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## MONEY TALKS: ECONOMIC ASPECTS OF MARINE TURTLE USE AND CONSERVATION

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For thousands of years, marine turtles have provided sustenance to coastal communities around the world. Unfortunately, populations have declined drastically due to human activities. Marine turtles occur predominantly in developing countries. These countries stand to lose most from continued decline and have most to win from reversing negative population trends. Economic factors are often behind marine turtle declines. Therefore, we set out to analyze economic aspects of marine turtle use and conservation. Economic information provides additional criteria for decision-makers and can help us identify policies to reconcile economic development and marine turtle conservation goals. We estimated gross revenue from consumptive use of marine turtle meat, eggs, shell, leather and bone at nine case study sites in developing countries. Gross revenue from consumptive use vary between US\$158-US\$1,701,328 per year per case study with an average of US\$582,752 per year. Gross revenue from non-consumptive use is estimated for nine case studies where marine turtles are major generators of revenue and four sites where they represent one of many tourism attractions. Gross revenue for case studies where non-consumptive use is a major revenue generator vary between US\$41,147-US\$6,714,483 per year per site with an average of US\$1,659,250 per year. Gross revenue at sites where marine turtles are one of many attractions vary between US\$3,387-US\$105,997 per year with an average of US\$40,791 per year. We evaluated the economic consequences of direct use options based on four cases where policy decisions were made to continue consumptive use or to promote non-consumptive use as an alternative. We conclude that non-consumptive use generates more revenue, has greater economic multiplying effects, greater potential for economic growth, creates more support for management, generates proportionally more jobs and social development than consumptive use. Both consumptive and non-consumptive uses result in leakage of revenue from local to national and international levels. Rivalry between uses means that consumptive use can have negative economic impacts on uses at other locations. Consumptive and non-consumptive uses may in many cases be incompatible at the same location. Cost of production, distribution of revenues and potential for economic diversification must be considered when evaluating use options. Environmental and social impacts should also be examined when evaluating use options for a particular site. Marine turtles have a wide range of passive use values. We chose to quantify a lower boundary for the passive use value as the expenditure of conservation organizations and conventions. Global marine turtle conservation expenditure for 162 organizations and conventions is estimated at US\$20,417,981 per year. Based on two case studies of captive

breeding, the replacement cost for nesting females is estimated at US\$245.9-US\$263.3 million for green and US\$2.5 billion for leatherback turtles. The cost of rearing turtles in captivity suggests that conservation of marine turtles in the wild is less costly.

Unsustainable marine turtle use and activities that negatively impact marine turtle populations continue unabated in many places because of local economic incentives in favor of continued overexploitation. Governments, international agencies and non-governmental organizations can prevent overexploitation by creating local economic incentives in favor of marine turtle conservation through employment and/or training of consumptive users, promoting use regulations, enforcing restrictive legislation, establishing fines, facilitating funding, subsidies and/or microcredits for non-consumptive use where feasible, eliminating perverse subsidies, and establishing concessions and use fees.