Fishers’ local ecological knowledge (LEK) on connectivity and seascape management

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**Background**

In developing countries, where data and resources are lacking, the practical relevance of Local Ecological Knowledge (LEK) in order to expand our understanding of the environment has been highlighted. The potential roles of the LEK varies from direct applications such as gathering environmental information to a more participative involvement of the community in the management of resources they depend on. Fishers’ LEK could therefore be useful in order to obtain information to advance management of coastal fisheries. Many targeted fish species migrate between habitats to feed, spawn or recruit, connecting important habitats within the seascape. LEK could help provide answers to questions related to this connectivity and the identification of fish habitat use, and migrations for species and areas where such knowledge is scarce. Here we assess fishers’ LEK on connectivity between multiple habitats within a tropical seascape, investigate the differences in LEK among fisher groups and the coherence between LEK and conventional scientific knowledge (CSK).

**Methods**

The study was conducted in 6 different locations in Zanzibar, Tanzania between September and November in 2017. One hundred and thirty-five semi-structured interviews were conducted. A minimum of 20 interviews were performed at each site. Firstly, questions were asked to gather the demographics of the respondents. Secondly, questions were asked to gather data on LEK about habitat use and connectivity of selected species of fish. Three general questions regarding different types of fish migrations between habitats (diurnal/feeding, spawning and ontogenetic) were asked. This section also contained pictures of fish species (juveniles and adults) and different habitats for the respondent to match the fish species to the habitats in which they are found. An array of fish species were included that either use single or multiple habitats. Towards the end, an open dialogue was held to better understand the level of ecological knowledge that the respondent possessed. Lastly, respondents were asked how they gained their knowledge that they demonstrated in the interview.

**Results**

The respondents were all male and between the ages of 17 and 75 years. Eighty-four percent of respondents had a formal education background, whether it was primary education (23%),
secondary education (59%) or tertiary education (2%). Differences between fisher groups were found, where fishers travelling further, exposed to multiple habitats, and fish with multiple gears had a greater knowledge on connectivity patterns within the seascape than those that fish locally, in single habitats and with just one type of gear. A high degree of overlap in LEK and CSK was found, highlighting the potential benefits of collaboration between scientists and fishers and the use of LEK as complementary information in the management of small-scale fisheries.

Conclusions
Local fishers of Zanzibar had a high knowledge of connectivity, but leading more towards a general understanding of connectivity than the in-depth knowledge of connectivity which scientists possess. However, this knowledge that local users possess (LEK) would aid fisheries management with valuable information regarding fish ecology and behaviours when used in conjunction with the knowledge gained from scientists (CSK). Results suggest differences between fisher groups. This should be recognized when finding “experts” within the local fishing community to consult in fisheries management. We suggest that a co-management approach to devising and implementing management proposals that incorporate both epistemological knowledge systems of LEK and CSK regarding seascape connectivity would increase the effectiveness of natural resource management in aquatic environments.