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.

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_2O_5	K_2O	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**

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He, P. et al. 2012. Plant Nutrition and Fertilizer Science, 18(2): 499-505.