

ILLUSTRATED CONCEPTS IN TROPICAL AGRICULTURE
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MATCHING CROP REQUIREMENTS TO LAND CHARACTERISTICS¹



Maize
April - Aug.
26°C
10,000 kg/ha



Soybean
Sept. - Dec.
26°C
2,500 kg/ha



Potato
Jan. - March
22°C
30,000 kg/ha

Figure 1. Three successive crops grown during one year, showing time span, mean temperature, and yield of each harvested product.

Multiple cropping, the growing of two or more crops on the same land during one year, is a widespread method of agriculture in the tropics. There are obvious advantages of sustained year-round production; however, it is also known that seasonal variations can drastically alter crop yields even in the tropics. This seasonal effect becomes greater as one moves away from the equator. In Hawaii, for example, winter maize yields are one-half to three-fourths summer yields. Developing *cropping systems* capable of taking full advantage of the seasonal variations is important for improved efficiency of crop production in the tropics. This can be accomplished by matching crop requirements to the *land characteristics*. Land characteristics are all of the attributes of land that affect crop performance, such as soil physical and chemical properties, air temperature, and rainfall.

The photographs above illustrate the concept of matching crop requirements to land characteristics. A cropping pattern developed for a clayey,

kaolinitic, isohyperthermic Tropeptic Eutruxox soil family in Hawaii shows that high yields of maize and a second crop of soybean can be obtained between spring and fall. The cool, wet winter months are not suited for these crops. Irish potato, which requires low temperatures for tuber formation and is adapted to cool climates, is an excellent crop for this soil in this season. By matching crops not only to a particular soil family but also to seasons within a family, crop production can be dramatically increased without increasing land area. The principle of transferability among regions with the same soil characteristics suggests that the results obtained in Hawaii apply to other areas in the tropics that have these same land characteristics.

¹This concept is being developed within the Benchmark Soil Project.