

Managing the Groupers Fishery of the Maldives

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Introduction

Groupers belong to the Family Serranidae, Subfamily Epinephelinae and the Maldives has approximately 40 species out of over 100 species worldwide.

Targeted grouper fishery in the Maldives began in the early 1990s and intensified quickly due to huge demand from the export market. Main export destinations are Hong Kong, Taiwan, and Thailand. High market value species such as *Epinephelus fuscoguttatus*, *Plectropomus areolatus*, *Plectropomus laevis* and *Plectropomus pessuliferus* have always been favourites.

Studies on grouper fisheries in the Maldives began in the early 1990s and all the studies made management recommendations which if implemented at the time would have helped conserve grouper stocks.^{1,5,7,8}

Marine Research Centre in collaboration with Darwin Reef Fish Project initiated an assessment in 2010. The aim was to collect baseline information necessary for the formulation of a grouper fishery management plan.

Methodology

Fishermen Interviews

Fishery Data collection areas: Baa, Vaavu, Faafu, Gaafu Dhaalu and Malé Atoll (Fig. 1)

- Consultations with the grouper fishermen to assess their opinions on:
 - the current status of the fishery
 - the need and importance of management for this resource
 - most effective management practices for making the existing grouper fishery sustainable

Sampling on Board Fishing Vessels and Grouper Cages

- Sampling on board fishing vessels: collection of site specific data over 12 days
- Sampling at the cages: total 25 days and 92 fishing trips (Fig. 2)
- Data collected: species specific length measurements in centimetres, information on fishing effort and locations, species-wise quantities of catch per trip and income earned per trip

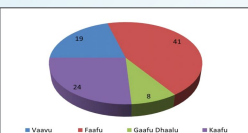
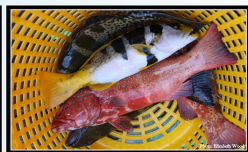


Figure 2: No. of fishing trips sampled at the grouper cages from the surveyed four atolls



FishWatch Surveys

- Survey areas: Gaafu Alifu, Gaafu Dhaalu, Haa Alifu and Malé Atoll (Fig. 1)
- 156 underwater surveys at 40 sites (depths between 0-25m); timed swim methodology
- Data collected: Counts and size estimates of key grouper species; calculation of the total biomass for each species.



Export Data and Income

- Grouper exports and income generated; Basic Fisheries Statistics of Maldives (Ministry of Fisheries and Agriculture)⁴

References

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5. Sattar, S. A. and M. S. Adam (2005) Review of Grouper Fishery of the Maldives with additional notes on the Faafu Atoll Fishery. Marine Research Centre, Malé, Maldives. 64pp
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8. Van Der Kraak, M., Waheed, Z., Shareef, H. and Rasheed, M. (1991) Reef fish resources survey in the Maldives. Reef fish Research and Resources Survey. B. O. B. Programme, Maldives, Bay of Bengal Programme: FACS/60pp.

Results

Fishermen Opinion

- Unable to get large quantities and larger sized individuals of main target species i.e. the high valued species (eg. *E. fuscoguttatus*, *E. polyphkadion*, *P. areolatus*, *P. pessuliferus* and *P. laevis*); now mainly caught from the breeding grounds during spawning period
- Currently target all species and sizes of groupers; low valued species are now being paid much higher prices by exporters
- Majority of fishermen in favour of a properly implemented and enforced management plan

Fishery Survey

- Number sampled: 12,797 individuals of 26 species
- Commonly caught species; same species as in 2003, however high valued species have decreased in quantity (Fig. 3)

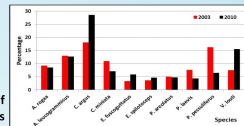


Figure 3: Percentage of catch composed of the 10 most commonly caught species

- Decreased mean lengths of majority of commonly exploited species (Fig. 4)

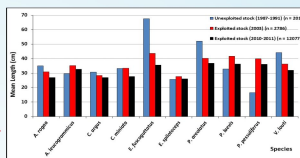
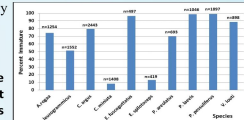


Figure 4: Comparison of mean length of groupers in the unexploited stock and exploited stock



- 70% of the individuals of most commonly exploited species caught prior to their theoretical maturity lengths (Fig. 5)

Figure 5: Immature percentage of the sampled individuals of the 10 most commonly caught species



- Size compositions of individuals; smaller than those taken in 2003, especially significant for high valued species

FishWatch Survey Results

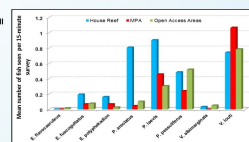


Figure 6: Abundance of key species of groupers on resort house reefs, Marine Protected Areas (MPAs) and open access areas

- Most commonly encountered species: *Cephalopholis argus*, *Variola louti* and *Cephalopholis miniata*
- High valued species were rarely encountered; mostly found on house reefs of tourist resorts than in areas which are open to fisheries (Fig. 6)
- Preliminary estimates of biomass: approx. 15,000 MT of groupers are found in all reef habitats of Maldives⁴
- Preliminary Maximum Sustainable Yield: 2,118 MT annually²

Exports

- Live grouper exports show a decreasing trend (Fig. 7), which is compensated for by increasing export of fresh/chilled groupers (low valued species and smaller sized individuals)

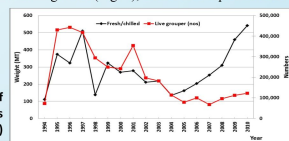
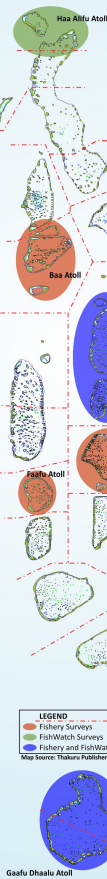


Figure 7: Export quantities of fresh/chilled and live groupers (1994 – 2010)

ACTIONS TO BE TAKEN!

- Maldivian Grouper Fishery Management Plan 2011³
 - Formulated and finalized through a participatory approach
 - Size limits and closure of spawning aggregation sites recommended
 - Regulated fishery
 - Mandatory log books and data collection
 - Long term monitoring of catch, abundance and spawning aggregation sites
 - National level awareness programmes



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