

Ecosystem-based Approach of the YSLME Project

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The UNDP/GEF project “Reducing environmental stress in the Yellow Sea Large Marine Ecosystem” (YS LME), like many other Large Marine Ecosystem (LME) projects has followed the GEF supported project framework. In accordance, we produced a Transboundary Diagnostic Analysis (TDA) of the transboundary problems and their causes which were addressed in the Strategic Action Programme, through the setting of regional targets and identification of management actions to achieve those targets. During the preparation of the SAP it became apparent that in order to reduce ecosystem stress, the objective of the project, we could not use the traditional sectoral management where for example fisheries, habitats and pollution are managed in isolation. This is because complex interactions between the ecosystem services (supporting, regulating, provisioning and cultural). The complex linkages mean that preserving habitat will not necessarily result in the conservation of biological diversity, it does not matter how big the area, if pollution is not controlled and resource extraction (e.g. Fishing, mariculture, sand mining) is not sustainable. Localised eutrophication significantly impacts ecosystems changing the dominant species of both phytoplankton and seaweed. These changes that can affect the whole food chain and the habitat structure as green macro-algae such as *Enteromorpha* sp. can smother entire areas. Unsustainable fisheries can remove the very food items such as clams and other bivalves that may support the very bird populations or fish species that are targeted by the protected area.

To manage these complex linkages, the SAP adopted a concept from population dynamics that of carrying capacity which describes the maximum population that can be supported at any given ecological state. The SAP uses ecosystem carrying capacity as management tool and defines it as the capacity of the Yellow Sea to provide ecosystem services. The SAP's primary objective is to sustain this ecosystem carrying capacity, and like in population dynamics, this capacity is dependent of ecosystem state (ecosystem structure, productivity and habitat integrity), therefore any impact that reduces the capacity will impact the ecosystem services that sustain the dependant human population. This capacity will change as society's requirements increase and climate change accelerates.



As governments continue to partition management, fisheries separate from the ocean, fresh water separate from seawater, the project has suggested that a YSLME commission be used to coordinate the management of the Yellow Sea. So that a true ecosystem based approach to management can be adopted and these complex linkages can be adaptively managed to sustain the ecosystem carrying capacity of the YSLME for future generation.