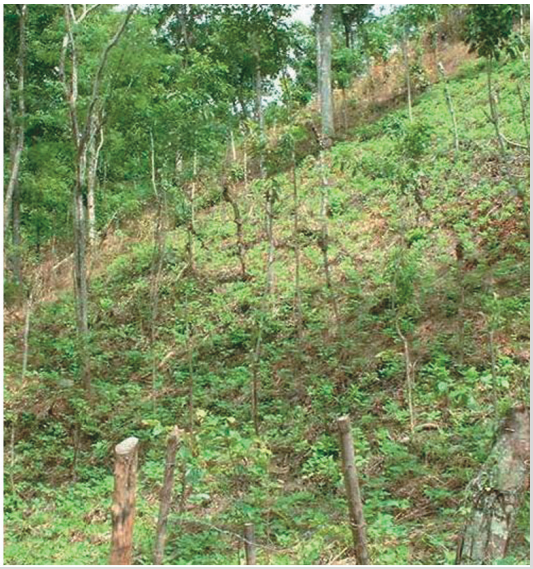
Quesungual Slash & Mulch Agroforestry System: An Eco-Efficient Option for the Rural Poor





Eco-efficient agriculture uses resources more efficiently to achieve sustainable increases in productivity, reduces the degradation of natural resources, and creates opportunities for boosting incomes and employment in rural areas.

The Quesungual Slash and Mulch Agroforestry System (QSMAS) is one example of eco-efficient crop production for tropical sub-humid regions. It has had an extraordinary impact on the livelihoods of farmers growing maize, beans, and sorghum in Central America, and has great potential to be used in other regions.

A system for the rural poor

QSMAS is a smallholder production system with a group of techniques for the sustainable management of vegetation, soil, and water resources in drought-prone hillsides.

The system was developed in the early 1990s in close collaboration with farmers and technicians from FAO and other institutions, as an alternative to traditional and widespread slash and burn agriculture. Slash and burn contributes to global warming by acting as a major source of greenhouse gas emissions, and by depleting reserves of carbon both above and below-ground. It can also lead to land degradation if population pressure reduces the fallow periods needed for the recovery of natural resources.

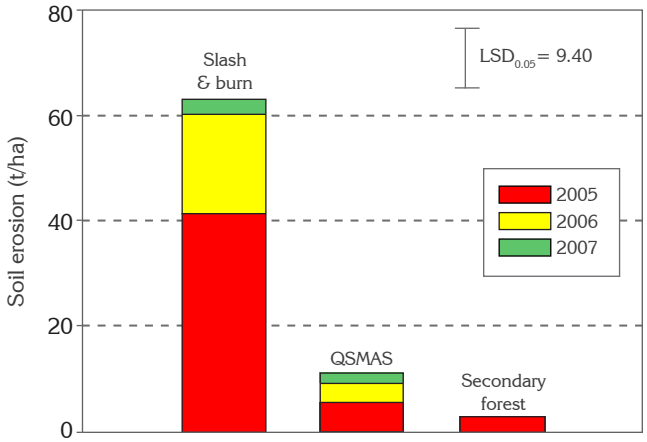
Four principles, multiple benefits

QSMAS' improved management is based on four key principles:

1. **No slash and burn**—partial, selective, and progressive management ("slash and prune") of natural vegetation.
2. **Permanent soil cover**—continual deposition and distribution of mulch from biomass of trees, shrubs, weeds, and crop residues.
3. **Minimal disturbance of soil**—"no tillage" throughout the growing season; direct seeding.
4. **Efficient use of fertilizers**—appropriate application (timing, type, amount, location).

Research by CIAT and its partners including FAO in southwestern Honduras found that application of these Quesungual principles resulted in significant benefits over slash and burn:

- Increased resilience of food production to extreme natural events, such as drought or excess water.
- Sustainable increases in productivity to guarantee household food security, by improving soil quality and crop water productivity.
- Surpluses of major staple foods (maize, beans, and sorghum) could be sold at local and regional markets, contributing to the welfare of whole communities.
- Increased availability of firewood for domestic consumption.
- Multiple ecosystem services, by decreasing deforestation, soil erosion, and global warming potential through reduced greenhouse gas emissions and increased carbon sequestration.
- Restoration and conservation of local biodiversity and protection of water sources.



QSMAS protects soil by markedly reducing soil erosion (87%, 84%, and 67% less after 1, 2, and 3 years, respectively) compared to SB system.

Can the Quesungual system be adapted to other regions? Yes. QSMAS has great potential to enhance support for livelihoods in vulnerable rural areas in sub-humid tropics, including marginal sloping lands.

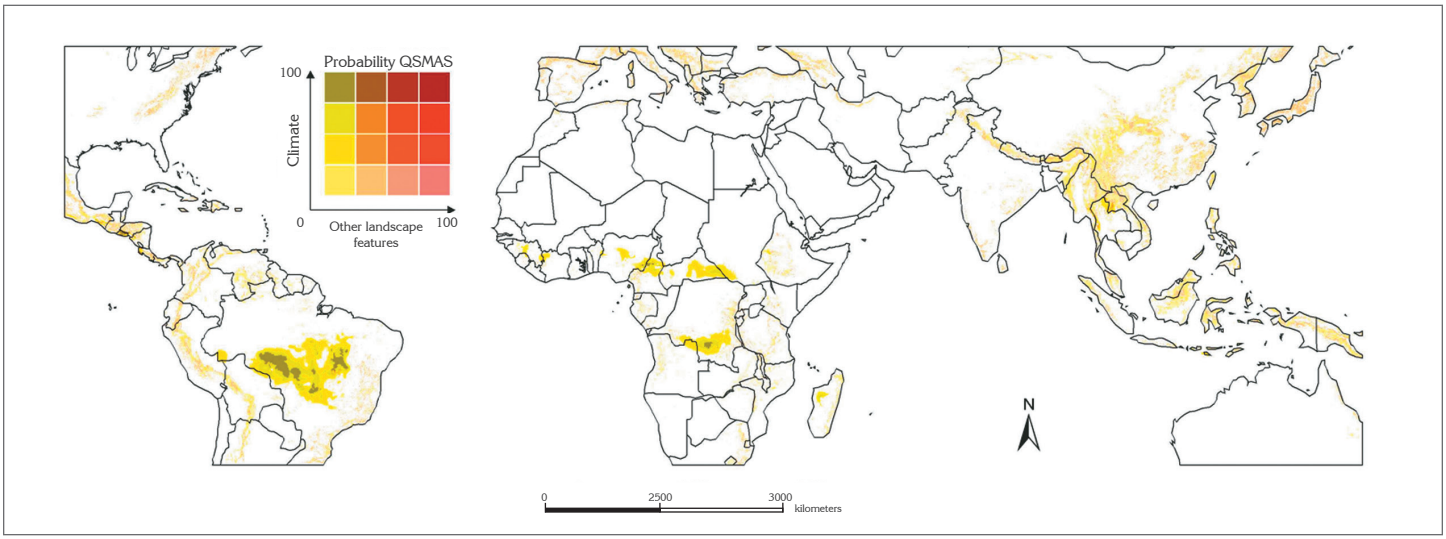
Based on previous studies, QSMAS could be suitable for testing and adaptation in several regions including Central America (it is already being practiced in Guatemala, Nicaragua, and southern Mexico), the Caribbean, northern South America, sub-Saharan Africa, and Southeast Asia.

How can the spread of the Quesungual among smallholders be encouraged? Initial acceptance of QSMAS has been attributed the need for alternative production methods due to (1) the importance of agriculture for subsistence, (2) the slight to moderate level of soil degradation due to the use of slash and burn practice, and (3) the dependence on increasingly unpredictable rains.

The successful adoption of the system by farmers has been facilitated by (1) access to markets for inputs and sale of surpluses, (2) increase in awareness of farmers on the new set of technological options, and (3) collective action of local communities that are committed to achieve food sovereignty through responsible management of their resources.

In northwest Nicaragua, where QSMAS was introduced in 2005, the system was not only readily accepted by farmers and local institutions but it eventually spread rapidly from farmer to farmer.

Potential to further develop payments for the ecosystem services provided by QSMAS could enhance its attractiveness to local and national authorities in the face of climate change and land degradation.



Site similarity analysis: bivariate map showing potential areas for targeting QSMAS across the developing countries in the tropics (performed by combining Bayesian and frequency probability statistical analyses).

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