

**Winner of the 2009
US Forest Service
Wings Across the Americas Award
For Protection of Migratory Birds
and their Habitat**



Golden-Winged Warbler

The US Forest Service works with a wide range of partners here in the United States and overseas to conserve habitats and populations of migratory birds, bats and butterflies. The program:

- Supports habitat conservation activities on National Forests and Grasslands, and from Canada's Boreal Forest to the Grasslands and Wetlands of South America;
- Assists in national and international assessments of conservation needs and opportunities;
- Provides training opportunities for biologists, and managers and administrators;
- Participates in national and international conservation initiatives;
- Enables partners and Forest Service employees to become more knowledgeable about global conservation needs.

The consumption of energy for coffee processing and loss of native habitat from coffee production present a grave ecological threat. However, through our development of sustainable technology for coffee processing and alternative methodologies for coffee cultivation, we have transformed this tremendous cost into a potentially huge conservation opportunity in the form of market-based incentives for conservation. Technologies and approaches that save energy costs and increase yields will be favored, and those that we have developed not only save energy costs and increase yields, but also conserve biodiversity.

Coffee is one of the most significant agricultural systems in Latin America, where 700,000 coffee farmers manipulate of 40% of agricultural lands to generate \$10 billion annually. The consumption of energy for coffee processing and loss of native habitat from coffee production present a potentially grave ecological threat. In a partnership between the US Forest Service Northern Research Station, the Mesoamerican Development Institute, the Montes de Oro coffee cooperative, the Department of Natural Resources Conservation at the University of Massachusetts, we have developed and field tested technology for sustainable coffee processing and alternative methodologies for coffee cultivation. These technologies and approaches have transformed this tremendous cost into a potentially huge conservation opportunity in the form of market-based incentives for conservation, because technologies and approaches that save energy costs and increase yields will be favored, and those that we have developed not only save energy costs and increase yields, but also conserve biodiversity.

The technologies we have developed to conserve energy include a solar/biomass coffee drying system that uses a combination of solar thermal and cogeneration to dry coffee beans. Thus, habitat degradation associated with the consumption of electricity and wood is almost entirely eliminated. To reduce the habitat degradation and destruction associated with coffee production we have developed a system in which farmers cultivate coffee in small ($\approx 2-3$ ha) lightly shaded coffee plantations and conserve an equivalent amount of adjacent forest. We have demonstrated that "Integrated Open Canopy" (IOC) coffee production supports forest-dependent bird species that don't occur in shade coffee, thereby addressing the deficiencies of shade coffee for biodiversity conservation. These species include Neotropical migrants such as the Golden-winged Warbler, which is identified by Partners in Flight as perhaps the most threatened Neotropical migrant species not already protected under the U.S. ESA. The use of IOC offers economic advantages to farmers including flexibility to regulate shade levels for optimal fruit

production and disease control, decreased wind damage, and erosion, and increased pollination services from adjacent forest, which translate to higher yields relative to shade coffee.

Regenerating forests also qualify farmers to receive payment for carbon credits under the Kyoto protocol.

These technologies and approaches are showcased at the MDI/Montes de Oro Demonstration and Training Center in Miramar, Costa Rica, which has hosted delegations of producer associations, policymakers, and cooperatives from throughout Central America to demonstrate the benefits of the alternative drying technology. The information developed from these activities is being transferred to Honduras with cooperation of the Honduran Coffee Institute in order to create a cluster of producers that will adopt these production processes. This model will serve to transform the Honduran coffee sector to a more environmentally sustainable industry and open opportunities to capture a higher portion of the growing market for sustainable products. The initiatives undertaken at the Montes de Oro Cooperative result in significant energy savings, increased coffee yields, and reduce forest destruction, thus providing a market-based incentive for individuals to engage in agricultural practices that conserve natural resources and biodiversity. These activities provide a model for the future for reducing the environmental costs of coffee production, while simultaneously improving economic conditions for the people in coffee producing regions.

Name of Individual and Organization: Raul Raudales, Mesoamerican Development Institute

Contribution: Raul Raudales is co-founder of the (MDI). Raul is an energy engineer and contributed directly to the design, development and promotion of the Solar/Biomass Drying System.

Name of Individual and Organization: Victor Arce, MDI/Montes de Oro Research and Training Center, Miramar, Costa Rica

Contribution: Victor Arce is the manager of the cooperative Montes de Oro. Victor supervised all aspects of the operation in Costa Rica. Victor is an agronomist and provided much of the economic analysis needed to evaluate the project.

Name of Individual and Organization: Arley Morales, Mesoamerican Development Institute

Contribution: Arley Morales is a training specialist in coffee processing and manages the solar drying facility at Montes de Oro. Arley also contributed to the design and deployment of the solar drying systems, and also conducted training and outreach on coffee drying and milling for visitors to the Co-op from throughout Central American and the Caribbean.

Name of Individual and Organization: Richard Trubey, Mesoamerican Development Institute

Contribution: Richard Trubey, a co-founder of the Mesoamerican Development Institute, and was involved in the economic, marketing and technology transfer aspects of the project.

Name of Individual and Organization: Reyes Picado, Mesoamerican Development Institute

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Contribution: Reyes Picado is the system installation and maintenance specialist involved in technology transfer. Reyes provided training of installation teams and the formation of local expertise in the maintenance of Solar/Biomass Drying Systems.

Name of Individual and Organization: Sixto Aguero, Mesoamerican Development Institute

Contribution: Sixto Aguero is an energy efficiency specialist who is overseeing the transition to solar technology to Honduras.

Name of Employee or Forest Service Unit: Dr. David King, USDA Forest Service - Northern Research Station

Contribution: Dr. David King originally recognized the potential of the IOC coffee system for biodiversity conservation, directed the development of the bird sampling protocols, and supervised the study implementation.

Name of Individual and Organization: Richard Chandler, Department of Natural Resources, University of Massachusetts Amherst, Amherst, MA

Contribution: Richard Chandler helped develop the procedures to evaluate the use IOC coffee from the perspective of bird conservation.