Introduction

The low input/output agricultural production systems of the Haitian Central Plateau are insufficient to meet the subsistence needs of the local population let alone contribute to the food security for Haiti as a whole. High erosion rates have degraded soils to the extent that slight changes in the production system can lead to rapid loss of productivity (Lutz et al., 1998). Despite these problems the soils of the Central Plateau are considered "less degraded and more productive than most other hilly regions of Haiti" (Jickling and White, 1995:185). In addition to degraded soils, smallholders in the Central Plateau reported that lack of water is their greatest production constraint.

Sustainably addressing the production needs in the Central Plateau will require an applied research program to increase both system inputs and outputs. The benefits of Conservation Agriculture Production Systems (CAPS) are clear (Haggblade and Tembo, 2003; Derpsch, 2008; Rookstroom et al., 2009; FAO, 2009): increased production and incomes, improved soil fertility/quality, decreased soil erosion, improved water use efficiency, etc. The actual uptake of conservation agricultural practices and systems, however, cannot be attributed to the technology itself; nor is there a single factor which determines adaptation to local conditions and use of supporting networks (Ekboir et al., 2002; Wall, 2007; CIMMYT, 2008; Giller et al., 2009). Two factors have been identified as key drivers of CAPS development (Ekboir et al., 2002; Wall, 2007; CIMMYT, 2008; Giller et al., 2009). Two factors have been associated with all successful cases of CAPS establishment: adaptation to local conditions and use of supporting networks (Ekboir, 2003; Baudron et al., 2007; Wall, 2007; Spielman et al., 2009).

Objectives

1. Increase agricultural production in the Central Plateau through development of CAPS.
   - New CAPS will be developed that address farmer production and livelihood priorities beginning with ‘best bet’ options particularly focused on improving water productivity, soil quality/fertility, soil organic matter (SOM), and developing higher productivity rotations.
   - The interactive process of farmer learning will be the core component of a program for establishing CAPS and developing adaptations to improve production as conditions in the region evolve.

Materials and Methods

Materials and Methods (cont)

- Cover crops were irrigated as needed to sustain adequate growth from December through March, at which time supplemental irrigation was stopped and cover crops allowed to senesce.
- Weed density counts were collected from a representative m2 from all plots in February 2013.
- Prior to maize planting, cover crop residue was either tilled into the soil to a depth of approximately 30 cm or cut and left on the soil surface, depending on tillage treatment.
- In May, 2013 maize (‘ti bourik’) was planted by hand in the entire experimental area in approximately 80 cm rows, with 30 cm between planting locations within rows. Two seeds were planted at each location.
- Plots were weeded twice during the season, first when maize was at the V5 stage, and again when maize was at approximately 30 cm tall. Where supplemental irrigation was stopped and adequate growth from December through March, at which time supplemental irrigation was stopped and cover crops allowed to senesce.

Materials and Methods

Materials and Methods (cont)

• Cover crops were planted in December 2012, during the dry season. Seeding rates were 50 kg ha-1 for sesbania and sunn hemp, and 75 kg ha-1 for sorghum sudangrass. Seed was broadcast uniformly over the plot area and lightly incorporated in the tilled plots.

Materials and Methods

Materials and Methods (cont)

- Materials and Methods (cont)

- Materials and Methods (cont)

Conversion of the Experimental Area

Conventional-Till No-Till

2013 Temperature and Rainfall

Historical Monthly Average Temperature and Rainfall

Maize Cultivar Evaluations, CIMMYT CHTTY

Maize Cultivar Evaluations, CIMMYT TTWCYL, 2012

Average yield over bean cultivars and locations was 268 kg ha-1 with max of 286 and minimum of 236 kg ha-1. These low yields represent significant environmental limitations, likely related to soil fertility and moisture availability.

Maize Cultivar Evaluations, CIMMYT CHTTY

Maize Cultivar Evaluations, CIMMYT TTWCYL, 2012

Average yield of the CHTTY studies in 2011 was 1852 kg ha-1 and 1297 kg ha-1 in 2012. Yield of the TTWCYL tests harvested in 2012 averaged 1697 kg ha-1. These studies were conducted using partial CA methods including reduced tillage and residue retained in the field. No additional inputs were supplied.

Environmental maximum yield potential for common bean is reported to be YY and for maize to be LL Mg ha-1, indicating the potential for significant yield advances over the performance measured in these trials.