

ALLOCATION DECISIONS AND THE CONSEQUENCES OF ARTISANAL FISHING COMMUNITIES THAT TARGET ATLANTIC BILLFISH

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THE ISSUES

APPROACH

RESULTS & DISCUSSION

ATLANTIC BILLFISH MANAGEMENT BACKGROUND

- International Commission for the Conservation of Atlantic Tunas (ICCAT) recommends management strategies for **sailfish, blue & white marlin, spearfishes** to member nations



- Highly-migratory, pelagic species
- Uncertainty on level of overfishing of Atlantic billfish stocks
- Leads to management risk that rebuilding strategies may be ineffective
- Multiple users
 - Directly targeted by recreational users
 - Caught as bycatch in industrial operations
 - Directly targeted by artisanal fishers

QUESTIONS OF INTEREST AND STUDY AREAS

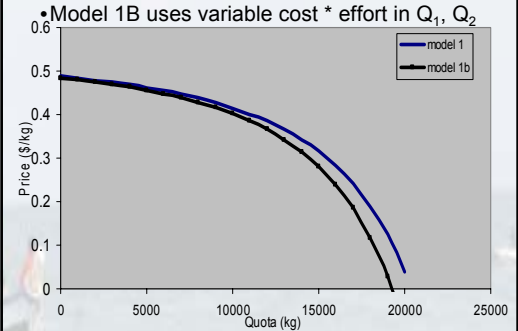
- What is the optimal allocation of billfish to the recreational and artisanal sectors?
- What are the impacts to artisanal fishers if there is an allocation policy implemented?



- How does risk and vulnerability affect the efficacy of such a proposed policy?
- Case study on Ghanaian artisanal fishermen compared to recreational fishing values

RESULTS: ARTISANAL Marginal benefit estimation

- Figure 1 – estimated tax per kilo fish landed by the artisanal sector



- Figure 2 – marginal benefit schedules for recreational and artisanal sectors

- Recreational schedule – based on expenditure estimates not marginal benefit

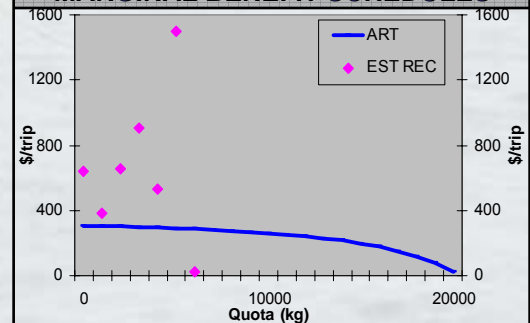
CURRENT MANAGEMENT STRATEGIES

- Strict regulations imposed on industrial sector
 - Release...billfish in manner...sustains survival
 - Responded & reduced billfish catches
- Recreational sector self-regulates
 - Through catch & release
 - Severe bag limits (e.g., US and Brazil)
- Artisanal sector specifically exempted
 - Many artisanal fleets have expanded
 - Increased billfish mortality
- 2007 – ICCAT required artisanal fleets to:
 - Monitor and report catch & effort data
 - Cap marlin landings by 2008

METHODOLOGY

- Estimate the annual cost of reducing harvest to the artisanal sector
- Case study approach
 - Target billfish and tunas
 - Land billfish in four sites along coast
 - ~ 240 vessels
- Data sources
 - Ghanaian fishery database
 - Landings, effort & ex-vessel price
 - Survey data
 - Individual vessel cost information
 - Variable & fixed costs

MARGINAL BENEFIT SCHEDULES



STUDY – USER GROUPS

RECREATIONAL

- Conservation oriented
 - Catch & release
 - Unknown post-release mortality rate
- Allocated billfish to recreational sector
- Unique subculture of general anglers (Maiolo 1990)
- Cultural perceptions of management differ
- Wealthy & experienced (Ditton and Stoll 2003)
- Expanding operations (Brinson et al. 2006)

ARTISANAL

- Motivations:
 - Local commerce
 - Home consumption
- Sparse data (Salas et al. 2007)
- Locally important (Perry and Sumaila 2007)
- Provide employment, food security & cultural significance
- Produce *positive*, but *unstable* fishing profits
- Impoverished conditions
- Expanding operations (Brinson et al. 2006)

MODEL ESTIMATION

- Parameters: α_1 , α_2 , β_{11} , β_{12} and β_{22}
- Variables:
 - E, number of trips per month
 - P, price of species /
- Equations:
 - Demand schedules: Q_1 , Q_2
 - $Q_1 = \alpha_1 E^2 + \beta_{11} E + \beta_{12} E (p_2/p_1)^{1/2} + \sigma$
 - $Q_2 = \alpha_2 E^2 + \beta_{22} E + \beta_{12} E (p_1/p_2)^{1/2} + \sigma$
 - Tax or royalty, τ , estimated from Q_1 , Q_2
 - $\tau = p_1 - p_2 \{ (\beta_{12} * E) / (Q^* - \alpha_1 E^2 - \beta_{11} E) \}^2$

DISCUSSION & CONCLUSIONS

- Unable to estimate marginal benefit for recreational sector,
 - Can only compare expenditure estimates
- Expenditures grossly overestimate value
- Potential to over allocate to recreational sector
- Allocation may negatively impact artisanal fishers' livelihoods
- Lack of data increases fishers' vulnerability
- Will need management interventions to offset negative impacts
 - Improve the storage capacity
 - Introduce savings institutions
- ICCAT scientific committee does not currently consider socioeconomic indicators even though managers may benefit from this information

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ACKNOWLEDGMENTS

Thanks too all of the fishers who participated in the survey. We would also like to thank B. Brown, P. Bannerman, J. Agar, Y. Diatta, D. Kelly, L. McManus, A. Nielsen for their assistance. We would also like to thank our funding sources.

