Abstract

Coffee is an important crop to both producers and consumers. Unfortunately, the current epidemic of the *Hemileia vastatrix* or Coffee Leaf Rust, has been devastating coffee farms throughout Latin America. A highly argued explanation for the recent outbreak of the disease has been placed on the transition of coffee farms from traditional shaded systems to sun-grown monocultures, allowing for faster and easier spread of the disease. Climate Change also encourages increased incidence of pests and diseases while stressing the growing conditions on coffee farms. Farmers, for a myriad of economic and ecological reasons, have practiced alternative methods for coffee management such as, shade grown, organic, bird-friendly, and fair trade management. Permaculture is another alternative practice that promotes holistic agricultural systems that are ecologically regenerative, economically viable, and socially just.

Currently, Permaculture design has yet to be utilized in coffee growing systems. This thesis project uses Permaculture design ethics and principles to redesign a coffee management system for a 1.5 hectare plot located in Palmira, Boquete, Panama. Site analysis was done on site and a finalized design was created. Since Coffee Leaf Rust is currently present on the farm, the goal of the final design is to mitigate and contain its effects in a systematic, precise, and positively economic manner. Maria Ruiz, the owner of this plot and coffee distributing operation, defined these goals. The main strategies incorporated in the design are, an increased application of shade trees and natural windbreaks using polyculture, water and soil management technologies and understanding, the use of farmer and picker participation and input, and more. This management system not only promotes and sustains small-scale farmer livelihoods, but it also allows for agro-ecosystems to perform to their fullest potential.