

GLOBAL PARTNERSHIP ON NUTRIENT MANAGEMENT

BMP Case Study

Overview

Name: Nutrient Expert (NE) Improves Grain, Profitability and Efficiency for Maize

Location/Terrain: North China

Crop(s): Maize

Nutrient(s): N, P and K

Rationale: A new fertilizer recommendation method based on yield response and agronomic efficiency for hybrid maize, Nutrient Expert (NE), was tested to increase yields and optimize profits.



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Issue(s) of Concern/Challenges:

A dynamic and robust nutrient management approach is essential to increase yields and optimize profits for smallholder farmers within intensified cropping systems.

Practice Description:

On-farm experiments were conducted from 2010 to 2012 at 408 sites in seven provinces to evaluate a new site-specific nutrient management method (SSNM), Nutrient Expert (NE) for Hybrid Maize (*Zea mays* L.), to meet the requirements of nutrient management and fertilizer recommendation for small-holder farms in China. Compared with the current farmers' fertilizer practices (FP), average grain yield increased from 9.9 to 10.1 t ha⁻¹ with NE, while plant N, P and K accumulation increased by 6.1, 1.4 and 10.6 kg ha⁻¹. Inputs of N and P fertilizers decreased by 30.2% (67.8 kg N ha⁻¹) and 11.2% (7.0 kg P₂O₅ ha⁻¹), while K fertilizer rate increased by 38.9% (18.9 kg K₂O ha⁻¹) with NE compared with FP. Although NE gave a higher K fertilizer rate, the total fertilizer costs (TFC) with NE (US\$ 236.2 ha⁻¹) was still lower than with FP (US\$ 272.6 ha⁻¹).

Practice Objectives:

Increase yields and max profit.

Outcomes:

Results indicated that NE had higher grain yields and net profits compared with farmer practice and the local “optimal” soil test-based recommendation.

Significance:

In 2010, the combination of hybrid maize and fertilizer saved 57 to 87 kg N/ha and in 2011 the system saved 54 to 61 kg N/ha compared to farmer practice and local “optimal” soil-test base. The yield increase achieved with NE could be attributed to the balanced application of N,P and K based on location-specific crop requirements that take into account yield potential and indigenous soil nutrient supplies.

Data/Graphs:

Year	Treatment	No.	Grain yield, t/ha	N	P ₂ O ₅	K ₂ O	Net profit, US\$/ha
				— kg/ha —			
2010	FP	138	8.6	225	53	33	2,155
	OPT Local	138	8.7	195	47	69	2,237
	NE	127	8.8	138	50	52	2,219
2011	FP	185	10.0	222	64	36	2,931
	OPT Local	185	10.2	215	64	86	2,990
	NE	90	10.6	161	49	51	3,048



For more information, please contact Chuck Chaitovitz at chuck.chaitovitz@gef.org or visit www.gpa.unep.org/index.php/global-partnership-on-nutrient-management.