Drivers of household fishing and selling strategies in coral reefs of Northwest Madagascar

E. Maire, S. D’Agata, J. Cinner, V. Ramahery, D. Mouillot, E. Darling, L. Velez, C. Aliaume
University of Montpellier: Marine Biodiversity Exploitation and Conservation (MARBECLab), France
WCS, Madagascar
ARC Centre of Excellence for Coral Reef Studies, James Cook University, Australia
WCS, Madagascar
University of Montpellier: Marine Biodiversity Exploitation and Conservation (MARBECLab), France
Wildlife Conservation Society and Banting Postdoctoral Fellow, University of Toronto, Canada
University of Montpellier: Marine Biodiversity Exploitation and Conservation (MARBECLab), France
University of Montpellier: Marine Biodiversity Exploitation and Conservation (MARBECLab), France
eva.maire@umontpellier.fr

The depletion of natural resources has become a major issue in many parts of the world, with easily accessible resources being most at risk. A global assessment of accessibility in the marine realm shows that travel time from the market is a strong predictor of fish biomass on coral reefs. However, a downscaling of this relationship with the integration of local socio-economic variables is still lacking. Here we propose to study the reefs and human communities of Northwest Madagascar to validate road networks and access to the reefs using field data about available technologies (canoe vs. motorized boat) and associated speed. Based on this improvement, we re-assessed travel time from major markets for ~1000 reefs (1km-resolution spatial grid) in Northwest Madagascar. By combining travel time with socio-economic data from intensive household surveys, we found that market integration influences the price and the proportion of fish sold vs. consumed by humans. Market integration varies according to road conditions (especially during wet season) and the presence of middlemen who transport fresh fish. We also highlighted that fishermen can adapt fishing strategies and gears used according to accessibility from markets with drastic changes in the relative catches of key groups of fish. This suggests that accessibility through market integration but also poverty shape the way people use and manage coral reefs. A critical step is to better understand, and integrate into governance strategies, the complex, multi-scale interrelationship between humans and coral reefs with accessibility being the cornerstone at fine scale.