

OCTOPUS FISHING IN RODRIGUES

On the autonomous island of Rodrigues, which lies about 600 km north-east of Mauritius, fishing for octopus – locally called “*ourite*” – has been a traditional economic activity for generations. The fishing is carried out by walking on the reef flats of the gigantic lagoon that surrounds the island (240 km²) and using metal sticks to search the dens in which octopus shelter. In the deeper parts of the lagoon, it can also be carried out using boats from which fishermen handle long spears. Traditionally sun-dried in the villages along the coast, octopus have in the last few decades been systematically collected in order to supply a handful of exporters who ship them, frozen, to Mauritius. A very organized octopus trade sector has therefore appeared, encouraging fishermen – professional or not – to catch more “*ourites*”.

The open access regime that characterizes Rodrigues fisheries and the lack of employment opportunities in other sectors has resulted in a steady increase in the number of fishers. The last census of the EPMU (Economic Planning and Monitoring Unit of the Rodrigues Regional Assembly) in 2012 reported 539 “harpoon fishing” cardholders (187 women and 352 men) and 730 non-registered octopus fishers (178 women and 552 men). However, the fisher card is not mandatory (it is not a license) and occasional or recreational fishing is difficult to quantify, which means that these figures are not sufficient to evaluate the importance of the fishing effort deployed in the lagoon.

The unregulated nature of the fishery has inevitably led to the decline of the stock of *Octopus cyanea*, mainly due to catches of small individuals. Fishery monitoring activities that have been undertaken by local NGO Shoals Rodrigues since 1999, although discontinuous, have regularly recorded important catches of juvenile females (sexually immature), sometimes reaching up to 87% of females landed in some locations. Total landings recorded by FRTU (Fisheries Research and Training Unit) decreased from 774.5 t in 2004 to 268.7 t in 2011.

ADVOCACY FOR A BIOLOGICAL RECOVERY PERIOD

Confirmation of the risk of stock collapse was provided in 2011 with the support of ReCoMaP, a former IOC project focused on the sustainable management of coastal zones. Studies conducted by this project on the *Octopus cyanea* population predicted, by extrapolation, the depletion of the stock by 2015, if nothing was done to reverse the downward trend. These studies also demonstrated the genetically divergent nature of the population of Rodrigues octopus in comparison with other islands in the western Indian Ocean, suggesting that very little genetic flow exists from outside the island; indicating that natural recovery would be almost impossible in the event of stock collapse.

Furthermore studies undertaken by ReCoMaP and Shoals Rodrigues brought evidence that although migration of spawning females outside the lagoon takes place throughout the year it is mainly during the winter that they go out to lay their eggs before dying. Peak recruitment thus occurs in early summer, when juveniles come to populate the warming waters of the lagoon.

Inspired by octopus fishing seasonal closures implemented in southwest Madagascar since 2004, ReCoMaP then began a process of advocacy with Rodrigues authorities, sensitization with schools, and called for a winter closure from August to October and for the respect of the minimum size. To support this approach, the

project financed two study tours to Madagascar for a few fishermen and officials from Rodrigues, including the Minister of Fisheries. Unfortunately, the administration – although seduced by the potential effectiveness of this measure – did not take the plunge and ReCoMaP came to an end before seeing this initiative brought to fruition in Rodrigues.

In early 2012, just after the regional elections, the SmartFish Programme took over and contacted the newly elected team of the Rodrigues Regional Assembly (RRA). Mainly composed of people convinced of the urgency of establishing a biological recovery period, the new administration requested technical and financial support and started preparations for the first “Octopus Closed Season”.



Octopus Fishermen © Toky Rasoloarimanana

PREPARATION OF THE FIRST CLOSURE

Decision of the Executive Council of the RRA to temporarily close the fishery came during the second quarter of 2012 leaving only a few months to develop and enact the new regulation, coordinate the sensitization campaign, set up the closure and organize alternative activities for redundant fishermen (see box “alternative activities”). The project was put under the responsibility of the EPMU, in charge of the coordination with stakeholders – public and private sectors – involved in the various components of the closure scheme (regulation, sensitization, enforcement, etc.). SmartFish was involved in the early work to support the EPMU in its task.

A working group was created under the auspices of the Commission for Fisheries to draft the new regulation that gave legal force to this new management measure. In its first version (<http://faolex.fao.org/docs/pdf/mat116944.pdf>), regulation is fairly minimal since it just prohibits the fishing, landing, collection and possession of octopus during the closed season, which was officially announced through the local press. In order to control the downstream sector, the draft regulation, however, adopted an export and import ban as well as an obligation to declare any stock of octopus – fresh, frozen or dried – exceeding 5 kg before the first day of the closure. After validation by the Rodrigues Regional Assembly, the draft regulation was officially recorded by the National Assembly of Mauritius on July 7, 2012.

Parallel to these developments, a sensitization campaign was launched across the island to ensure proper understanding of the motivations that led to this management decision. In order to support the campaigners who were visiting villages, SmartFish elaborated a “Communication Guide” in a question-and-answer format. Teams of campaigners were trained to use it before being dispatched in groups by area of the coastline. In addition to their

Management of the octopus fishery in Rodrigues



Octopus drying © Yann Yvergniaux

advocacy role, the latter were also given the task of consulting stakeholders and collecting their testimonies, concerns and suggestions to refine the closure scheme in preparation. This campaign through fishing communities targeted 23 villages and landing sites and reached 1,142 people.

In addition to these on-site meetings, radio shows were scheduled from early July to allow listeners to interact with heads of government bodies in charge of the closure (fisheries surveillance officers, Southeast Marine Protected Area managers, experts of the SmartFish Programme, etc.). Radio spots announcing the closure were also broadcasted repeatedly, and posters and t-shirts were distributed across the island through schools and educator teams. Local newspapers also participated in this effort by providing regular information throughout the closure, with a view to deter poaching, but also to facilitate the organization of the alternative activities.

IMPLEMENTATION OF THE FIRST CLOSURE

Octopus fishing was declared closed – for the first time in the history of the island – for two months from 13th August to 12th October 2012. Preparation of the monitoring plan and enforcement of the closure were initially assigned to the Fisheries Protection Service (FPS), which is the police force usually in charge of fisheries control in the lagoon. Despite the additional support

Alternative activities

At the announcement of the foreseen closure, Rodrigues authorities received demands for the compensation of fishers. Indeed, Rodrigues has inherited the “allowances” system from Mauritius, under which registered fishermen may receive financial compensation when bad weather prevents them from going out at sea or when a fishery is temporarily closed, as is already the case for the seine fishery. However, the amount necessary for the daily payment of this allowance to all impacted octopus fishers during the two months would have been a burden for the regional budget, not to mention the dependency that such a system would create.

Therefore RRA decided to opt for a payment for environmental services (PES) policy rather than maintaining its previous compensation policy, both to allow impacted fishermen to participate in income-generating activities during the closure and to implement the action plan of some State departments and NGOs that needed manpower to perform community services.

“Alternative activities” were co-financed by the Rodrigues authorities and SmartFish, and were coordinated by different Commissions of the Regional Assembly (Environment, Fisheries, Public Infrastructure, Agriculture, etc.), local environmental NGOs (Shoals Rodrigues and the Mauritian Wildlife Foundation) and other institutions. They covered a wide range of work from beach clean-ups, to agricultural land rehabilitation, invasive plant species control and maintenance of riverbeds and reservoirs. A training module was also integrated so that fishers could, alternating with community work, attend first aid, swimming and outboard engine maintenance courses, on a voluntary basis. Additional activities were organized in collaboration with the rangers of the SEMPA (South East Marine Protected Area), including participatory monitoring of the seine fishery, maintenance of buoys in the MPA and anti-poaching interventions (sensitization and surveillance).

Beyond these temporary alternative activities, the regional government wanted to promote alternative sources of income in fishing communities. SmartFish has therefore launched a livelihood diversification pilot project focusing on the development of agro-processing and agro-forestry sectors. This project has been coordinated by SmartFish under its Food Security component (FAO) in partnership



Pilot Project © Michel De San

with the RRA's Commission for Women Affairs and Industrial Development and in collaboration with the SEMPA management unit, the Mauritius Wildlife Foundation, the Small and Medium Enterprise Development Agency (SMEDA) and the Forum for Rodrigues Women Entrepreneurs (FFER). Four women cooperatives – formerly engaged in octopus fishing – engaged in the production of lemon and hot pepper-based canned products benefited from this pilot project, which aimed to reduce post-harvest losses, improve processing techniques and promote these products on the local market as well as in Mauritius and abroad. Twenty-two training sessions have been held and the community kitchen “Limon d'Or” was fully equipped. A set of five processed products were developed in a participatory manner and presented in Mauritian supermarkets during the “Rodrigues' Week”.

Following the success of this initiative, it was decided, for the second closure (2013), to extend the pilot project to octopus-derived products with a focus on improving processing techniques while maintaining the nutritional value of “ourites”. It is in this context that a cooking contest was organized and a recipe book dedicated to octopus was published and launched on the occasion of the reopening of the fishery in October 2013.

from SEMPA rangers, the National Coast Guards, the Environment Police and an MCS (monitoring, control and surveillance of fisheries) expert seconded by SmartFish to Rodrigues authorities, the FPS highlighted the lack of human resources and equipment at the early stages of the preparation.

In response to the lack of field staff to monitor the entire lagoon and establish offenses during the first weeks of the closure, decision was taken – midway through the closure – to mobilize groups of fishers enrolled in alternative activities for surveillance shifts. This deployment allowed to limit poaching (to a certain extent) during the second half of the closure and confirmed the need to involve fishers in a participatory monitoring programme, such as the one set up permanently in the SEMPA. Over the total duration of the closure, only a dozen of cases of illegal fishing were reported. However, the effectiveness of the monitoring system was questioned by the authorities, and it is believed that more cases of poaching occurred.

The system also showed some shortcomings on the side of inventory control. Following the requirement to report any possession of octopus exceeding a total of 5 kg prior to the closure, random inspections of fishmongers and restaurants should have taken place to ensure that quantities sold were coming from these reported stocks. Moreover, without an obligation to keep a record of transactions, such checks would probably have been unable to identify illegal quantities with any certainty, and it is believed that illegal supply took place throughout the closure.

RESULTS OF THE FIRST CLOSURE

The post-opening monitoring of the fishery, also funded by SmartFish, demonstrated the short and medium-term benefits of the biological recovery period. An expert from the Albion Fisheries Research Centre was first sent to Rodrigues to propose improvements in the statistical system available to the FRTU. Following this evaluation, the NGO Shoals Rodrigues was appointed, in collaboration with the staff of the SEMPA to clean and update databases available. It was also designated, along with FRTU, for supervising teams of investigators responsible for monitoring catches at landing sites.

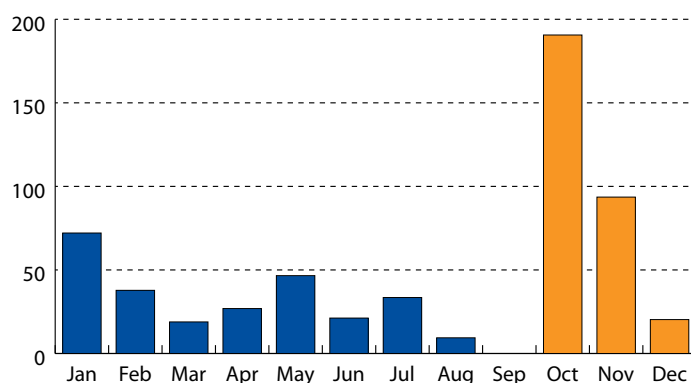
The significant volume landed immediately after the reopening of the fishery was probably the most obvious effect of these two months of closure. Although the increase observed in the beginning was partly due to the unusually high fishing effort during the first days (rush on octopus across the island), the CPUE (catch per unit of effort) which averaged 1.1 lbs per fisher per hour before



Invasive species removal © MWF

the closure was multiplied by 7.6 immediately after the reopening. By extrapolating the data collected by the FRTU at 10 out of 23 landing sites, the total catch for the first day is estimated at 10,281 kg, and landings for the entire month of October 2012 (19 days from the reopening) are estimated at 190.6 t, an average of 10 t per day.

2012 landing (FRTU)



The importance of landings is partly due to the increase of the octopus population during the closure, but is mainly due to their increase in size and weight. Indeed, the available data sets for the months of October to March for three consecutive years allowed for comparing the evolution of the average weight of individuals landed. This showed a net increase for the first month following the closure (1,730 g for males and 1,721 g for females, which



Monitoring © ONG Shoals



Octopus fishing © Yann Yvergnaux

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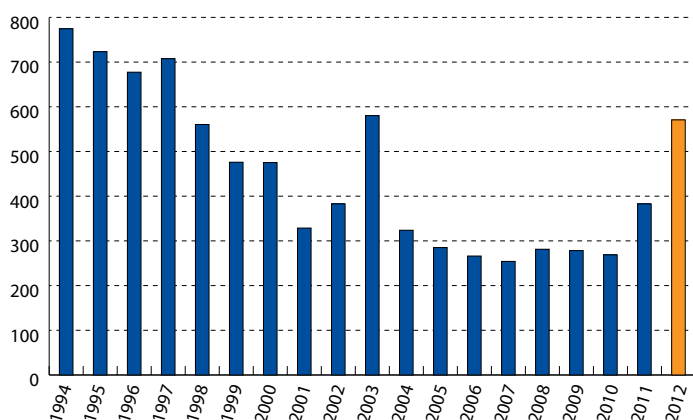


Sensitization © Yann Yvergnaux

is twice the average weight measured during the previous two years) followed by a gradual decrease until stabilization around the levels of previous years. Although encouraging, the average weight observed at reopening remains well below the maximum recorded weight (about 10 kg). Moreover, the percentage of undersized females decreased from 90.2% of females landed in October 2008 to 10.71 % in October 2012, indicating that the initial purpose of the closure – to increase the probability of octopus females attaining maturity to see an increase in recruitment of juveniles to the lagoon in the following summer – had largely been achieved.

Following this first temporary closure, annual landings for 2012 (570.7 t) are almost back to their level of 2003 (580.2 Mt), after having decreased over the past fifteen years. These results are even more compelling as we know that half of this volume was landed during the three months following the closure (fourth quarter 2012). Octopus exports to Mauritius had been steadily decreasing from 278 t in 2005 to 79 t in 2011, the lowest on record; 2012 exports reached a volume of 185 t (excluding significant amounts taken to Mauritius by individuals).

1994-2012 landings (FRTU)



Based on an average first sale price of Rs 40/lbs, it would be fair to say that the increase in production from 2011 to 2012 (estimated at 188 t), resulted in an increase of Rs 16,544,000 to fishers' income, or approximately EUR 400,000. The benefit due to the increase in production can easily be doubled by taking into account the collectors and exporters' margins.

TOWARDS AN IMPROVED CLOSURE SCHEME

The greatest success of the first edition of the "Octopus Closed Season" is the emergence of a belief – both among fishers and within the administration – that it is possible to sustainably manage the fishery, and derive substantial profits. Taking advantage of the momentum created in 2012, the RRA and the SmartFish Programme quickly engaged in the preparation of the second edition, with the aim of improving the previous closure scheme.

The main shortcoming of the first edition was undoubtedly the weakness of control and surveillance, not only because of the lack of resources but also because of a lack of motivation. In addition, there is some reluctance on the part of the administration to punish poaching, fostering a sense of impunity and leaving room for the organization of an illegal trade, which remains difficult to detect in the absence of rigorous monitoring of declared stocks. To address this, the FPS developed a more stringent Monitoring, Control and Surveillance plan, which specifically includes a participatory surveillance component (fishers stationed along the coast to report poaching activities to FPS officers) and a more systematic control of stocks, both at the level of collectors/wholesalers and at the level of restaurants/hotels. Besides better enforcement of the closure itself, FPS will have to ensure that fishers respect the legal size for octopus (7 cm of mantle length, approximately 350 gr) as well as the five Marine Protected Areas (MPAs) all year round.

The second main weakness observed in 2012 was the market distortion caused by the closure. In fact, the sudden abundance at the reopening together with the rush on "*ourites*" had the effect of driving prices down during the first days of fishing (sometimes decreasing by 30%) and saturating the storage capacity of wholesalers. This situation was condemned by fishers who considered that buyers did not "play the game". In order to anticipate this situation and keep control over prices at the reopening, the RRA is considering various solutions for the future, including the provision of additional refrigerated warehouses. Octopus value-addition initiatives will also help to increase the preservation of octopus products, and will therefore help to absorb excess production at reopening.

Understandably, the second edition of the closure, from August 5 to October 6, 2013, did not solve these issues instantly, and local authorities will still have to work together with fishers and traders many times to fine-tune the measures taken and improve the closure, year after year.

Lastly, it is important to note that the "alternative activities" organized occasionally during the first two octopus fishing closures (2012 and 2013) were proposed to fishermen with a view to facilitate the acceptance of this new measure, while evidence of its effectiveness is established. In the future, these temporary activities shall no longer be subsidized (2.5% of the annual budget of the RRA, excluding the contribution of SmartFish) and the "open access" that currently characterizes the fishery should give way to a new access regime which, ideally, would be associated with a self-supported compensation scheme for fishing rights holders.

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