Decision Support for Coral Reef Fisheries Management: Community Input as a Means of Informing Policy in American Samoa

**Background**

American Samoa is in the U.S. Territory located in the South Pacific, approximately 2,000 miles southwest of Hawaii. The territory encompasses five volcanic islands and two coral atolls, where coral reef is found approximately 2-3 miles offshore. Historically, fishing has been an important part of the American Samoan way of life and remains so today. The Department of Marine and Wildlife Resources (DMWR) is the lead agency in fishery management.

**Problem Statement**

Evidence suggests that over the past two decades reef fish and invertebrates have declined in both abundance and size in American Samoa. Our study addresses overfishing by creating a decision-support tool for DMWR based on socioeconomic and geographic data. We recognize this policy area towards which to focus management strategies.

**Research Questions**

- **Regulation**
  - What is the central perception of fishery regulation?
  - What types of regulations are people most likely to comply with?
  - What are the factors that influence people’s agreement level with regulation?
  - How does a difference of opinions between user groups regarding attitudes and opinions towards fishery regulations and management policies?
  - What spatial level of management is most preferred?

- **Education**
  - Where do American Samoa residents receive most of their coral reef fishery education?
  - Specifically, from which sources and how frequently do users receive fishery education?

**Geographic Prioritization**

- How can DMWR incorporate spatial variation in demographic and environmental factors in order to enhance fishery management strategies?

**Methods**

Using a random, stratified sampling technique, we surveyed 36 villages throughout the Territory. We administered a total of 625 surveys in both English and Samoan.

To analyze our data, we used a variety of statistical methods, including summary statistics, analysis of variance tests (ANOVA), chi-squared tests, and multivariate regression analysis.

**Results and Discussion**

**Fishery Use**

The majority of survey respondents felt that maintaining a healthy ecosystem and fishing for food were important uses of the fishery. Commercial use of the fishery (buying and selling) and recreational fishing were considered important by a significantly lower number of respondents.

**Regulation**

Percent Preference of Spatial Level of Management

The majority of the total respondents show a preference for village level management.

In general, the response is in favor of each of the eight regulation types, with at least 65% of respondents in agreement with each regulation.

Based on our regression analysis, we found the following socioeconomic factors to be significant in influencing people’s overall agreement with regulation:

- Age
- Citizenship
- Coral reef status
- Social education
- Fishing frequency

**Education**

The education sources utilized most frequently by the greatest number of respondents are TV and radio, newspapers, and school. Both the summary statistics and regressions for the education policy area indicate that media education is not received significantly more by any particular demographic group.

**Conclusions**

- Nearly half of the respondents think current regulations are too lenient.
- Compliance is estimated to be greatest with the following four regulation types:
  - DMWR should regulate what is caught.
  - DMWR should regulate how people fish.
  - DMWR should regulate when people can fish.
  - DMWR should regulate who fishes.
- Respondents feel rules from villages with a strong social structure are more likely to agree with regulations.
- Average average fishers are less likely to agree with regulations than other people.

**Geographic Management**

- There is significant spatial variation in perceptions and opinions about fishery management and education.
- The remote villages have the highest reef complexity and average to above average per capita effort, but their residents have the lowest mean agreement with DMWR regulations and higher proportions of the populations prefer village level management.

**Geographic Prioritization**

We calculated values for 11 socioeconomic and biophysical factors to highlight spatial variation and detect trends among surveyed villages. For example, per capita fishing is lower in villages with higher populations. However, total population has a greater effect on total effort per capita fishing.

We created maps of the socioeconomic and biophysical factors to provide visual representations of the analysis and potentially allow managers to identify broader regions of concern. For example, this map shows spatial variation in total fishing effort.

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