

Use of the Nutrient Management Expert System NuMaSS to Improve Management of Nitrogen in Maize-Based Systems in Hillsides of Honduras and Nicaragua.



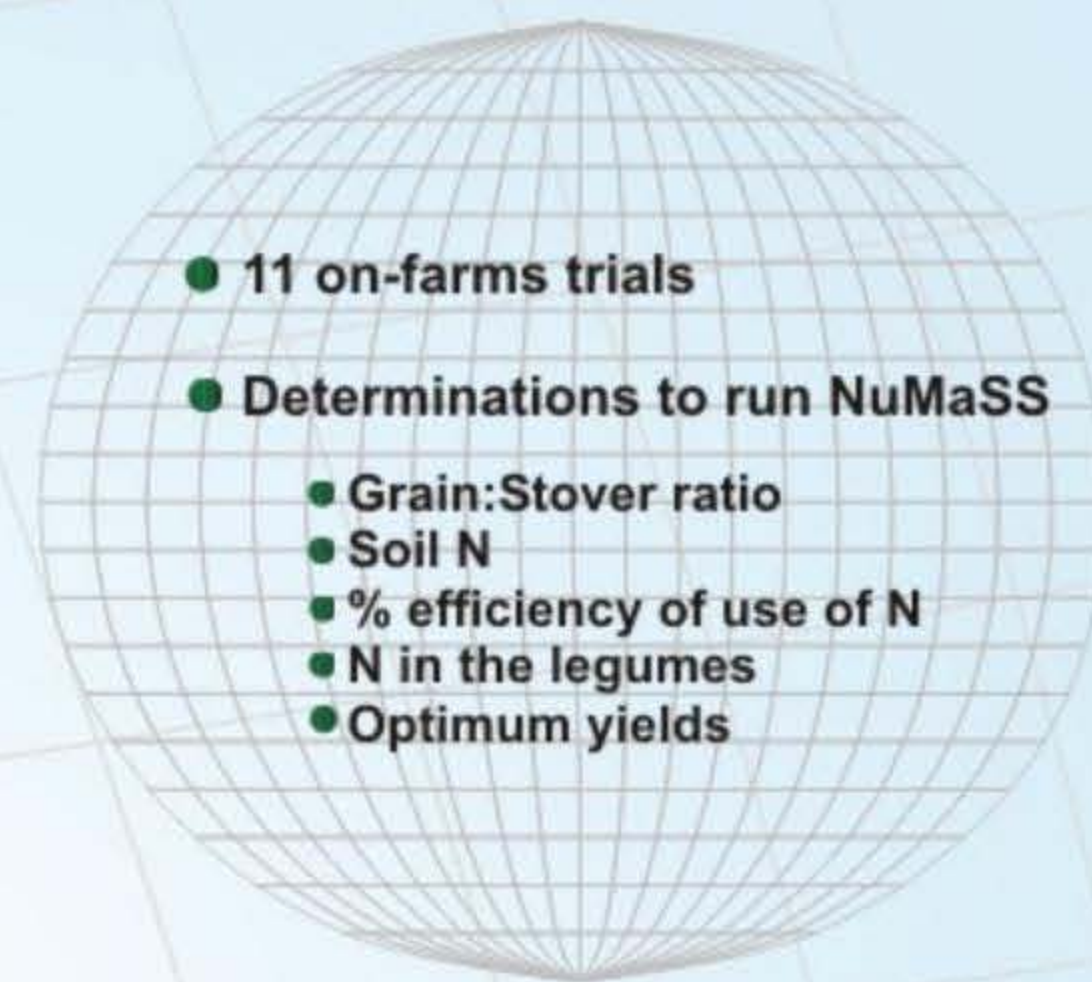
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BACKGROUND



Nitrogen and Phosphorus are the main soil fertility constraints for improving crop production in hillsides of Honduras and Nicaragua. In 2004 members of the MIS and CRSP-USAID Consortia initiated 2-year trials in Honduras and Nicaragua to generate corn cultivar and soil coefficients for developing improved N fertilizer recommendations using the Nutrient Management Support System (NuMaSS) software. The amount of fertilizer N recommended is the balance between the total amount of N needed by the crop and the N acquired from the soil, plant residues and cover crops, with a subsequent adjustment for the fertilizer N use efficiency by the crop. Although the software provides default values derived from reviews of existing publications for many of these plant factors it is possible to generate specific N recommendations for the prevailing cultivars and soils cropped in the region.

Location of on-farm trials to validate N recommendations generated by the NuMaSS expert system



Hands-on software training with their own soil data, field test results and local crop coefficients



Table 1. NuMaSS default and site/variety-specific crop and soil coefficients, and associated software fertilizer N recommendations in Honduras and Nicaragua

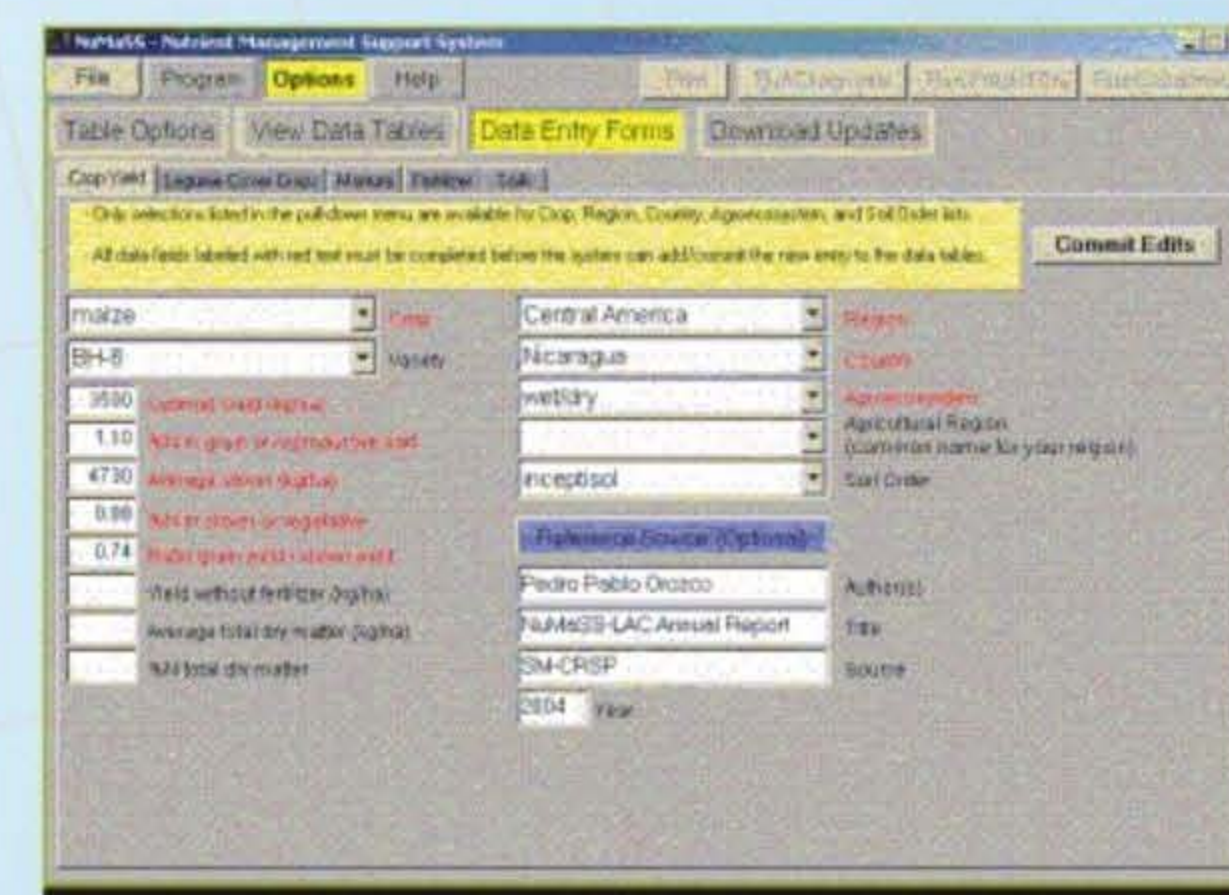
Variable	NuMaSS Location						
	Default	Candelaria	Catacamas	Talgua	Yorito	S. Dionisio	S. Rafael
Variety	--	D.guayape	HS 15	Dk 53	HB 104	NB 6	N.blanco
Yield w/o N, kg/ha	2468	1700	5600	5200	1400	3000	2450
Opt. Yield, kg/ha	3320	4100	5600	7400	3100	4100	6600
N for opt. yield, kg/ha	--	50	0	105	95	60	125
Grain:stover ratio	0.84	0.69	0.77	1.34	0.77	0.76	1.17
% N grain	1.24	a	1.47	1.44	1.40	1.68	1.43
% N stover	0.57	0.61	1.15	0.65	0.71	0.70	0.51
Soil N supply, kg/ha	97	a	154	75	36	66	46
% fert. N recovery	44	a	c	49	30	32	74
N Recom. ^a , kg/ha	0	a	0	4	197	124	38

^a Determination pending completion of plant tissue N analysis

^b NuMaSS fertilizer N recommendations using either the software's default values or the site- and variety-specific values; for purposes of comparison, a target grain yield of 4500 kg ha⁻¹ was used for all recommendations.

^c Unable to be determined due to lack of yield response to fertilizer N.

NuMaSS2.2: module to enter specific crop information



Parámetro	NuMaSS (Default)	Talgua - var. DK-353
Yields without N, (t ha ⁻¹)	5.2	5.2
Optimum Yield (t ha ⁻¹)	7.4	7.4
Grain:stover ratio	0.84	1.34
% N in grain	1.24	1.44
% N in stover	0.57	0.65
N from the soil (kg ha ⁻¹)	85	75
% N recovery	44	49
Nitrogen recommended rate (kg ha ⁻¹)	82	105

Nitrogen applied in the field = 106 kg ha⁻¹

Next Steps



- Further validation with 13 MIS Members, 8 NGOs and 1 fertilizer sector
- Assessment of economic implications to recommendations
- Release of Spanish, Portuguese versions