Soil and Climate Information for Agribusiness Development
A case study on southern part of Yogyakarta Special Territory

Azwar Masu
Faculty of Agriculture UGM (Soil Science), Yogyakarta - Indonesia

Introduction

Soil is one of the fundamental components of terrestrial ecosystems. These ecosystems are often transformed by man into agro-ecosystems which furnish food, fiber, wood, raw material for industries, etc. The productivity and potential of agro-ecosystems are determined by the possible adaptation of terrestrial ecosystems to various alternatives of utilization. The adaptation possibilities are governed by the nature of the soil and its interactive behavior toward the other fundamental components of the terrestrial ecosystem, especially climate, hydrology, and land forms (Notoshidaprowito, 1982).

Agriculture is human activity for prime-oil mass production by using three combinations of crop production such as land, plant/crop and technology. Land condition shows the raised ability of natural ecosystem against the utility (replacement of the natural vegetation), also showing the capability of the land to fulfill the human need without its ecosystem deterioration.

The land evaluation system (LECS) has been developed to set the crop strategy need and climate data and soil characterization, as well as for its economic evaluation for certain management scale for different land units of the region (Bunting, 1981).

Agribusiness activity mainly is targeted for maximum yield by optimum utilization of the land. Over management of the land may result in land deterioration due to breakdown of buffering systems of one or a combination of its biophysical components. The biophysical components consist of climate, soil, geology, hydrology, topography, altitude, vegetation, and wild life, and useful/aphagen soil biology.

Accuracy of land evaluation depends on the homogeneity of the delineation of physical land units/soil units and the mapping scale. Detailed mapping scale will have more detail information and higher homogeneity of soil property. Climatic units have diffuse boundaries and frequently differ by time, then climatic data can be applied for the whole range of the mapping scale.

Regional agricultural planning is aimed to unite parts of the lands which have similar alternative utilization, or possible similar adaptive. For sustainability, the high potential land may be used for crop of high energy demand, while limited potential should be used for crop with low energy input.

Cropping System in Cawang Kidul Region, Southern Yogyakarta Special Territory

Soil database has been used for geographical information systems (GIS) at Province level of Yogyakarta, almost all areas (378,380 ha) have been mapped (LEEP project, 1995) at a scale of 1:50,000. The compiled database consisted of slope classes, soil types, climate, transportation, irrigation facility, landuse, and production center for input, marketing crops. This GIS information has not yet produced mapping units of valuable crop (matching crop type and its physical ecology properties). It means it still cannot be used for direct searching of areas of potential agribusiness development.

Physical Characteristics:
- Mainly composed of hard and hard regions, (655,625 ha, BNP, 1999) from an upland of glacenee marine deposit with an altitude of 5 - 200 m, high heterogeneity of topography.
• The deposition material is situated in the flat area (doline), with >100 cm soil thickness, relatively fertile, high moisture and nutrient retention (Sadikharjo and Notoladi普rawiro, 2000).

• The eroded hill terracing regions situated at surrounding dolines, have shallow soil with depth <25 cm, original slope >45°, and low moisture retention.

• Mean rainfall in the karst region is 1,310 – 2,300 mm with 4 – 5 months of dry period, and 3 – 5 months of wet period. Climatic zone is D-E with Q = (66.7-165.7)% (Schmidt and Ferguson System).

• In some places, water trap has been created by digging a small hole (embong) with dimension of 5 x 2 m and 2 m depth along the contour line at the upper or middle hill, in order to wetting the lower part of the hill in the dry season. This condition can be observed in the old volcanic region. The small dam has been created at the doline in karst region for non-cropping purpose.

**Cropping Systems:**

• Uppper and Middle hilly region with slope >15%, bench terracing system, managed with agroforestry system (mainly teak, acacia, or mklung) in combination with maize/corn and cassava. Fertilizing with organic manure especially at the beginning of planting perennial crop.

• Lower hilly and doline (<15%) for upland rice, corn, groundnut, cassava with organic and mineral fertilizers with CI (Cropping Index) of 100 – 150.

---

**Fig. 1.** Capability, capacity, suitability, usability, and land firstability in sustainability landscape planning (Notoladi普rawiro, 1993)
Agribusiness Management for PT. Kinarya Era Buana Nusantara

Yield: Management and Marketing Pathway

- Hybrid corn in Wologai plains, delines or alluvial plains with average yield of 6 - 7 ton/ha dry seed. Fertilizing with 400 kg/ha urea, 250 kg/ha SP46, and 100 kg/ha KCI with 2.5 ton/ha organic manures. The trader collect the corn yield from the farmer’s leased lands or from the farmer’s production up to about 50 - 100 ton before transported to Senarang/Jakarta for poultry raw materials. The price at the farmer level is US $ 0.1 - 1.44% dry seed.

- Dry cassava is collected from the farmer’s field with price of US $ 2.00/ton dry cassava and after having 100 ton will be sold to Jakarta. The average yield of the wet/crisp cassava is 15 ton/ha or about 5 ton/ha dry cassava (gqplek).

- The Bangladesh cattle are collected from the local trader with price of US $ 50 - 60 each and are fattened in Jakarta as well.

References:

- BPS, 1999. Daerah Istiria Wiyakarta dalam Angka. BPS DIY.
Fig. 2. Agribusiness Management for P1. Kinarya Era Bumi Nusa