

## **Recovery of Ecosystem Services of the Cerron Grande and Sustainable Livelihoods of Santa Barbara's Population**

### **Existing Conditions:**

- The population of cormorants (an invasive species), has grown to the point where the birds are dominating the avian community within the reservoir.
- Cormorants are eating the fish in the lake to the point of diminishing the available fish for local anglers.
- The lake's nitrogen levels have increased due to agricultural chemical runoff and the high input of cormorant feces. This nutrient enrichment in the reservoir has increased aquatic plant growth.
- Invasive non-native water plants (water hyacinth, *Eichornia crassipes*) have taken over the lake to the point where anglers and tourist boats are not able to navigate at times.
- Although anglers' livelihoods have been diminished from these conditions, a small artisanal business has been created within the local community from the harvesting and processing of the water hyacinth.

### **Objective-Purpose and Need**

- The purpose of this project is to restore and conserve the reservoir's water quality, ecosystem function and ecosystem services for fish production, community livelihoods, and water resource management of the dam for electricity.
- There is a need to better understand the changing of the lake's dynamics related to the activities ongoing in and around the lake (i.e., within the lake's watershed).
- There is a need to reduce the population of cormorants to reestablish a viable fishery in the lake via reduced nitrogen levels and reduced harvest of fish by cormorants.
- There is a need to reduce the water hyacinth to allow open boating access by anglers and boat tour operators, and to reduce interference of the hyacinth with dam operations.

### **Possible Actions (to address the Purpose and Need):**

- Controlled hunting of cormorants via permits issued by the Ministry of Environment to diminish the cormorant population and thus their impact on fish populations and nitrogen levels of the lake.
- Collection of cormorant eggs to reduce subsequent populations of cormorants. Local residents could eat the eggs or sell them. Another option is to spray eggs with food-grade oil, which prevents the exchange of gasses through the shell, causing asphyxiation. With the latter option, birds will continue to incubate the eggs and are less likely to re-nest than with egg collection.
- Harvesting of water plants by local community members by hand pulling/cutting plants and drying them for use in making artisanal products as supplemental income.
- Exploration of alternative sources of tourism income by local community members.

Example of Suchitoto Water Hyacinth Movement



Morning



Afternoon