Global study of the management of baitfisheries that support pole-and-line tuna fishing

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Pole-and-line tuna fishing is generally recognized as having many positive characteristics, especially in terms of its social and environmental attributes. An important aspect of pole-and-line fishing is that it requires live baitfish — and catching baitfish is associated with both opportunities and constraints. There is a widely held view that there are significant prospects to improve the pole-and-line fisheries (i.e. mitigating negative impacts, enhancing benefits) through modifications to baitfishing and its management.

A global study was undertaken of baitfisheries that support pole-and-line tuna fisheries. Visits were made to most countries in the world where pole-and-line tuna fishing is significant, in an attempt to understand the associated bait fisheries and their management.

The initiative and funding for this study came from the International Seafood Sustainability Foundation (ISSF). It is important to note that the choice of countries visited, specific subjects examined, and methodology used was largely left to the consultant.

Fieldwork for the study began in early March 2012 and was concluded in mid-May 2012. Eleven areas in Africa, Asia, Europe, North America, Oceania and South America were visited.

The study allowed for an estimation of the production of tuna by pole-and-line fishing (Figs. 1 and 2).

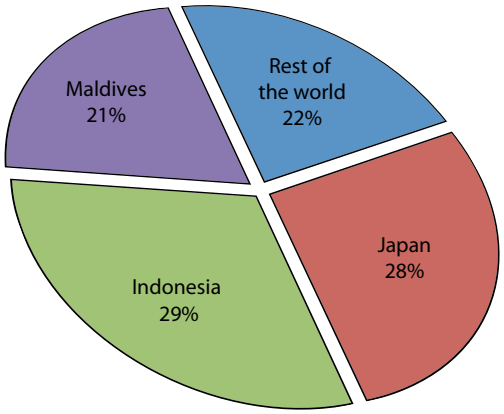

Figure 1.
The major countries involved in pole-and-line tuna fishing.

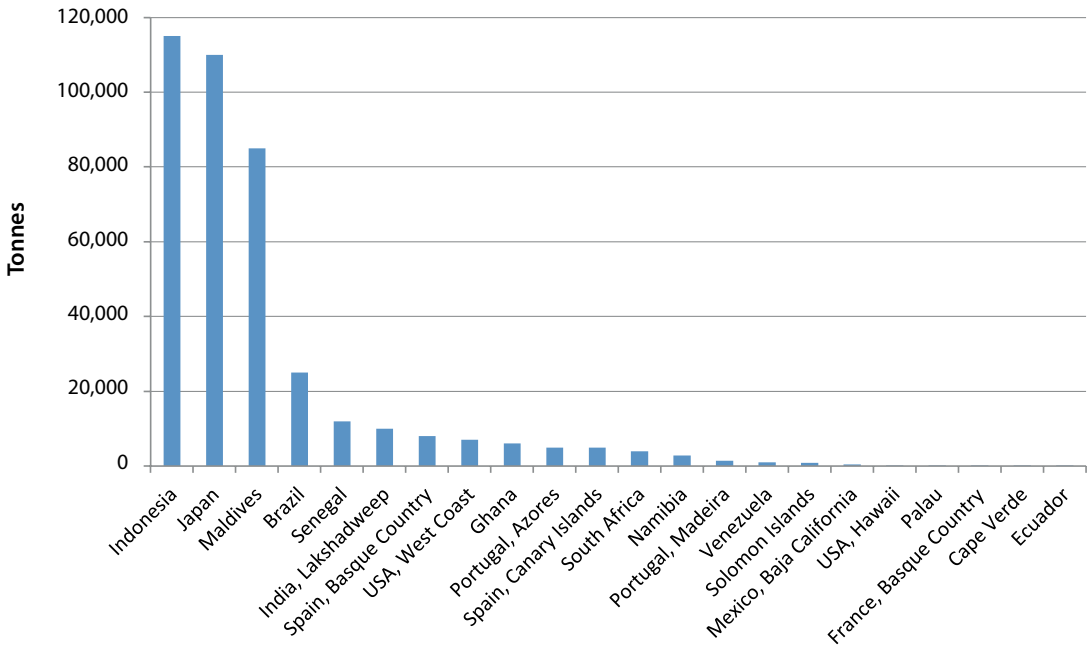

Figure 2. Estimates of recent annual pole-and-line tuna catches (in tonnes).

The study's major findings with respect to baitfishing include the following.

Some major features of the baitfisheries	The baitfisheries of the Maldives, Indonesia, and Solomon Islands involve a large number of species (i.e. complex tropical, multi-species fisheries), whereas other fisheries make use of only a small number of species. In Indonesia and Japan, baitfish are characteristically purchased from separate baitfish capture operations. In Senegal, most of the baitfish comes from separate operations, whereas in Ghana only some does. Only in the Solomon Islands and Maldives is baitfishing a discrete, stand-alone fishery. In other areas, baitfishing is a component (mostly very small) of the total amount of fishing effort on the species used as bait. In a sense, baitfisheries are "nested" inside a larger, overall fishery. The most dominant baitfishery trend is a decline in production that mirrors the production decline of the associated pole-and-line tuna fishery. There is great diversity among the various baitfisheries in the relationship between baitfishing and local communities.
Management measures that are specific to baitfisheries	Presently, there are only a small number of management measures that are specific to baitfisheries. The two stand-alone baitfisheries (Solomon Islands, Maldives) are only lightly regulated, while in cases where baitfisheries are nested in larger, overall fisheries, the management unit is the overall fishery, and most management measures are not specific to the baitfishing component.
Limits on amounts of baitfish captured	Limits on amounts of baitfish captured are not characteristic of the world's baitfisheries. This appears to be due to perceptions of resource abundance and/or resilience (Solomon Islands), an inability to place catch restrictions on fishers (Maldives, Indonesia), declines in baitfishing production resulting in a sense of less urgent need for management (most locations), and the fact that a catch restriction for a nested and relatively small baitfishery characteristically has little impact on the overall fishery (most locations).
Fishery management plans for baitfisheries	Currently there are no functional fishery management plans for any significant baitfishery in the world. Management plans are presently being prepared for two baitfisheries: the Maldives and Solomon Islands. Fishery management plans are in place for the overall fisheries that encompass the baitfisheries of the USA West Coast, and (to a degree) the Basque Country (Spain). Fishery management plans are not in place for the overall fisheries that encompass the baitfisheries of Indonesia, Japan, Brazil, Azores, Canary Islands, Senegal and Ghana.
What is a fishery management plan?	In the areas covered by the study there is no consistent concept of what a fishery management plan actually is: many different types of documents are called fishery management plans.
Monitoring of baitfisheries	Monitoring catches (i.e. collecting catch and effort information) is an essential activity in support of fisheries management. Given the simplicity of collecting, analyzing, and using that information (and the utility of the analyzed information), it is somewhat surprising that few baitfisheries are adequately and routinely monitored. The usual case is that catch and effort data are: 1) not collected, 2) collected only during specialized research projects, 3) collected only during the height of the fishery, or 4) collected and not analyzed.

Baitfish resiliency	The nature of many baitfish species points to relatively high productivity and some degree of resilience to fishing: low trophic level, highly fecund with rapid growth, and relatively short lifespans. On the other hand, this favorable productivity is often tempered to some degree by recruitment variability due to environmental influences.
Some major challenges in improving the management of baitfisheries	Improving the outcomes of baitfish management in some countries would require a major overhaul of the entire coastal fisheries management regime, which would be a monumental undertaking. Improvements in other baitfisheries require some ability to restrict a large amount of "semi-unmanageable" artisanal fishing effort. A significant challenge for improving most of the world's baitfisheries concerns "nested" baitfisheries. The logical way to improve management would be to deal with the overall fishery rather than tinkering with the small baitfish component, but it is uncertain what should be the appropriate role of the baitfishery and its stakeholders in improving the management of the overall fishery.
Improvements are mainly site-specific, except for monitoring	There are few improvements to baitfish management systems that would be universally applicable. In the recent past, there has been a notion that fishery management plans are essential for good baitfishery management everywhere, but this is probably not the case. It has become apparent during the present study that perhaps the only improvement that is broadly applicable to the management of most baitfisheries concerns monitoring. The relatively simple process of collecting and analyzing baitfishing catch and effort data would help improve the management of most of the world's baitfisheries by providing key information for decision-making. Baitfishing catch and effort data are obviously important to dedicated baitfisheries (e.g. Solomon Islands, Maldives), but are also of value in the "nested baitfishery" component of a large, overall fishery.
Fishery management plan role in improvements	Management plans can be a convenient way to organize fisheries management, improve efficiency, assure that interventions are tied to objectives, guide less-sophisticated managers, and promote transparency. They become even more useful in complex situations and where stakeholders are unfamiliar with fisheries management processes. In short, they are quite appropriate for the conditions commonly found where there are baitfisheries in developing countries. This desirability, however, seems to fall somewhat short of such plans being absolutely essential. Therefore, a blanket statement on the necessity of a fishery management plan for all baitfisheries could be too prescriptive. In addition, a template baitfishery management plan or "best practices" or "common standards" for management plans for the dedicated baitfisheries, may not be applicable to the overall fisheries that contain nested baitfisheries.

Baitfishing boats in the Maldives.

Common elements of effective management	If fishery management plans are not essential for effective management (i.e. where objectives are being achieved), can some essential elements be identified that are common to all effective management arrangements? Such a list (at least for baitfisheries) would probably include: 1) some type of monitoring of the fishery, 2) some formal statement of the rules (e.g. plan, legal instrument, policy document), and 3) a mechanism for applying those rules.
Conclusions on stock assessment	Rather than promoting regular comprehensive baitfish assessments, another approach worth considering is to collect and analyze catch and effort data for major trends, while opportunistically making use of a more sophisticated analysis when it becomes available. Trends in catch and catch per unit of effort have the advantage that they are simple, easy for developing country managers to use, and are readily understood by fishers and the general public.
Suggestions for research	Because there appears to be considerable interest in researching topics that have already been well-studied, there is a need to compile previous baitfish research findings, including overall lessons learned. Another important category of research that is applicable to many baitfishing countries concerns making progress with the three "major challenges" cited above.
Specific activities for improving the management of baitfisheries	Ideas improving baitfishery management that emerge from this report include promoting the monitoring of all baitfisheries, and promoting the concept of a "fisheries management framework" in countries with favorable conditions (i.e. where there is political will and stakeholders willing and able to engage). Such a framework would feature collecting, reporting, using catch and effort data on the baitfishery, and some formal statement of the rules and how they are to be applied.

A full copy of the report is available from Robert Gillett (Gillett@connect.com.fj) and the ISSF website (http://iss-foundation.org/wp-content/plugins/download-monitor/download.php?id=ISSF-2012-09-Baitfish-Management-Report-August-18-VERSION.pdf)

A fixed bagan *(platform used to catch baitfish at night with a large lift-net and lights) in Indonesia.*