

The fishers of Jamaica are making change mon!

by *Stephanie Lingard*

Jamaica, the land of wood and water, famous for its warm people, reggae music, jerk chicken and overfished reefs. Jamaica lives up to its reputation in every aspect.

The people are some of the kindest, warmest and funniest you could hope to meet in your life. The landscape is an impossibly beautiful green, the food is flavourful, and... the reefs are desolate. However, there are many reasons to expect a better future for Jamaica's fishers and fishes.

During the winter of 2010 and spring of 2011 I was given the opportunity to live in Jamaica on an internship funded by the Canadian International Development Agency (CIDA). Having worked at the Fisheries Centre for the summer of 2010, I was delighted to find I would be working alongside the Fisheries Division of Jamaica's Ministry of Fisheries and Agriculture. I was working with an initiative called Improving Jamaica's Agricultural Productivity Project (IJAPP). The fisheries aspect of the project, funded in part by CIDA, had three focus points: market facilities, enhancement of fisheries resources through artificial reefs, and capacity building with fishers in six south coast fishing villages. The project also worked to establish co-management bodies within each of the fishing villages.



Left: Learning to clean lionfish at the lionfish handling workshop. Right: Typical catch dominated by small herbivorous fish.



These bodies would be responsible for managing the new markets, and community organization tasks. Capacity building included workshops concerning all aspects of life: money management, conflict resolution, ecological knowledge, fisheries management, and safety at sea, to name a few. During the workshops, fishers faces lit up, and they absorbed the information eagerly. Community members were deeply thankful to have the opportunity to learn how they could care for their resources and improve their livelihoods. Working with fishers during workshops was by far the most rewarding aspect of my time there, and I'm happy to report: progress is being made.

A long list of challenges is faced by the ecosystems of Jamaica: invasive lionfish, pollution, overfishing, destructive fishing habits, lack of regulation, hurricanes, and coral disease. Initially, working among these challenges made it difficult to stay positive and understand why we were building fish markets while previously donated gear sheds, from the European Union, sat unused. Why were new reefs,

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The Sea Around Us Project Newsletter

Issue 67 – September/October 2011

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sure to be targeted by destructive fishing practices, being built? In my mind, enforcement of fish sanctuaries (MPAs), and other regulations were clearly a priority. I often asked myself what the solution was to the myriad of problems, often feeling like I had nothing to offer the fishers or the fish.

Then, as time went on, my attitude changed. The more I became involved with the fishing community, and after meeting fishers and fisheries officers, I felt things, like my attitude, could be changed. The fishers themselves provided inspiration. Despite hauling up empty pots (Antillean Z traps) day after day, they continued to smile and laugh. At community meetings hosted by the project, many fishers were outspoken with other community members about the need to stop dynamite fishing, and other destructive practices. Many fishers I spoke with also expressed that, while they may not see the benefits of their changed behaviour, it was important to keep working at it for the next generation of fishers. The fisheries division staff, Dr. Karl Aiken (the Jamaican fish expert with the University of the West Indies), and members of local NGOs provided constant inspiration as well. All of these dedicated people have worked for years amongst funding cuts, broken government

promises, destructive fishers, and natural disasters, and yet they persist in good spirits.

My friend Nakhle Hado, who works with Food for the Poor, teaches lionfish handling

workshops around the island. He works tirelessly with fishers to teach them less destructive fishing techniques (like deep water handlining vs. trap fishing), as well as encouraging them to catch lionfish. Along side this work, he promotes a market for lionfish by selling it on the menu of his family's restaurant in Kingston. The fried lionfish is amazing! The trend appears to be catching on as I had several fishers tell me they prefer lionfish to other types of fish, and that they have customers who will come to them specifically for the prickly fish. In time, it may just become a Jamaican delicacy.

The Nature Conservancy is currently working with the Fisheries Division to set up enforcement of the Pedro Bank Fish Sanctuary. Pedro Banks is a large fishing ground with several small sandy cays which host a transient community of fishers approximately 60 km off the south coast of Jamaica. Although funding is slow to come through, all are hopeful this will commence before the end of this year, or in early 2012.

The Oracabessa Fish Sanctuary was finally launched on October 9, 2011, Dr. Aiken giving me the good news. There is a wonderfully dedicated group of local NGOs working to get the rest of the 8 designated fish sanctuaries off the ground: Caribbean Coastal Areas Management Foundation, Blue Fields Bay Fishermen's Friendly Society, St. Mary Fishermen's Cooperative, Oracabessa Foundation, The Negril Coral Reef Preservation Society, The Montego Bay Marine Park Trust, Fisheries Division, Alloah fisher group and Business Community.

Despite several decades of hardships, and slow-moving political action, there is a strong community of fish-friendly organizations and individuals in Jamaica. I hope the return of the herbivorous long-spined sea-urchin (*Diadema antillarum*), combined with the much anticipated launch of the fish sanctuaries, and a burgeoning lionfish market signal a recovery of Jamaica's marine resources.



The Sea Around Us

Project newsletter is published by the Fisheries Centre at the University of British Columbia. Six issues of this newsletter are published annually. Subscriptions are free of charge.

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The *Sea Around Us* website may be found at www.seararoundus.org and contains up-to-date information on the Project.



The *Sea Around Us* Project is a scientific collaboration between the University of British Columbia and the Pew Environment Group that began in July 1999. The Pew Environment Group works around the world to establish pragmatic, science-based policies that protect our oceans, wild lands and climate. Pew also sponsors scientific research that sheds new light on the dimensions of and solutions to the problems facing the global marine environment.

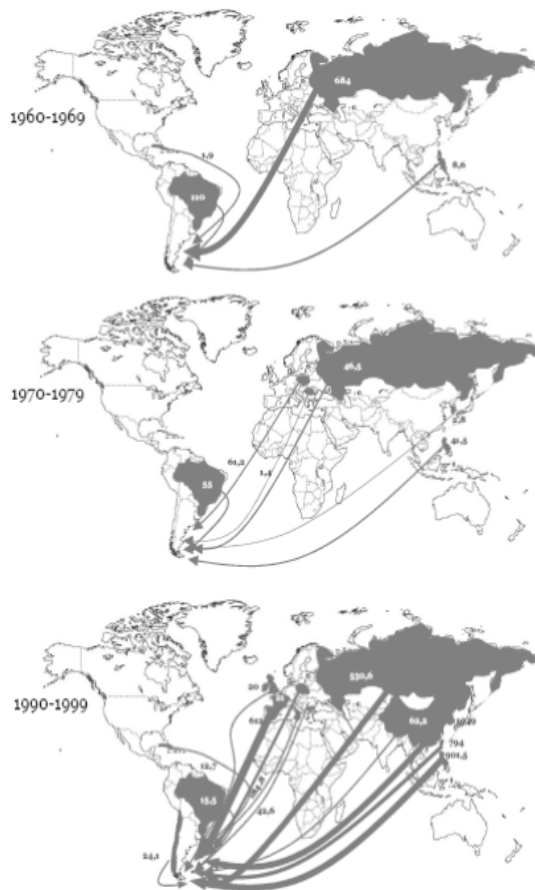
Why cooperate in the management of the Argentine shortfin squid fishery?

by Sebastián Villasante and Rashid Sumaila

How to sustainably manage shared fish stocks for the benefit of present and future generations is one of the key issues currently being investigated by the scientific community. We participated in a World Bank Conference in Development Economics titled “*Development Challenges in a Post-Crisis World*” in Stockholm, Sweden. Several Nobel laureates in economics (Erik Maskin, James Mirrlees, Elinor Ostrom, Joseph Stiglitz, and Robert Solow) and other well-recognized worldwide experts in natural resource economics participated as speakers. We presented our paper “Linking environmental economics, game theory and fisheries: an estimation of the economic benefits to sharing the *Illex argentinus* fishery in the Patagonian marine ecosystem”.

The research described in our paper was financially supported by the Latin American and Caribbean Environmental Economics Program (LACEEP), the Canadian International Development Research Center (IDRC), and the Swedish International Development Cooperation Agency (SIDA), as well as by Pew Environment Group through the *Sea Around Us* project. Our paper was presented in the session titled “New Findings in Common Property Management” organized by Dr. Scott Barrett, which included the participation of Drs. Ostrom and Mirrlees. The experience of sharing our results with distinguished economists in the stimulating academic environment of this Conference was highly productive.

The Patagonian marine social-ecological system supports one of the most productive shared fish stocks in the world, and it includes important commercial species such as the Argentine shortfin squid (*Illex argentinus*). This resource is exploited by different foreign fleets that operate both within the Argentine exclusive economic zone, and within the adjacent area beyond the 200-mile limit, as well as in Falkland (Malvinas) Island waters. Hence, the countries involved face what is known as stock externality, in which one nation’s catch negatively impacts that of another country. However, to date only biological and management aspects of this fishery have been studied, and a better understanding of the economic factors of the fishery is needed.



Catches by DWFN and other coastal states from the Patagonian marine ecosystem by decade (in thousand tonnes). The lines indicate the intensity of foreign fishing fleet activity in terms of catches.

Therefore, the main objective of this research was to estimate the economic benefits of the squid fishery under both cooperative and non-cooperative management scenarios. The bioeconomic model that we used was based on Munro’s (1979) pioneering work on transboundary fishery stocks, and from later works. According to the *Sea Around Us* catch database, total catches in the ecosystem increased from 45.7 tonnes in 1950 to 1.19 million tonnes in 2002. The peak catches occurred in 1997, with 1.8 million tonnes. It is worth noting that the catch of distant water fishing nations (DWFNs) increased by over 240% between the 1980s and the 1990s, with a peak catch of 751,500 tonnes in 1988. Moreover, in the

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last three decades, catches by Argentinean vessels in the high seas have declined from about 44% to 17% of the 15 million tonnes caught by all countries between 1970–2000. This despite the increase in the overall catch volume, as shown in the figure.

The countries (or *players*) participating in the squid fishery are Argentina, the Falkland Islands, and DWFNs from Spain, Japan, South Korea, Taiwan, and China. However, at present data are not readily available on the activities of the foreign fleets, so the most important players included in the model were Argentina and the Falkland Islands.

Before estimating the economic benefits of the fishery under both cooperative and non-cooperative scenarios, the parameters related to the biomass and catches were first calculated. It then was possible to calculate the solutions to the model associated with the prevailing prices, fishing costs, and discount rates. We used a parameter, *beta*, to represent the sharing program of the two players. A *beta* equal to 0 or 1, would mean that one of the two countries was the sole owner of the resource, whereas a *beta* of 0.5 would represent equal rights.

When using a seasonal horizon of 10 years, results of the model indicate that the greatest economic benefits are obtained when there is sharing arrangement of between 30-70% between the two countries. When considering catch, the non-cooperative scenario yields the greatest benefits, with a catch volume close to 335,000 tonnes.

Under the cooperative scenario, the largest catches are obtained when a 50/50 sharing rule is in place, providing catches of 227,000 tonnes. Results indicate that as the value of *beta* increases, Argentinean catches increase while those in the Falklands decrease.

The best catches would be obtained in a situation with a single owner (where *beta* equals 0 or 1), both for Argentina and the Falklands. With respect to the average yearly fishing effort for the fleet of the Falklands, catches are always higher in the competitive scenario compared to the cooperative one, including under a single owner, most probably because of the short time horizon of the model (10 years).

For Argentina, the highest levels of effort are

reached in the competitive scenario, in which the Argentinean fleet adopts a dominant position in the fishery. The best results in terms of the amount of standing biomass, however, are obtained in the cooperative scenario. Biomass is always lower in the competitive scenario when comparing the results of the simulation with current trends of the last fifteen years of the fishery. That is, the closest solution to current exploitation pattern of the fishery corresponds to a non-cooperative situation.

In summary, the results of this study are well-correlated with what has occurred in the fishery recently under non-cooperative management. Game theoretic models provide the necessary tools and conditions to estimate the net present value of the current regime and the potential benefits for Argentina and the Falkland Islands to exploit shortfin squid in a sustainable way. It should be noted that both players would obtain better economic benefits in the cooperative scenario because both would reduce their fishing effort and the stock would remain above the reference points recommended by biologists. Experience from around the world demonstrates that strong political commitments, at the highest level of government, are required to make joint management work. Therefore, if both countries decide to develop a more cooperative framework, they would need to have political reinforcements.

To potentially achieve primary and secondary cooperation levels within a long-term perspective, different outcomes should be explored. Firstly, both theory and empirics demonstrate that all who enter long-term relationships benefit, although in an unequal manner (Dasgupta, 2008). Secondly, free riding and compliance should be analysed in detail in order to have a full understanding of the results presented here (Barrett, 2001).

References

- Barret S. (2001). International cooperation for sale. *European Economic Review* (45): 1835-1850.
- Dasgupta, P. (2008). The place of nature in economic development. In Rodrik D, Rosenzweig M. (Eds.) *Handbook of development economics*, Amsterdam: Elsevier, Volume 5, 4977-5046.
- Munro G. (1979). The optimal management of transboundary renewable resources. *Canadian Journal of Economics* 12: 353-376.

