

Evaluation of Land Quality with Reference to Maize Productivity - Research Plan for FY2010 -

prepared for "Tentora-kai" on 12 Mar 2010

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Rationale

- Each parcel of land has a different quality in terms of crop production and its stability.
- Farmers recognize and utilize such difference.
- To understand land use pattern or strategy, we need to evaluate land quality.

Study objectives

Focusing on maize as a major crop in the study area, we will

1. identify key determinants of maize production and its stability through field experiments, and
2. evaluate key determinants spatially through soil survey and topographic analysis.

1. Outline of field experiments

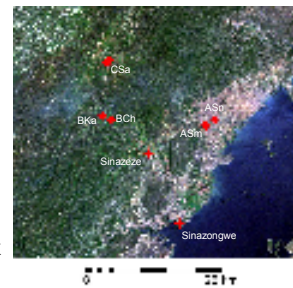
At each site, fields in typical topography were selected.

- Site A: 3
- Site B: 4
- Site C: 4

Local maize grown in a uniform way since 2007/08 season.

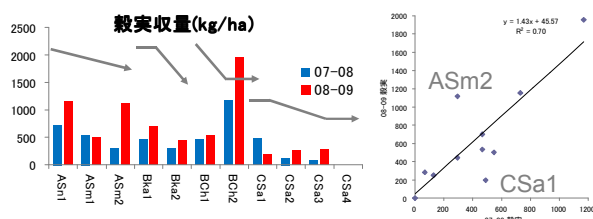
Soil depth and nutrient stock was determined.

Soil moisture is monitored.



1. Results

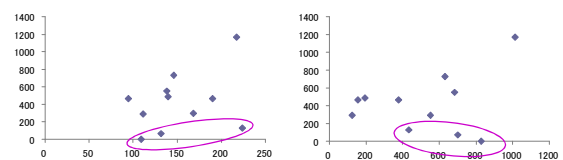
a) Maize yield (kg/ha)



- 07-08 < 08-09
- As a whole, good correlation between two seasons.
- But, a upper or lower part had variable yield.

1. Results

b) Maize yield (kg/ha) vs N stock in soil (g/m²) surface soil (0-15 cm) whole soil



- Better correlation with N in whole soil
 - Importance of soil thickness
- But, low yield in some plots with good N stock
 - Importance of topographic condition

2. Spatial evaluation of maize productivity/stability

a. Relate maize productivity/stability with indicators (=key determinants)

-Productivity

- Topographic position
 - "Lower" position as low productivity
- Soil N stock
 - Why not only surface?
 - Down to which depth?
 - How about rock fragments?

-Stability

- Waiting for results of 3rd season (Topographic position???)

2. Spatial evaluation of maize productivity/stability

b. Evaluate key determinants spatially

- Topographic position
 - How extract "lower" position?
- Soil N stock
 - How evaluate spatially?
 - Can soil rooting depth be a proxy?
- Materials to be used
 - Knowledge from soil survey, landscape classification by local people (?),,,
 - Terrain attributes from topographic map
 - slope gradient, curvature, compound wetness index,,,,,

Time schedule

- Field survey in May 2010
 - Crop yield (Miyazaki)
 - Soil survey (M, Shinjo, Nishio)
- Soil analysis since June
 - @Kyoto Univ. (Nishio)
- Topographic analysis
 - under supervision of Yamashita san
- Finalize in Dec 2010