TAHITI DCP 2011

Tuna Fisheries and FADs

RESUMES / ABSTRACTS

Second colloque international : Pêches Thonières et DCP

Second international symposium on : Tuna Fisheries and Fish Aggregating Devices

28 novembre - 2 décembre 2011
TAHITI, Polynésie française

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

REMERCIEMENTS / *ACKNOWLEDGEMENTS*

Partenaires et Sponsors / *Partners and Sponsors*

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

Ifremer

Service de la Pêche
PIHA RAVA'AI

SPC
Secretariat of the Pacific Community

CPS
Secrétariat général de la Communauté du Pacifique

INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION

IRD
Institut de recherche pour le développement

Liberté • Egalité • Fraternité
RÉPUBLIQUE FRANÇAISE

FONDS PACIFIQUE

2011 ANNÉE DES OUTRE MER

Tahiti Fa'ahotu
Pôle d'innovation de Polynésie française

mana
L'INTERNET POLYNÉSIEN

Air Tahiti Nui

BRASSERIE DE TAHITI

Radisson
PLAZA
RESORT TAHITI

Tahiti
TOURISME

COMPOSITION DES COMITES
COMMITEE MEMBERSHIP

Comité de Pilotage
Steering committee

Michel BLANC, SPC - Nouvelle-Calédonie
Priscille Tea FROGIER, REC - Polynésie française
Loïc GOURMELEN, Ifremer - France
Hélène GUEGUEN, Tahiti Fa'ahotu - Polynésie française
Pierre MERY, DRRT - Polynésie française
Christian MORETTI, IRD - Polynésie française
Bruno PEAUCELLIER, SRI Présidence - Polynésie française
Tiare PENILLA Y PERELLA, SPE - Polynésie française
Mainui TANETOA, SPE - Polynésie française
Marc TAQUET, Ifremer - Polynésie française
Bruno UGOLINI, MRM - Polynésie française
Stephen YEN KAI SUN, SPE - Polynésie française

Comité Scientifique
Scientific committee

Michel BLANC, SPC - Nouvelle-Calédonie
Laurent DAGORN, IRD - France
Alain FONTENEAU, IRD - France
Jean-Claude GAERTNER, UPF - Polynésie française
René GALZIN, CRIOBE/EPHE/CNRS - France
Paul GERVAIN, POLKA - France/Antilles
Olivier GUYADER, Ifremer - France
Martin HALL, IATTC - USA
Kim HOLLAND, Hawaii University - USA
David ITANO, Hawaii University - USA
Beatriz MORALES-NIN, CSIC/UIB - Espagne
Lionel REYNAL, Ifremer - France/Antilles
Marc TAQUET, Ifremer - Polynésie française

ORGANISATION DES SESSIONS

Session 1 - Pêcheries artisanales et DCP ancrés

Session 2 - Pêcheries industrielles sur DCP ancrés ou dérivants

Session 3 - Compréhension du phénomène agrégatif

Session 4 – Impacts écosystémiques des DCP

Session 5 – Impacts socio-économiques des DCP

Session 6 – Posters

SESSION SCHEDULE

Session 1 – Artisanal Fisheries and moored FADs programs

Session 2 – Industrial fisheries on moored and drifting FADs

Session 3 – Understanding the phenomenon of aggregation

Session 4 – Ecosystem impacts of FADs

Session 5 – Socio-economic impacts of FADs

Session 6 – Posters

Table des matières

Planning – Tahiti DCP 2011
Schedule – Tahiti FAD 2011

Lundi 28 novembre – *Monday, November 28*

07:30 - 09:00	Accueil des personnalités et des participants à la conférence *Welcoming personalities and participants to the conference*
09:00 - 10:30	Cérémonie d'ouverture & Discours officiels *Opening Ceremony and Official speeches*
10:30 - 10:50	**Conférence introductive** - ***Introductory speech*** Pourquoi parler des DCP ? *Marc Taquet, coordinateur scientifique*
10:50 - 12:30	**Session 1 : Pêcheries artisanales et DCP ancrés** ***Session 1 : Artisanal fisheries and moored FAD programs***
10:50 - 11:10	› Nearshore FAD types and designs currently used in the Pacific *William Sokimi et Michel Blanc*
11:10 - 11:30	› Fish Aggregating Device deployments and maintenance on Guam *Jamie Bass*
11:30 - 11:50	› American Samoa FADs Program *Nonumaifele Tuisamoa*
11:50 - 12:10	› Les DCP ancrés à Wallis et Futuna *Bruno Mugneret*
12:10 - 12:30	› Cook Islands National FAD Programme *Terakura Tatuava*
12:30 - 14:00	Déjeuner - *Lunch*
14:00 - 15:40	**Session 1 : Pêcheries artisanales et DCP ancrés** ***Session 1 : Artisanal fisheries and moored FAD programs***
14:00 - 14:20	› Regional overviews of the use of anchored and drifting FADs (Palau) *Lora Demei*
14:20 - 14:40	› Marshall Islands FAD Programme *Candice Guavis*

14:40 - 15:00	› Tuvalu National FAD Programme *Samuelu Telii*
15:00 - 15:20	› Les DCP ancrés en Nouvelle-Calédonie: historique, technologie, utilisation et perspectives *Manuel Ducrocq*
15:20 - 15:40	› Le programme d'ancrage des DCP en Polynésie française *Mainui Tanetoa et Stepen Yen Kai Sun*
15:40 - 16:10	Pause café – *Coffee Break*
16:10 - 17:30	**Session 1 : Pêcheries artisanales et DCP ancrés** ***Session 1 : Artisanal fisheries and moored FAD programs***
16:10 - 16:30	› Overview of the current status of FAD deployments in Australian waters *Daniel Spooner*
16:30 - 16:50	› Mediterranean FADs fishery: an overview *Beatriz Morales-Nin*
16:50 - 17:10	› The Maltese FADs fishery *Mark Gatt*
17:10 - 17:30	› Les DCP ancrés dans les petites Antilles, avancée des connaissances depuis 10 ans et questions soulevées par le développement durable *Lionel Reynal et Nicolas Diaz*
17:30 - 17:50	› Status of Fish Aggregating Device (FAD) fisheries in Tonga *Sione Mailau*

Mardi 29 novembre – *Tuesday, November 29*

Heures	événement
08:00 - 09:20	**Session 1 : Pêcheries artisanales et DCP ancrés** ***Session 1 : Artisanal fisheries and moored FAD programs***
08:00 - 08:20	› Le DCP du parc collectif de Guadeloupe, conception, études et fabrication. *Paul Gervain*

Heures	événement
08:20 - 08:40	› Le parc de DCP collectifs de Guadeloupe, suivi et entretien. *Paul Gervain*
08:40 - 09:00	› La courantologie associée au DCP et les perspectives de mutualisation des parcs de DCP collectifs *Paul Gervain*
09:00 - 09:20	› Le parc de DCP collectifs de Martinique, d'Haïti et de Mayotte *Paul Gervain*
09:20 - 10:10	Pause café – *Coffee break*
10:10 - 12:15	**Session 1 : Pêcheries artisanales et DCP ancrés** ***Session 1 : Artisanal fisheries and moored FAD programs***
10:10 - 10:30	› 20 ans après : les DCP côtiers ancrés réunionnais face à de nouveaux défis *David Guyomard, Sandra Hohmann et Claire Bissery*
10:30 - 10:50	› La pêche artisanale et les DCP aux Comores *Aboubacar Oirdi Zahir*
10:50 - 11:10	› Development of the Fish Aggregating Devices Fishery in Mauritius *Sunil Panray Beeharry,*
11:10 - 11:30	› An Account of Premature FAD Loss in the Maldives *Mohamed Shainee, Bernt Leira et Ali Naeem*
11:30 - 11:50	› Finite Element Model for FAD *Daniel Priour*
11:50 - 12:10	› Coastal FAD development in Samoa *Autalavou Tauaefa*
12:15 - 14:00	Déjeuner - Lunch
14:00 - 15:40	**Session 2 : Pêcheries industrielles sur DCP ancrés ou dérivants** ***Session 2 : Industrial fisheries on moored and drifting FADs***
14:00 - 14:30	› An overview of world FAD fisheries by purse seiners, their impact on tuna stocks and their management *Alain Fonteneau*
14:30 - 15:00	› Logs, FADs and Payaos: Towards consistency in definitions and characterization *Martin Hall*

Heures	événement
15:00 - 15:20	› The fisheries on floating objects of the Eastern Pacific *Martin Hall et Marlon Roman*
15:20 - 15:40	› An overview of FAD-based fisheries and FAD issues in Indonesian archipelagic waters *Mohamad Natsir et Craig Proctor*
15:40 - 16:10	Pause café
16:10 - 18:00	**Session 2 : Pêcheries industrielles sur DCP ancrés ou dérivants** ***Session 2 : Industrial fisheries on moored and drifting FADs***
16:10 - 16:30	› FADs fishery in the Gulf of Thailand: time to manage *Pavarot Noranarttragoon, Piyachock Sinanan, Nantachai Boonjohn, Pakjuta Khemakorn, Amararatne Yakupitiyage*
16:30 - 16:50	› FAD Programs in Papua New Guinea and their Commercial Uses *Samol Kanawi*
16:50 - 17:10	› Federated States of Micronesia FAD Management Plan *Naiten Bradley Phillip Jr*
17:10 - 17:30	› Status of FADs in Solomon Islands *Lionel Luda*
19:00 - 21:30	Cocktail au Haut-Commissariat – *High Commissioner Cocktail*

Mercredi 30 novembre – *Wednesday, November 30*

Heures	événement
08:00 - 09:40	**Session 3 : Compréhension du phénomène agrégatif** ***Session 3 : Understanding the phenomenon of aggregation***
08:00 - 08:20	› Using fish aggregating devices (FADs) as observatories of pelagic ecosystems *Laurent Dagorn, Kim Holland, Fabien Forget, Jon Lopez, John Filmalter, Marianne Robert, Manuela Capello, Mariana Travassos, Marc Soria, Gala Moreno, Frédéric Ménard, Jean Deneubourg*

Heures	événement
08:20 - 08:40	› Social interactions and aggregation processes at FADs *Marianne Robert, Jean-Louis Deneubourg et Laurent Dagorn*
08:40 - 09:00	› Interplay between physical and social phenomena may explain the behavioral plasticity of tuna (Thunnus albacares) associated with an array of floating objects *Marianne Robert, Laurent Dagorn, Jean-Louis Deneubourg, Kim Holland et David Itano*
09:00 - 09:20	› Islands and FADs; just how sticky are they? *David Itano, Kim Holland et Laurent Dagorn*
09:20 - 09:40	› Behavior of Skipjack (Katsuwonus pelamis) and Yellowfin (Thunnus albacares) tuna in an array of Anchored FADs around the Maldive Islands *Riyaz Jauharee, Rodnay Godiven, John Filmalter, Fabien Forget, Shiham Adam, Marc Soria, Laurent Dagorn*
09:40 - 10:10	Pause café – *Coffee break*
10:10 - 12:30	**Session 3 : Compréhension du phénomène agrégatif** ***Session 3 : Understanding the phenomenon of aggregation***
10:10 - 10:30	› The Influence of FADs on the Vertical Distribution of Yellowfin Tuna in Hawaii *Kim Holland, David Itano et laurent Dagorn*
10:30 - 10:50	› Quantifying the spatial structure of fish aggregations around FADs at the micro- and mesoscale from field-based modeling and acoustic data analysis *Manuela Capello, Marc Soria, Pascal Cotel, Jean-Louis Deneubourg, laurent Dagorn*
10:50 - 11:10	› Aggregation of early juvenile yellowfin tuna with payaos in the Philippines *Yasushi Mitsunaga et Ricardo Babaran*
11:10 - 11:30	› Temporal patterns of small and large pelagic fish species under drifting and anchored FADs *Manuela Capello, Marc Soria, Laurent Dagorn, Kim Holland, Sunil Panray Beeharry, Fabien Forget, John Filmalter*
11:30 - 11:50	› Species composition and diversity of fish assemblages associated to anchored FADs in the Western Indian Ocean *Fabien Forget, Frédéric Ménard, Bastien Mérigot, Ian Robinson, Jean-Claude Gaertner, Paul Cowley, Shiham Adam, Yoosuf Rilwan, Mira Hurbungs, Meera Konjul, Marc Taquet, Laurent Dagorn*

Heures	événement
11:50 - 12:10	› On the role of FADs in the ecology of juvenile silky sharks *John Filmalter, Fabien Forget, Michel Potier, Paul Cowley, Laurent Dagorn*
12:10 - 12:30	› Do seamounts act as mooring FADs? *Morato Telmo, Simon Hoyle, Valérie Allain, Simon Nicol*
12:30 - 14:00	Déjeuner - *Lunch*
14:00 - 15:30	**Session 4 : Impacts écosystémiques des DCP** ***Session 4 : Ecosystem impactq of FADs***
14:00 - 14:30	› Impacts of FAD fishing on the ecosystem *Laurent Dagorn, Kim Holland, Victor Restrepo, Gala Moreno*
14:30 - 14:50	› Bycatches in FAD fisheries *Martin Hall et Marlon Roman*
14:50 - 15:10	› Benefiting from Innovations in Sustainable and Equitable Management of Fisheries on Trans-boundary Tuna's in the Coral Triangle and Western Pacific (BESTTuna) *Paul van Zwieten et Simon Bush*
15:10 - 15:30	› Overview of exploitation and ecology of pelagic fish associated with offshore drifting and anchored FADs in the WCPO *Bruno Leroy, Valérie Allain, Simon Nicol, Shelton Harley, John Hampton, Peter Williams*
15:30 - 16:10	Pause café – *Coffee break*
16:10 - 18:00	**Session 4 : Impacts écosystémiques des DCP** ***Session 4 : Ecosystem impactq of FADs***
16:10 - 16:30	› Mitigating tropical tuna purse seine bycatch *Laurent Dagorn et Victor Restrepo*
16:30 - 16:50	› Survival rate of silky sharks (Carcharhinus falciformis) caught incidentally onboard French tropical purse seiners *Francois Poisson, Anne-Lise Vernet, John Filmalter, laurent Dagorn*
16:50 - 17:10	› Using fishers' echo-sounder buoys for remote discrimination of bycatch - *Jon Lopez,Gala Moreno et Laurent Dagorn*

Heures	événement
19:00 - 21:30	**Plate-forme technique – *Technical platform***
19:00 - 21:30	**6- Posters**

› Involving tuna fishers in bycatch reduction research: the ISSF Skippers Workshops
Jefferson Murua, LaurentDagorn, Martin Hall, David Itano, Gala Moreno, Victor Restrepo

› Catch composition in small-scale tuna fisheries associated to data buoy moored in the Western equatorial Atlantic
Guelson da Silva, Humberto Hazin, Antônio Fonteles-Filho

› Historique des DCP à Mayotte
Johanna Herfaut

› Que mangent les poissons pêchés sous les DCP ancrés ?
Lionel Reynal, Thomas Roussel et Josselin Chantrel

› Elaboration d'une barge en aluminium pour l'ancrage des DCP en Polynésie française
Mainui Tanetoa

› DCP nouvelle génération : un outil de pêche comme plateforme pour l'observation des cétacés, Guadeloupe, Petites Antilles françaises.
Cédric Millon, Nadège Gandilhon, Paul Gervain, Gilles Nolibe, Max Louis, Olivier Adam

Jeudi 1 décembre – *Thursday, December 1*

Heures	Evénement
08:00 - 09:40	**Session 5 : Impacts socio-économiques des DCP** ***Session 5 : Socio-economic impacts of FADs***
08:00 - 08:20	› Economic Benefits of Fish Aggregating Devices in the South Pacific *Michael Sharp*

Heures	Evénement
08:20 - 08:40	› Le rôle de l'investissement dans la pêche sous DCP. Le cas de la flottille thonière française de senneurs dans l'Océan Indien *Patrice Guillotreau, Frédéric Salladarré, Patrice Dewals, Laurent Dagorn*
08:40 - 09:00	› Exploring fishermen behaviour around Moored FADs : the example of air plane survey and vessels positioning system in Guadeloupe and Martinique. *Olivier Guyader, Lionel Reynal et Manuel Bellanger*
09:00 - 09:20	› Fishing strategies, economic performance and management of moored FADs in Guadeloupe *Olivier Guyader, Manuel Bellanger et Lionel Reynal*
09:20 - 09:40	› Hawaii Community FADs: strategic locations, data collection, and cooperative research *Eric Kingma et David Itano*
09:40 - 10:10	Pause café – *Coffee break*
10:10 - 12:00	**Session 5 : Impacts socio-économiques des DCP** ***Session 5 : Socio-economic impacts of FADs***
10:10 - 10:30	› Moored Fishing Aggregating Devices development in Martinique: Review and Outlook after 20 years *Lionel Reynal et Olivier Guyader*
10:30 - 10:50	› Fishing technology associated to a data buoy moored in the Western Equatorial Atlantic: impacts and benefits *Guelson da Silva et Antônio Fonteles-Filho*
10:50 - 11:10	› Towards sustainable FAD fishery in the WIO region. Efforts and milestones explored *Emmanuel Mbaru*
11:10 - 11:30	› The Secretariat of the Pacific Community's library *Stéphanie Watt*
12:00 - 14:00	Déjeuner - *Lunch*
14:00 - 15:40	**Table ronde** - Conception et Technologie des DCP ancrés : longévité et efficacité ***Round Table*** *- Balencing anchored FAD design for costs, longevity and aggregation efficiency*
15:40 - 16:10	Pause café

Heures	Evénement
16:10 - 18:00	**Table ronde** - Impacts socio-économiques et gestion des programmes DCP régionaux ***Round table*** *- Socio economic impacts and management of domestic FAD programs*

Vendredi 2 décembre – ***Friday, December 2***

08:00 - 09:40	**Table ronde** – DCP dérivant : Comment gérer cet outil dangereusement efficace ? ***Round Table*** *- Drifting FAD: how to manage this efficient but dangerous fishing tool?*
09:40 - 10:10	Pause café
10:10 - 12:30	**Table ronde** - Les priorités de recherche sur cette double thématique DCP ancrés et dérivants ? ***Round Table*** *- Research priorities on both drifting and anchored FADs?*
12:30 - 14:00	Déjeuner – *Lunch*
14:00 - 15:40	**Synthèse de la conférence –** ***Conference Synthesis***
15:40 - 16:10	Pause café
16:10 - 17:00	**Conclusion**

Nearshore FAD types and designs currently used in the Pacific

Sokimi William [1], Blanc Michel [2,*]

1 : Secrétariat de la Communauté du Pacifique (CPS)
BP D5, 98848 Noumea Cedex, Nouvelle Calédonie (Nouvelle-Calédonie)
2 : Secrétariat de la Communauté du Pacifique (CPS)
BP D5, 98848 Nouméa Cedex (Nouvelle-Calédonie)
* : Auteur correspondant

While, until recently, anchored FADs in the Pacific region were typically deployed several miles offshore, a growing trend is to moor them closer to the reef edges. Those nearshore FADs are becoming popular because they are seen to be effective in aggregating fish; they are cheaper to construct and easier to deploy; they reduce fishing operations costs; and they improve the safety of fishers in case of small craft accidents or engine breakdowns during FAD fishing operations. Nearshore FADs also contribute to food security and provide coastal fishing communities with alternatives to reef fisheries. One of the challenges common to nearshore FAD programmes in the Pacific region is to keep the FADs moored long enough to cover the cost of producing them and to provide long term returns before they break away and are replaced. The key problem areas that affect FAD longevity are vandalism and design faults in the anchor mooring system and the hardware used in joining sections. SPC and several Pacific Island Countries and Territories are addressing those problems, mainly through intense FAD awareness promotion, prosecution of vandalising offenders, and improved designs with the use of pressure floats and innovative mooring methods and systems. In places where the threat of vandalism is still high, another innovation, that may also address the longevity issue, is to deploy subsurface FADs. Sub-surface FADs of different designs have already been deployed in Fiji, Tonga, Samoa, Pohnpei, and Kiribati, with some encouraging preliminary results.

Fish Aggregating Device deployments and maintenance on Guam

Bass Jamie [1,*]

1 : Division of Aquatic and Wildlife Resources (DAWR)
163 Dairy Road Mangilao 96913 (Guam)
* : Auteur correspondant

Fish Aggregating Devices were deployed on Guam in the hopes of providing better opportunity for sustenance and small scale commercial pelagic fisherman. Most fishermen realized that longer distances were traveled to yield a favorable catch. The first two FADs were deployed in 1979 and currently 14 FAD locations are utilized. Designs, locations, permitting requirements and the number of FADs have changed over the years due to funding, frequent loss of buoys and the naturally occurring higher catch rate on the windward parts off the island. Data collected from creel surveys conducted on boat based fisherman by the Division of Aquatic and Wildlife Resources and reports from local fisherman outside sample days suggest better catch rates on fishing trips utilizing the FADS. Some reports indicated that the FAD immediately started working just hours after deployment. Additionally, fishermen without sophisticated electronics use the Fads as waypoints to help plot more efficient fishing trips. The importance of FADS on Guam is evident in the frequent use and dissent of fisherman as FADS become detached from mooring further justifying the maintenance of the current 14 FAD locations surrounding Guam.

American Samoa FADs Program

Tuisamoa Nonumaifele [1,*]

1 : Department of Marine and Wildlife Resources
PO Box 3730 Pago Pago Amercian Samoa (Samoa américaines)
* : Auteur correspondant

The American Samoa Department of Marine and Wildlife Resources Fish Aggregating Devices Program started in 2004 It is funded by the Sportfish Restoration and Enhancement grant from the United States Fishery and Wildlife Service Am Samoa uses the aluminum raft design believed to be originated in Samoa Because of the high cost associated with the FAD program personnel materials mooring and anchor plus deployment expenses the DMWR management wanted to deploy and maintain only six FADs --five FADs around the main island of Tutuila and one FAD around the Manu a islands Most FADs are deployed at the south part of Tutuila Island where most people reside and where the Pago Harbor the canneries boat ramps and the marina for the artisanal fishery are located All FADs are deployed offshore at three or more miles from land Maintenance check if the FADs are in position check the mooring line the connections and the raft itself- are carried out by the FAD technicians every quarter using a chartered alia or the Office boat These trips are recorded in a maintenance form and if there is a problem it is noted on the check list form and it will used to plan out activities for the next quarter The recreational fishery the alia troll fishery and the local alia longline boat fish around the FADs or in the vicinity of the FADs in almost a daily basis The fishing trips by these boats are recorded on the participation form the during a boat count run We will check out which boat is not in port and if a boat is missing it is assumed to be out fishing When a fishing trip returns the fishermen are interviewed to collect information about the time they went fishing how long they were fishing number

Les DCP ancrés à Wallis et Futuna

Mugneret Bruno [1,*]

1 : Service des Affaires Rurales et de la Pêche
Service des Affaires Rurales et de la Pêche
BP 19 98600 Mata Utu Wallis et Funtuna (France)
* : Auteur correspondant

Initié en 1992 grâce à du matériel reçu des accords de pêche avec les Coréens, le programme DCP des îles Wallis et Futuna a démarré par l'implantation de 2 DCP à Wallis et 1 à Futuna. La localisation des sites et le montage des DCP (de type « lourd ») a bénéficié de l'appui technique de la CPS. Ces premiers DCP ont tenu 4 ans. Le programme a ensuite été interrompu jusqu'en 2004, où il a été repris grâce à des financements de l'Etat en collaboration avec l'association de pêcheurs de loisir et le groupement des pêcheurs professionnels pour la maîtrise d'oeuvre. Les DCP lourds ont été remplacés, sur les mêmes positions, par des structures légères de type « océan indien ». Fin 2008, les DCP posés en 2004, perdus, ont été remplacés et complétés par deux autres à Wallis. Le DCP de Futuna a été renouvelé en 2009. Contrairement à celui de Futuna, les quatre DCP posés à Wallis ne sont plus en place actuellement (longévité entre 18 et 30 mois). Ils seront remplacés en novembre 2011 par 6 nouveaux DCP de type océan indien. Le programme s'inscrit dans une stratégie de diversification des zones de pêche et s'adresse d'abord à la petite pêche professionnelle, avec l'objectif corollaire de réduire la pression de pêche commerciale sur le lagon. Les DCP sont essentiellement utilisés par les pêcheurs de loisir et sportifs, qui ciblent le thazard du large, le thon jaune, le marlin et la bonite, à la traîne. Les pêcheurs professionnels boudent encore cet outil, par méconnaissance des techniques (malgré une formation à la palangre verticale en 2008) et surtout en raison de la difficulté à se procurer le matériel.

Cook Islands National FAD Programme

Tatuava Terakura [1,*]

1 : Ministry of Marine Resources
PO Box 85 Rarotonga Cook Islands (Îles Cook)
* : Auteur correspondant

The development of anchored Fish Aggregation Device FAD s in the Cook Islands began in 1981 This initiative was seen as a means of improving pelagic fish availability reducing the cost of fishing operations and to improve sea safety The introduction of FADs was also accompanied by introduction of various new fishing technologies FADs have improved alternative income generation either for part time full time fishers and tourism related fishing charters The Ministry of Marine Resources also sees FADs as a means of ensuring food security for both the domestic population and tourism sector In the Cook Islands various alterations have been made to the Standard Secretariat of the South Pacific FAD design from float design aggregates the mooring system and the anchor system to try and improve FAD longevity and at the same time reduce cost of FADs while ensuring there effectiveness What is currently in use are the steel spar and Indian Ocean float design the mooring system compiling nylon rope for the upper portion and polypropylene rope for the lower mooring system Rope size range from 14-22mm three strand although eight and twelve strand ropes have been used The anchor blocks are generally concrete however heavy discarded steel engines have been used Cook Islands have deployed both deep water FADs 800 meters and shallow water FADs between 250-500 meters From our experience FAD maintenance either through the use of SCUBA gear or using airbags to retrieve as much as possible the upper portion of the FADs is crucial to improved longevity During FAD maintenance coral fishing gear such as hooks and tangled monofilament are found and removed Fishing gear interaction with FADs appears to be the main concern with FADs FADs longevity has improved since the introduction of the Seychelles type designs FADs longevity is generally over

Status of Fish Aggregating Device (FAD) fisheries in Tonga

Mailau Sione [1,*]

1 : Fisheries Division of Ministry of Agriculture & Fodd, Forest and Fisheries (MAFFF)
Fisheries Division of Ministry of Agriculture & Fodd, Forest and Fisheries
PO Box 871 Nuku'alofa Tonga (France)
* : Auteur correspondant

The primary purpose of Tonga's national FAD programme is to assist with the development of domestic fisheries in Tonga. FADs have been used, with varying success, around the Tongan islands since the 1980's. In the early 1990's, the FAD program was expanded to the northern groups of Ha'apai and Vava'u and, in 2004, several FADs were deployed at the northern-most islands of Niua Foou and Niu Toputapu. In 2007, FAD work was one of the main activities under the Community-Based Fisheries Management Programme (Special Management Areas), in an attempt to try and to relieve fishing pressure in inshore areas. Four FADs were deployed under this program in the Ha'apai group. Later, in 2008 - 2009, two more FADs were deployed in Tongatapu and Vava'u under the same program. Two types of FADs are used in Tonga, the floating FAD and the sub-surface FAD. Currently, the sub-surface design is predominantly used due to a number of problems encountered with the floating design. The FAD fishery is still under developed in Tonga, however, the Fisheries division is seeking renewed assistance to strengthen the development of this fishery.

Regional overviews of the use of anchored and drifting FADs (Palau)

Demei Lora [1,*]

1 : Bureau of Marine Resources - Ministry of Resources & Development
Bureau of Marine Resources - Ministry of Resources & Development
P.O. Box 359 Koror PW 96940 (France)
* : Auteur correspondant

Outer island communities of Palau have always benefitted from drifting wood and debris that aggregate pelagic fish. In 1980 the Secretariat of the Pacific Community (SPC) introduced a man made FAD and continued a second FAD Program from 1990 to 1994. It supported the introduction of four types of FADs - the McIntosh, Seychelles, Indian, and Hawaiian Sphere Steel designs. All designs aggregated fish, however strong winds proved fatal for these designs. The culprit to lose a FAD is that the inverse catenary loop may be too long and get chaffed by coral and wind & current bringing the FADs close to shallow coral. It is also speculated that a 2 ton anchor splits upon impact with the sea bed and the tugging on the anchor eventually cracks completely letting loose the whole system. Another factor is that during calm weather, the inverse catenary loop would surface and fishing vessel run over the rope and cut with the propeller. Over two decades, the Bureau of Marine Resources made many changes relating to the size of shackles, swivels, ropes, and floats and still problems occur. FAD deployed in March 2005 was active for 485 days and was suspected to have been vandalized. Two FADs were recently deployed however one has been reported missing after strong winds. The FAD components are costly, but the main concern for Palau is how all components can be specifically identified relative to their durability that could ensure longevity of the system. In this outcome the utilization of FADs can have greater impact to the sustainability of coastal fisheries, food security, job opportunities, diversity of ecotourism, and the overall socio-economic development in Palau.

Marshall Islands FAD Programme

Guavis Candice [1,*]

1 : Marshall Islands Marine Resources Authority (MIMRA)
Marshall Islands Marine Resources Authority (MIMRA)
PO Box 860 Majuro 96960 (Îles Marshall)
* : Auteur correspondant

The Marshall Islands has a long history of fishing and Marshallese people have always relied on harvesting of marine resources for food security. Fish aggregating devices (FAD) were first introduced in 1986 by the Overseas Fishery Foundation Cooperation (OFCF) of Japan in Majuro and Arno atolls. Several FADs were deployed and prompted interest but never followed through as a program. In early 2007, MIMRA secured PDF funding through FFA to procure four sets of FADs to promote sustainable fishing and food security through FAD fishing in the Marshall Islands. Three FADs were deployed and have shown to be productive over a two week period; however, were lost. The extra FAD was deployed in 2009 and has shown to be very productive. By 2009, another set of 3 FADs, again through PDF funding, were secured and successfully deployed with onsite technical assistance by SPC. All FADs deployed within Majuro Atoll are offshore, Indian Ocean designs. Trolling is the main fishing technique used around FADs with catches of yellowfin (Thunnus albacores), skipjack (Katsuwonus pelamis), mahimahi (Coryphaena hippurus), wahoo (Acanthocybium solandri) and marlin (Makaira spp) on some occasions. Monitoring of the FADs is done every three months to inspect its flotation, mooring rope, underwater hardware etc. Data collection system is through face to face consultations with local fishermen using SPC's Artisanal Tuna Logbook, which will later then be entered to TUFMAN-Artisanal database at MIMRA. With the rising fuel costs and other economic factors, FADs have shown to be effective and has a drastic positive impact on the fishing community.

Tuvalu National FAD Programme

Telii Samuelu [1,*]

1 : Fisheries Department (FD)
Fisheries Department Ministry of Natural Resources & Lands Funafuti TUVALU (Tuvalu)
* : Auteur correspondant

The Tuvalu National Fish Aggregating Device (FAD) Programme was initiated back in the early 80s when FADs were first introduced to Tuvalu by the South Pacific Commission now known as the Secretariat of the Pacific Commission. Since their introduction to the late 80s, a total number of 20 - 25 devices were deployed. The programme was revived in the early 90s on funding under the Deep Water Snapper Project with a total of 11 FADs for the country each distributed to all the islands. The programme became non-active and finally stops in 2000. In 2010, it was revived again with funding from the Government of Tuvalu of 8 units. Lack of financial support from aid donors and the government hindered the development and continuity of the programme. This has led to increasing pressure to the inshore reef fisheries on all islands that causes overfishing in the past years. The latest change in approach of the programme in 2010 is by handing over of unit devices ownership to Fishermen Associations on each island to manage, maintain and replace if needed. Each Fishermen Association was provided with data sheets for data collection. A variety of species were fished from different fishing methods around FADs but the most common species that also targeted is tuna. Reports from fishers indicated that the programme has benefited fishers' and their fishing businesses as they now earned profits as well as communities with an ongoing supply of fish.

Les DCP ancrés en Nouvelle-Calédonie: historique, technologie, utilisation et perspectives

Ducrocq Manuel [1,*]

1 : ADECAL (Programme ZoNéCo)
Immeuble centre sud, 1 bis rue Berthelot, BP 2384 98846 NOUMEA Cedex (Nouvelle-Calédonie)
* : Auteur correspondant

La Nouvelle-Calédonie est un archipel Français d Océanie situé dans l Océan Pacifique à 1200 km de l Australie et 1500 km de la Nouvelle Zélande Son organisation institutionnelle résulte des accords de Matignon et de Nouméa Elle est divisée en 3 Provinces Nord Sud et Iles Loyauté On distingue 3 grands types de pêche en Nouvelle-Calédonie la pêche hauturière à la long line qui vise le thon germon la pêche artisanale qui exploite essentiellement la ressource récifo-lagonaire et la pêche plaisancière qui génère des débarquements importants difficiles à quantifier en raison de l absence de programme de suivi adapté Les premiers DCP ont été posés par le service territorial de la marine marchande en 1984 Historiquement ce sont les DCP de type Océan Indien qui sont employés en Nouvelle-Calédonie La fragilité de la partie supérieure des DCP face aux agressions extérieures à conduit le service de la marine marchande et les services des pêches provinciaux à étudier des nouvelles pistes technologiques Même si le recours au câble inox à permis d augmenter la durée de vie des DCP les problèmes d électrolyse ont entrainé de nombreuses pertes qui ont conduits à poursuivre les investigations Les essais conduits avec du nylon monofilament de fort diamètre ont apporté des améliorations notables du comportement à la mer du DCP mais n ont pas solutionné le problème des agressions extérieures Même s il convient de distinguer les spécificités des pratiques de pêche propres à chaque Province l utilisation des DCP par les pêcheurs côtiers tend à se généraliser en Nouvelle-Calédonie et plus particulièrement dans le Provinces Sud et Iles Ce sont les Provinces qui financent les programmes de pose Pour permettre une meilleure appropriation de ces outils par les pêcheurs des formations ont été dispensées et des livrets de vulgarisation ont été édités

Le programme d'ancrage des DCP en Polynésie française

Tanetoa Mainui [1,*], Yen-kai-sun Stephen

1 : Département Développement Pêche Hauturière (SPE)
BP20 Motu Uta 98713 - Papeete - Tahiti (Polynésie française)
* : Auteur correspondant

Démarré au début des années 80 le programme DCP entièrement financé et géré par le service de la pêche SPE du Pays a permis d accompagner le développement de la flottille côtière en Polynésie française et cible essentiellement l archipel de la Société qui rassemble plus de 85 de la flottille côtière Le premier DCP fut ainsi mis en place le 12 juin 1981 Les premiers dispositifs métalliques volumineux et co teux ont été progressivement remplacés par des dispositifs légers de type Payao moins co teux aussi efficaces nécessitant une logistique plus rudimentaire pour leur ancrage et ayant résisté à des épisodes cycloniques Aujourd hui ce programme a été étendu aux archipels éloignés pour pallier à la raréfaction des ressources récifo-lagonaires mais également à la recrudescence de la ciguatéra dans un but essentiel de sécurité alimentaire Depuis ces 3 dernières années un transfert technologique a pu être assuré auprès de certaines organisations professionnelles qui procèdent dorénavant à l ancrage et à la gestion de leur propre DCP Au total 480 DCP ont été mouillés par le SPE autour de certaines îles de l ensemble des archipels de la PF par des profondeurs variant entre 100 et 2500 mètres et distant de 1 à 8 miles nautiques des côtes Aujourd hui 50 DCP dont 6 financés exclusivement par les organisations professionnelles de pêche constituent le parc de DCP de la PF accessibles par l ensemble des utilisateurs du domaine public maritime professionnels pêche de subsistance plaisanciers pêche charter Les espèces ciblées sont la bonite le germon le thon jaune le marlin bleu le mahimahi et thazard espèces très appréciés et valorisées sur le marché local L arrêté n 1661 CM du 4 décembre 2000 réglemente les activités de pêche autour du DCP interdisant notamment toute pêche dans un rayon de 100m

Overview of the current status of FAD deployments in Australian waters

Daniel Spooner [1,*]

1 : Department of Primary Industries - Fisheries (DPI)
DPI Information Centre, GPO Box 4440, Melbourne VIC 3001 (Australie)
* : Auteur correspondant

Australia has a substantial recreational fishing sector, with many millions of people across the country ?wetting a line' on a regular basis. In Australia, Fish Aggregation Devices (FADs) are generally installed for the direct benefit of recreational fishers by providing new target fishing locations. These FADs provide a focal point for fishing activities where fishers primarily target fast growing, short lived pelagic species. They are usually installed in tropical waters to attract pelagic species such as dolphinfish and tunas. In Australia, FAD programs operate in New South Wales, Queensland and Western Australia. FAD deployments in the southern waters of Australia (Victoria) are currently being considered. Species such as yellowtail kingfish, southern bluefin tuna, albacore tuna, blue shark, mako shark and dolphinfish are regularly being taken by recreational fishers. FADs may have the potential to increase opportunities for targeting these species. This presentations will provide a broad overview of the current status of FAD deployments in Australian waters. Consideration of the southern FAD deployments will be covered, providing some context to why FADs may be increasingly effective in these waters.

Mediterranean FADs fishery: an overview

Morales-nin Beatriz [1,*]

1 : Mediterranean Institute Advanced Studies-CSIC/UIB (IMEDEA)
CSIC
Miquel Marqués 21, 07190 Esporles (Espagne)
* : Auteur correspondant

Traditionally the small scale fleet on the central (Sicily, Malta, Tunisia) and western Mediterranean (Mallorca) targets dolphinfish (Coryphaena hippurus)seasonally from summer to fall, deploying moored FADs and fishing with a special surrounding net. This fishery employs low technology, FADs being made with recycled materials. Drifting FADs are used opportunistically. The by-catch is composed by Seriola dumerili and Naucrates ductor which are commercialised. The catches are composed of 0-age fish, spawned in spring or early summer, with abundances fluctuating strongly depending on the recruitment and environmental parameters. The fish are marketed fresh with prices depending on abundance. The fishery management has different degrees of control depending on the country. The common measures are on effort control applying closed sessions, restricted access (registered boats) and spatial delimitations of FADs deployment. Recently in Mallorca some initiatives to keep the prices profitable have been developed based on self-regulation on the landings and product diversification.

The Maltese FADs fishery

Gatt Mark [1,*]

1 : Agriculture and Fisheries Regulation Department of Malta (MRRA)
Fort San Lucjon, Marsaxlokk BBG 1283 (Malte)
* : Auteur correspondant

The beginning of the Maltese FADs fishery is not known but the main species targeted by this fishery, Dolphinfish, was already consumed locally from the 18th century. Pilot fish (Naucrates ductor), Seriola dumerili, Polyprion americanus and Thunnus thynnus are the main bycatch species of this fishery. Up to the 1960's, two large tubular masses of cork slabs several layers thick were used as floats for the construction of these moored FADs. The two float masses were also eventually replaced by one single float composed of expanded polystyrene slabs. Palm fronds are also tied to the ?kannizzati? as it was discovered that algae and other growths encrusted on palm fronds floating in the sea had very good fish aggregating potential. The net used for the FAD fishery is a modified purse seine, in view of the absence of pursing rings. The size of the net depends on the size of the operating boat. Fishermen fish these anchored FADs either during the day or the night. The FAD fishery in Malta is allowed to operate only between 15th August to 31st December of each year and the number of vessels participating in the dolphinfish FAD fishery around the Maltese archipelago is not to exceed 130. Each boat is allotted a single rimja. A minimum number of 30 FADs needs to be deployed however, there is no imposition on the maximum number of FADs deployed. The maximum number of FADs deployed ranged from 300 ? 400 during the fishing seasons of 2005 ? 2009 where the maximum number of licensed fishing vessels was of 110. Sizes of the fishing vessels ranging from a minimum length overall of 3.63 m to a maximum of 21.95m.

Les DCP ancrés dans les petites Antilles, avancée des connaissances depuis 10 ans et questions soulevées par le développement durable

Reynal Lionel [1,*], Diaz Nicolas [2]

1 : Ifremer - UR de Martinique
IFREMER RBE-RHANTILLES
Pointe Fort 97231 Le Robert (Martinique)
2 : Comité des Pêches de la Guadeloupe (CRPMEM)
Pointe à Pitre (Guadeloupe)
* : Auteur correspondant

Depuis 10 ans, la pêche aux DCP ancrés a poursuivi son développement dans les petites Antilles. Cette pêche émergente a pris une importance différente selon les pays. Du fait de son intérêt avéré pour les pêcheries artisanales insulaires, elle a soulevé un ensemble de questions. Pour tenter d'y apporter des réponses, un groupe de travail a été créé sous l'égide de la FAO/COAPCO (Commission Pêche de l'Atlantique Centre Ouest) et des travaux de recherche ont été conduits en inter session. Ce papier fait la synthèse des questions soulevées par les aménageurs et des avancées réalisées dans des domaines divers tels que la conception des dispositifs, la gouvernance des parcs de DCP, l'impact de cette pêche sur les ressources exploitées, la connaissance des principaux stocks ciblés, les agrégations observées à proximité des DCP, les techniques de pêche utilisées et leur sélectivité ou la qualité des produits. L'importance de la prise en compte de tous ces éléments pour le développement durable de la pêche associée aux DCP est soulignée.

Le DCP du parc collectif de Guadeloupe, conception, études et fabrication.

Gervain Paul [1,*]

1 : PLKMarine (PLK)
Allée des cocotiers 97120 Saint-Claude (Guadeloupe)
* : Auteur correspondant

La technologie des DCP a fait l'objet d'importants travaux dans les Petites Antilles depuis deux décennies. Un bilan a été dressé en 2007, lors d'une session du groupe de travail « DCP ancré des Petites Antilles » de la FAO. Sur la base de ce bilan, on a examiné les évolutions souhaitables du DCP artisanal traditionnel. Les 3 principales ont été : l'insubmersibilité du dispositif (qui permet l'utilisation de feux et équipements), l'utilisation d'une mono bouée (qui assure une moindre vulnérabilité aux abordages) et le perfectionnement des lignes d'ancrage (pour éviter la rupture dans les 300 premiers mètres depuis la surface). Un cahier des charges détaillé a été élaboré pour le flotteur. Il concerne la flottabilité, la résistance à l'immersion, l'anneau d'ancrage et les équipements et accessoires. Le logiciel DCP d'IFREMER a été utilisé pour analyser les choix et la répartition des différents éléments de la ligne d'ancrage. Une protection anodique des parties métalliques du dispositif a été étudiée. Sur la base de ces études un premier DCP a été construit et posé en janvier 2008. Depuis 4 ans, la conception générale de ce DCP a fait ses preuves ; des variantes, modifications et expérimentations ont été effectuées. Certaines sont toujours en cours là où des améliorations sont encore accessibles.

Le parc de DCP collectifs de Guadeloupe, suivi et entretien.

Gervain Paul [1,*]

1 : PLKMarine (PLK)
Allée des cocotiers 97120 Saint-Claude (Guadeloupe)
* : Auteur correspondant

Depuis janvier 2008, la Guadeloupe a déployé 40 DCP mono bouées de 600 litres de flottabilité autour de l'Archipel. La maintenance des parcs de DCP est un problème récurrent (tant technique que financier) qui, dans la région, n'a jamais été résolu de façon satisfaisante. Une nouvelle approche est possible grâce la surveillance des dispositifs par géo localisation GPS. Le suivi continu depuis 2008 permet de présenter, sur 1400 jours, les événements survenus et les interventions faites sur le parc, ainsi qu'une analyse fine des causes et des fréquences de rupture de ligne d'ancrage Les résultats obtenus sur le parc de DCP guadeloupéen doivent être évalués de manière comparative. L'optimisation du rapport entre coûts (déploiement et entretien) et longévité du DCP reste l'objectif. Mais le choix d'un type de DCP doit aussi tenir compte des moyens financiers et techniques disponibles et des contraintes spécifiques (réglementation, trafic maritime ....) de chaque région.

La courantologie associée au DCP et les perspectives de mutualisation des parcs de DCP collectifs

Gervain Paul [1,*]

1 : PLKMarine (PLK)
Allée des cocotiers 97120 Saint-Claude (Guadeloupe)
* : Auteur correspondant

De la position instantanée des DCP, obtenue par le système de surveillance, on a déduit avec une bonne précision la direction du courant et obtenu une indication sur son intensité. Ces éléments, utiles aux pêcheurs pour la préparation de leur sortie, ont été mis en ligne sur Internet et actualisés 2 fois par jour. Ces données courantologiques issues des DCP ont suscité assez d'intérêt pour amener une réflexion plus globale sur l'utilisation des DCP. Les DCP peuvent ainsi devenir des plateformes délivrant de multiples informations grâce à des capteurs de tout genre avec des objectifs variés : - sécurité de la navigation (AIS) - connaissance de l'activité autour du DCP (hydrophones) - collecte de données environnementales (météo, océano) Des réalisations ont déjà eu lieu et concernent la surveillance des mammifères marins pour l'UAG et des mesures météo et océanographiques pour le PAG (Port Autonome de la Guadeloupe). Un projet est en cours d'élaboration ; il sera présenté au Pôle Mer Bretagne (pôle de compétitivité) pour labellisation. Il se propose de concevoir et construire un prototype de DCP prééquipé (énergie, AIS, systèmes de stockage et de transmission de données) capable d'accueillir de nombreux types de capteurs. L'objectif est d'attirer de nouveaux utilisateurs pour faciliter le financement ou l'entretien des parcs de DCP.

Le parc de DCP collectifs de Martinique, d'Haïti et de Mayotte

Gervain Paul [1,*]

1 : PLKMarine (PLK)
Allée des cocotiers 97120 Saint-Claude (Guadeloupe)
* : Auteur correspondant

Les parcs de DCP collectifs de Martinique, Haïti et Mayotte (33 DCP au total) sont constitués de DCP chapelets renforcés. Ils sont montés sur la base des DCP chapelets utilisés depuis 20 ans dans de nombreuses régions, mais présentent des parties renforcées et des particularités de montage. Un premier bilan peut être esquissé notamment depuis le parc Martinique où ils ont été fortement exploités, sans entretien, depuis 20 mois. Ce bilan peut être complété avec les données d'Haïti, où ils sont en place depuis un an, et celles de Mayotte où ils ont été plus récemment déployés.

20 ans après : les DCP côtiers ancrés réunionnais face à de nouveaux défis

Guyomard David [1,*], Hohmann Sandra, Bissery Claire

1 : Comité Régional des Pêches Maritimes et des Elevages Marins (CRPMEM)
Comité National des Pêches Maritimes et des Elevages Marins
47, rue Evariste de Parny, BP 295, 97827 Le Port Cedex, La Réunion (France)
* : Auteur correspondant

Les Dispositifs de Concentration de Poissons (D.C.P.) côtiers ancrés ont été introduits à La Réunion en 1988 par l'Ifremer, grâce au soutien des collectivités locales. Suite à un processus d'appropriation progressif réussi par les pêcheurs professionnels réunionnais, les DCP ancrés ont, au cours des années 1990, relancé un secteur à bout de souffle. Ils ont notamment dynamisé l'organisation économique et sociale de la pêcherie artisanale réunionnaise, par l'apparition de nouvelles techniques de pêche, la modernisation des embarcations, ainsi que le développement d'infrastructures collectives à terre améliorant les conditions de débarquement et de commercialisation. Depuis, l'organisation collective de la gestion du parc, confiée au CRPMEM de La Réunion, a permis d'impliquer les pêcheurs dans la fabrication des engins, leur pose, leur entretien ou encore la recherche d'amélioration technologique des outils. Aujourd'hui, de nouveaux défis se posent pour la pérennité de cet outil : question de la rentabilité des DCP par rapport au coût de leur entretien, participation plus significative des pêcheurs dans leur financement, partage de la zone côtière avec d'autres acteurs...Le CRPMEM de La Réunion a engagé une étude depuis septembre 2010, dans le but de i) de mettre à jour les connaissances sur l'utilisation de cet outil par les pêcheurs professionnels réunionnais via une enquête sur les usages et perceptions ii) de connaitre l'efficacité économique de ce « modèle DCP » via un suivi embarqué. Le premier axe a été mené, grâce à une enquête détaillée réalisée auprès de 103 patrons pêcheurs (52% du total de petite pêche), qui a permis d'apporter des éléments concernant l'utilisation actuelle des DCP ancrés, les conflits d'usage et la gestion de ces outils. Des variables thématiques synthétiques ont ensuite été établies sur la base des réponses à ce questionnaire, afin de dégager d'une part les grandes modalités techniques liées aux usages des pêcheurs sur DCP ancrés, et d'autre part les perceptions et aspects « sociologiques » des pêcheurs vis-à-vis des DCP ancrés (« schémas mentaux »). Une typologie technique et sociologique a ainsi pu être proposée à partir de ces variables thématiques, permettant de mieux comprendre le profil et l'évolution récente des pêcheurs sur DCP à La Réunion. Il ressort d'abord de cette typologie qu'une large part des pêcheurs (70%) reste très attachée aux DCP ancrés, dont une majorité de manière très dépendante (51%). Une tendance inquiétante, sans doute liée aux problèmes récents de renouvellement et d'entretien du parc de DCP ancrés, est qu'une part significative de ces pêcheurs (30%) déclare de nouveau s'orienter vers les ressources démersales côtières, par essence fragiles et limitées...Ces résultats montrent l'importance de considérer les DCP côtiers ancrés comme un véritable outil d'aménagement durable des pêches dans la bande côtière, et serviront à la deuxième partie de l'étude, en cours de réalisation, pour collecter des données plus précises sur la rentabilité des entreprises de petite pêche réunionnaise exploitant les DCP ancrés.

La pêche artisanale et les DCP aux Comores

Oirdi Zahir Aboubacar [1,*]

1 : INRAP (Institut National de Recherche, de l'Agriculture et de la pêche)
BP 41 Moroni (Comores)
* : Auteur correspondant

La pêche est un secteur important non seulement au niveau national, mais aussi sur le plan social si l'on tient compte de son existence dans des villages éloignés, enclavés où elle constitue un pôle d'activité et la source la plus importante de protéines animales du pays. L'utilisation des Dispositifs de Concentration de Poissons (DCP), comme une nouvelle activité intermédiaire, entre la pêcherie artisanale et la pêcherie au large pour donner accès aux grands pélagiques fréquentant le voisinage des accores, à des distances de l'ordre de 2 à 10 km vers le large, espèces non accessibles à la pêcherie artisanale traditionnelle (pirogue), permet une très bonne exploitation de ces dernières. La motorisation des embarcations et l'introduction de nouvelles techniques pour la pêche des grands pélagiques ont apporté une rapide augmentation des débarquements.

Development of the Fish Aggregating Devices Fishery in Mauritius

Beeharry Sunil Panray [1,*]

1 : Tuna/FAD 2011
Ministry of Fisheries and Rodrigues
Tahiti (Maurice)
* : Auteur correspondant

The Fish Aggregating Devices (FADs) fishery was introduced in 1985 with the aim to relocate the artisanal fishermen from the heavily exploited lagoon areas to the open sea, with a view to increasing their catch and concurrently reducing fishing pressure in the lagoon.The Fish Aggregating Devices (FADs) designed in Mauritius is composed of reinforced plastic floats mounted on two strings of polyamide rope and moored to the sea bed with polypropylene rope. 27 FADs have been set around the island at distances of 3 to 10 nm from the shore and at depth ranging from 400 to 3 000 m. The main species caught around FADs are tuna, dolphinfish, wahoo and skipjack. The common fishing techniques are trolling, handlining, vertical longlining and the drift line. Some 400 registered lagoon fishermen supported by an appropriate training program have successfully been redeployed to the FAD fishery. A sample-based data collection system is in place since 2008. Landing from the FAD fishery is estimated to some 300 tons. The catch per fisherman day is 27 kg which is much higher compared to the catch of 5 kg from the lagoon.

An Account of Premature FAD Loss in the Maldives

Shainee Mohamed [1,*], Leira Bernt [2], Naeem Ali [3]

1 : Norwegian University of Science and Technology (NTNU)
Otto Nielsens v 10, 7491 Trondheim (Norvège)
2 : Department of Marine Technology (NTNU)
7491 Trondheim, Norway (Norvège)
3 : Ministry of Fisheries and Agriculture
Ameeru Ahmed Magu, Male (Maldives)
* : Auteur correspondant

Fishermen have been using FADs for more than half a century (and much is now known about the behavior and biology of tunas and other pelagic fishes), however, the reason why FADs attract fish still remains largely unexplained. Regardless, the resultant fact is undeniable that a large amount of various fish species aggregate around FADs and the prospective result in terms of fish capture is highly appealing. However, the unpredictable durability and premature loss of these devices together with a large quantity of fish attracted to them is a major concern for FAD users. The premature loss of FADs have been linked with possible sources such as incompatible design and material used in the FAD systems, fish bites on the mooring line, mooring line failure due to the inability to resist the environmental forces, the submergence and collapse of the buoy due to low reserve buoyancy in the system, and FADs being dragged into deeper water due to inadequate holding capacity. The aim of this paper is to make an account of possible causes of premature FAD loss in the Maldives since the inception of the FAD program in 1981. First, the paper will look into some possible causes of earlier FAD loss in the Maldives and the consecutive improvements to the FAD design in the Maldives to overcome this problem. Then, the authors will look into numerical results investigating the possibility of premature FAD loss due to mooring rope failure, inadequate buoyancy and anchor holding capacity. The paper shows that the current mooring line sizes are adequate for the environmental forces experienced by FADs in the Maldives. The results strongly suggest that the small anchor weight might be the primary cause of premature FAD loss in the Maldives.

Finite Element Model for FAD

Priour Daniel [1,*]

1 : REM-RDT-HO
IFREMER
Technopole, 29281, Plouzané (France)
* : Auteur correspondant

A finite element model devoted to flexible marine structures such as FAD is described. The structures is made of cables, floats, moorings. The main hypothesis are that cables are split in bar elements, the current in constant in amplitude and direction, wave is mono-chromatic. The virtual work principle is used to calculate the forces on nodes. The forces taken into account are: tension in cables, weight, buoyancy, bending stiffness of cables, hydrodynamic loadings from current and waves. The equilibrium of the structure is calculated using Newton-Raphson method. Results are given for FAD of 2000 m long, in 1500m deep, current of 1m/s and wave of 12m high.

Coastal FAD development in Samoa

Taua Autalavou [1,*]

1 : Samoa Fisheries Division
Samoa (Samoa)
* : Auteur correspondant

The offshore FAD program was first introduced in Samoa in the early seventies targeting pelagic species mainly tuna. The tuna industry has since developed successfully with many fishermen now familiar with FAD fishing.In the fiscal year 2007-2008, the estimated catch of albacore tuna (Thunnus alalunga) was 3.704 metric tons. Those results helped to promote coastal FADs in communities with established fish reserves under the Samoa Community Based Fisheries Management Program (CBFMP).The coastal FAD program started in 2009. Its primary objectives are to reduce fishing pressure on reefs and lagoons, provide canoe fishermen with alternatives, increase food security and livelihoods of local communities and strengthen management of fish reserves. In August 2009, six near-shore FADs were deployed: two bamboo surface FADs at Savaii island and four sub-surface, Okinawa-type FADs at Upolu island. These devices were anchored at about 60 ? 150 meters from the barrier reef. The two surface FADs were reported missing in February 2010 and were replaced, in April 2011, withtwo sub-surface FADs. Coastal FADs need to be cheap to construct and deploy, durable enough to withstand adverse sea conditions, and vandalism-proof. Canoe fishermen should be able to easily locate the FADs using land marks. Community awareness workshops were conducted to facilitate sustainable management of the program and introduce FAD fishing technology, sea safety and data collection. The coastal FAD program in Samoa is still at an early stage therefore the Fisheries Division will continue to work closely with communities to monitor the coastal FADs and their socio-economic and biological impacts.

An overview of world FAD fisheries by purse seiners, their impact on tuna stocks and their management

Fonteneau Alain [1,*]

1 : Institut de Recherche pour le Développement (Sète) (IRD)
IRD
Bd Jean Monnet, B.P. 171, 34203 Sète Cedex (France)
* : Auteur correspondant

Cette conférence fait un bilan comparatif des pêches sur objets flottants dérivants (Dispositif de concentration des poissons, DCP), naturels et artificiels, par les thoniers senneurs intertropicaux. Les statistiques de pêche sont tout d'abord analysées ; elles conduisent à estimer que la prise sous DCP, initiée il y a une vingtaine d'années, atteint environ 1.3 million de tonnes, soit 55% de la prise des senneurs, durant la dernière décennie. Cette comparaison met en évidence les zones de pêche et les tendances annuelles dans chaque océan, ainsi que la composition spécifique et les tailles des thons capturées dans chaque océan. La pêche sous DCP vise principalement le listao, toujours majoritaire dans les captures (Les prises sur FADs contiennent 76% de listaos), mais aussi les petits albacores et petits patudos qui y sont présents à un degré variable. Les prises significatives de petits patudos sous les DCP sont une source de sérieuses préoccupations dans toutes les commissions thonières, mais leurs conséquences restent difficiles à estimer du fait des fréquentes et sérieuses incertitudes statistiques et biologiques (en particulier sur la mortalité naturelle des petits patudos). Cette comparaison porte ensuite sur les résultats des observateurs scientifiques et évoquera les prises accessoires sous DCP des espèces non ciblées. La pêche sous DCP introduit de sérieux problèmes potentiels dans les évaluations des stocks, parce qu'ils modifient potentiellement la biologie des thons associés (hypothèse du piège écologique), et assurément la nature des efforts de pêche, les zones de pêche et les tailles et espèces de thons capturées. Ils soulèvent ainsi des problèmes de gestion qui sont de plus en plus discutés, tant par les scientifiques que par les commissionnaires des diverses Commissions thonières. Il semble que l'emploi excessif de DCP dérivants, tel qu'il est actuellement observé dans certaines régions, s'il a permis d'accroître les captures de listaos de manière durable, puisse générer de sérieux problèmes de surexploitation de certaines ressources, en particulier des stocks de patudos. Les mesures adoptées ou envisagées par les diverses commissions thonières afin de limiter les effets négatifs des FADs sont présentées et discutées.

Logs, FADs and Payaos: Towards consistency in definitions and characterization

Hall Martin [1,*]

1 : Inter-American tropical Tuna Commission
8604 La Jolla Shores Dr la Jolla, CA 92037 (États-Unis)
* : Auteur correspondant

The rapid expansion of the FAD fisheries requires that we achieve consistent definitions of the different types of floating objects used by the tuna purse seiners, and consistent characterization of the types of sets involved. This will allow us to compare across oceans, stratify data sets for estimation, and other purposes. I propose to use ?LOGS? for encountered objects, ?FADs? for drifting objects deployed or modified by the fishers with the intention to revisit them, and ? PAYAOS? for anchored objects. The differences among types will be discussed based on data from co-occurring sets. A set on an object will be defined by the encirclement of the object or by taking place at some distance from the object (0.5 mile?). Dead animals will be included in the Log category, while living animals (whales or whale sharks) will be a separate category. A form called Flotsam Information Record is been used by IATTC to describe the FADs, and is available at: http://www.iattc.org/Downloads.htm, under Purse seine observer forms. The usefulness and purpose of the different fields will be discussed. The issue of individual identification of the FADs will be discussed.

The fisheries on floating objects of the Eastern Pacific

Hall Martin [1,*], Roman Marlon

1 : Inter-American tropical Tuna Commission
8604 La Jolla Shores Dr la Jolla, CA 92037 (États-Unis)
* : Auteur correspondant

Setting on tuna schools associated with floating objects has been a component of the purse seine fishery from its beginnings. It was based on sets on logs or branches that had been carried out to sea by the tropical rivers of the region at the beginning of the rainy season. In the early 1990s, the ?dolphin-safe? policy adopted by some canneries forced many boats to search for tuna in alternative ways, and, after some unsuccessful attempts in some regions, the fleet found a region where devices deployed by the fishers (Fish Aggregating Devices, FADs) were very productive. The fishery on Fish Aggregating Devices expanded at a fast pace, and increased the range and the production of the fishery in a major way. We will describe the log set fishery, the transition to the FAD fishery, and the operational characteristics. The change in fishing method resulted in a major geographical change, a significant targeting change from yellowfin to skipjack, and a transition from a seasonal to a year round fishery. After some experimentation, the design of the FADs began to converge, but there is still a fluid situation, where new concepts (material, shape, operational modes, equipment, etc.) are introduced and tested with frequency. We will cover the geographical expansion, the evolution of the construction, the major operational modes, characteristics of sets, etc. for the eastern Pacific region.

An overview of FAD-based fisheries and FAD issues in Indonesian archipelagic waters

Natsir Mohamad [1], Proctor Craig [2,*]

1 : Research Institute for Marine Fisheries (RIMF)
Jl. Muara Baru Ujung, Jakarta 14440 Indonesia (Indonésie)
2 : CSIRO Marine and Atmospheric Research (CSIRO)
GPO Box 1538, Hobart, Tasmania 7000, Australia (Australie)
* : Auteur correspondant

Indonesia's pelagic fisheries resources are of high economic importance to the nation's economy and equally, if not more important, as a domestic food resource. Anchored FADs (rumpon) have been a significant feature in Indonesia's pelagic fisheries for many decades. FAD construction varies regionally, with significant differences between western and eastern Indonesia. Surface structures for FADs include steel pontoon, bamboo raft (rakit), and bamboo raft with bungalow. Subsurface components include natural (coconut palm branches) and artificial (plastic streamer) materials. Depth of anchorage varies from in-shore coastal (

FADs fishery in the Gulf of Thailand: time to manage

Noranarttragoon Pavarot [1,*], Sinanan Piyachock [2], Boonjohn Nantachai [3], Khemakorn Pakjuta [4], Yakupitiyage Amararatne [5]

1 : Asian Institute of Technology (AIT)
P.O. Box 4, Klong Luang, Pathum Thani 12120, Thailand (Thaïlande)
2 : Eastern Marine Fisheries Research and Development Center
2 Phe, Muang, Rayong 21160 (Thaïlande)
3 : Chumphon Marine Fisheries Research and Development Center
408 Paknam, Muang, Chumphon 86120 (Thaïlande)
4 : Southern Marine Fisheries Research and Development Center
79/1 Wichianchom Rd., Bo-yang, Muang, Songkhla 90000 (Thaïlande)
5 : Asian Institute of Technology
P.O. Box 4, Klong Luang, Pathum Thani 12120 (Thaïlande)
* : Auteur correspondant

Fish aggregating devices (FADs) in the Gulf of Thailand are made of bamboo poles, twisted wire and coconut leaves, and fastened to a concrete block. Purse seines with 2.5 cm mesh size are used to surround the fish by fishing boats ranging from 18-28 m overall length. Fishing grounds are in the central Gulf of Thailand at the depth of 25-60 m. Catch per unit effort (CPUE), species composition and size of economically important species were analyzed by collecting the data from fishing boats using FADs at six main fishing ports along the Gulf of Thailand during January-December 2007. The results show that average CPUE was 3,351.36 kg day-1 which composed of 88.07% pelagic fishes, 5.13% demersal fishes, 4.33% trash fishes and 2.47% squids and cuttlefishes. The major pelagic species were Indian mackerel (Rastrelliger kanagurta), Indian scad (Decapterus russelli) and bigeye scad (Selar crumenophthalmus) which were 25.37%, 23.65% and 8.24% of total catch respectively while small tunas (kawakawa; Euthynnus affinis, frigate tuna; Auxis thazard thazard and longtail tuna; Thunnus tonggol) were 8.26% of total catch. The mean length of 10 economically important species were smaller than size at first maturity while 2 species were larger than size at first maturity. The results indicated that juvenile fish were largely caught by FADs fishery which may led to fisheries resources depletion and loss in economy. Although there is a set of measures to control the use of purse seines, effective management of the FADs capacity is urgently needed also.

FAD Programs in Papua New Guinea and their Commercial Uses

Kanawi Samol [1,*]

1 : National Fisheries Authority (NFA)
11th Floor, Deloitte Tower, Port Moresby N.C.D. (Papouasie-Nouvelle-Guinée)
* : Auteur correspondant

The size of the industrial scale tuna fishery has increased through time and is clearly evident in Papua New Guinea (PNG), which has an extremely productive fishing area. Currently FADs are limited to 1000 in the purse seine fishery, 30 for the pump boat fishery and a handful for the artisanal fishermen in New Ireland and Madang. Design of FADs differs according to the area of use. The industrial purse seine fleet are the predominant users of off-shore FAD and the pump boats and dories for near shore FADs utilising Vertical and Mini horizontal long line, trolling and hand lines. Tuna and tuna like species make up the bulk of the catch along with associated by catch such as rainbow runners, billfish, oceanic trigger fish, sharks and various bait species. FAD deployment and maintenance for the purse seine fishery is done by the companies and deployment is monitored under a Fad management policy. Pump boat and dories utilize FADs deployed by donor funding and are monitored by the provincial fisheries offices. An inshore FAD program is currently underway in PNG. Main socio-economic effects for the inshore FAD program include food security; relieve fishing pressure on reefs, ownership and fishing rights amongst others.

Federated States of Micronesia FAD Management Plan

Phillip Jr. Naiten Bradley [1,*]

1 : National Oceanic Management Authority
P.O. Box PS 122 Kolonia, Pohnpei FSM 96941 (États fédérés de Micronésie)
* : Auteur correspondant

The 200 mile Exclusive Economic Zone (EEZ) of the Federated States of Micronesia (FSM) covers roughly 1,000,000 square kilometers of ocean. It is one of the largest fishing zones in the Western and Central Pacific Ocean (WCPO). The key target species are skipjack, bigeye, and yellowfin tuna. Fishing revenues from domestic and foreign fishing vessels comes from principal fisheries operating in the FSM: purse seine, longline, and pole-and-line. Like many other Pacific Island countries, the FSM is concerned about the use of drifting Fish Aggregating Devices (FAD) deployed and used by purse seine vessels in the FSM EEZ. These FADs may be unsustainable both in a biological and an economic sense. The government of the FSM recognised such potential adverse impacts of fishing on drifting FADs and developed a FAD Management Plan in 2009. Elements of this FAD Management Plan apply variously to FSM-flagged purse seine vessels and all foreign flagged purse seine vessels operating in the FSM EEZ under license. The Plan also includes anchored FAD and other FAD that fits the overriding definition of a FAD. The FSM FAD Management Plan is under continual review to ensure that management decisions are well informed with respect to the impact of FAD fishing mortality on vulnerable species such as juvenile bigeye, yellowfin and other non-target species. As a member of the Parties to the Nauru Agreement (PNA), the FSM has implemented a three-month FAD closure inside the EEZ as part of its conservation and management measures with respect to bigeye and yellow fin tuna. Additional scientific monitoring, technical support, and funding is necessary to for further our understanding of the impacts of fishing on drifting FADs in the FSM EEZ and the appropriate management responses to such impacts.

Status of FADs in Solomon Islands

Luda Lionel [1]

1 : Ministry of Fisheries and Marine Resources (MFMR)
P. O. Box G13, Honiara, Solomon Islands (Îles Salomon)

Solomon Islands, with the current trend of inshore marine resources exploitation, their primary source of diet protein will become scarce. With a majority of Solomon Islanders living in rural and coastal communities, some communities are faced with potential hardship from declining fish supply in years to come. FADs were introduced to the Solomon Islands by Solomon Tayio Co. Ltd as early as 1973 to support their fleet of pole & line boats. NFD (National Fisheries Development) Co. Ltd started in 1984 with pole & line boats and two purse seiners. FAD design with 16mm pp rope, 2/3 concrete drum anchor and bamboo raft, NFD 250, STL 110 FADs. The national inshore FAD program was identified by the Solomon Islands government as part of the Ministry of Fisheries and Marine Resources(MFMR) Inshore Fisheries Strategy as a medium term goal to deploy FADs as part of CBRM activities. From March up to September 2011, a total of 15 FADs deployed and 5 had been lost due to sabotage/vandalism within 2 - 4 weeks after deployment. In Malaita province, with community initiatives, materials were acquired through their MPs, provincial fisheries staff helped to rig and deploy 10 FADs within the last 3 years but have lost 2. All FADs are nearshore, surface, moored FADs while 2 in Marovo and 1 in Langalanga are lagoon FADs. Fishing techniques used - Solomon Tayio & NFD ? Pole & line and Purse-seining Community fishermen - Trolling, Drop stone, Jigging Main species caught ? Yellowfin tuna, Skipjack tuna, Bigeye tuna and Albacore tuna while Community fishermen target all pelagic species that are edible and valuable. Monitoring, maintenance and data collection (catch) is undertaken by the WorldFish Center in collaboration with MFMR staff, PFOs and CBRM partners. The purpose of the FADs is for food security, income generation and fishing diversification. The FAD program is managed by a steering committee comprising of WorldFish and MFMR staff, is funded by NZaid, deployed by WorldFish and MFMR staff, while monitoring is done By WorldFish, MFMR and CBRM partners. Fishermen do FAD observational monitoring. The program is for 3 years (2011-2013).

Using fish aggregating devices (FADs) as observatories of pelagic ecosystems

Dagorn Laurent [1,*], Holland Kim [2], Forget Fabien [1,3], Lopez Jon [4], Filmalter John [1,5], Robert Marianne [1], Capello Manuela [6], Travassos Mariana [7], Soria Marc [6], Moreno Gala [4], Ménard Frédérique [8], Deneubourg Jean-louis [9]

1 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
2 : University of Hawaii
Hawaii (États-Unis)
3 : South African Institute for Aquatic Biodiversity (SAIAB)
Grahamstown , South Africa (Afrique du Sud)
4 : AZTI
Herrera Kaia - Portualdea z/g E-20110 Pasaia (Gipuzkoa) (Espagne)
5 : South African Institute for Aquatic Biodiversity (SAIAB)
Private Bag 1015, Grahamstown, 6140 (Afrique du Sud)
6 : Institut de Recherche pour le Développement (La Réunion) (IRD)
IRD
IRD - Université de la Réunion - Ile de La Réunion (France)
7 : Universidade Federal Rural de Pernambuca (UFRPE)
Brazil (Brésil)
8 : Institut de Recherche pour le Développement (IRD)
UMR 212
Av. J. Monnet, 34203, Sete (France)
9 : USE (Unit of social Ecology)
Université Libre de Bruxelles, Campus de la Plaine, Boulevard du triomphe, Bat NO 5et 1050 Ixelles, Bruxelles, Belgique. (Belgique)
* : Auteur correspondant

Many pelagic species aggregate around floating objects and so far, fishers have been more efficient than scientists in exploiting this behaviour. In addition to fishing on natural objects, fishers have been using FADs to enhance their catches of tropical tunas and other pelagic species. Research activities on fish at FADs are mainly aimed at improving our understanding of this associative behaviour and assessing the effects of FADs on fish ecology. However, the observation of pelagic species is inherently difficult, primarily due to the immensity of the pelagic habitat, the highly vagile behaviour of pelagic species and the fact that they are difficult to access. Here we propose a new use for FADs: in addition to fishing tools, FADs could become scientific aids to assist in improving our knowledge of pelagic ecosystems. Due to their abilities to naturally aggregate a wide variety of pelagic species, FADs represent micro "hot spots" of pelagic ecosystems and therefore provide an excellent opportunity to cost effectively investigate the nature of this immense realm. Even now, information collected by fishers could already provide scientists with very valuable data (e.g. those from echosounders buoys). Moreover, by equipping FADs with appropriate scientific instruments, they could become ideal scientific observation platforms for the regular collection of valuable data which can then be used to improve stock estimates of tropical tunas and other species (i.e. deriving fisheries-independent assessments which are not currently possible) and for the monitoring of the regional species diversity of open ocean pelagic ecosystems. In addition, fishers could actively participate in research by being in charge of deploying and maintaining such instrumented networks.

Social interactions and aggregation processes at FADs

Robert Marianne [1,*], Deneubourg Jean-louis [2], Dagorn Laurent [1]

1 : Institut de Recherche pour le Développement (IRD)
UMR 212
Av. J. Monnet, 34203, Sete (France)
2 : USE (Unit of social Ecology)
Université Libre de Bruxelles, Campus de la Plaine, Boulevard du triomphe, Bat NO 5et 1050 Ixelles, Bruxelles, Belgique. (Belgique)
* : Auteur correspondant

Increases in the density of individuals in a given area occurs at a variety of biological levels ranging from bacteria to humans. This aggregation phenomena involves individual responses to environmental heterogeneities and social interactions. Tunas are social species; however the contribution of schooling and inter-individual attraction in their aggregation process under floating structures is often suggested but rarely studied. Through the combination of modeling and experimental approaches, this work reveals how the consideration of social interactions changes our view of the aggregation processes. This, in turn, provides insight into how the release of large numbers of FADs in the ocean potentially influences tuna behavior, a major management issue. In a system without inter-individual attraction, the greater the number of FADs, the greater the total number of individuals around all FADs. With inter-individual attraction, where the population under a FAD influences the probability of an individual leaving or joining this FAD, results are very different: the model predicts heterogeneous partitioning of individuals among FADs and that an optimal number of FAD exists, that would maximize the total population around FADs. These models' predictions are compared to observed distributions of tuna populations at FADs, derived from observers' data. Furthermore, we report on the first trail of a binary choice experiment applied to tuna-FAD association. A flourishing literature demonstrates how such experiments are helpful in understanding the extent to which social interactions influence aggregation patterns. Despite various technical difficulties, highlighted in the discussion, the results support the need to perform further binary choice experiments and to collect indices of schooling behavior around FADs.

Interplay between physical and social phenomena may explain the behavioral plasticity of tuna (Thunnus albacares) associated with an array of floating objects

Robert Marianne [1,*], Dagorn Laurent [2], Deneubourg Jean-louis [3], Holland Kim [4], Itano David [5]

1 : Laboratoire d Ecologie Sociale - Université Libre de Bruxelle (USE)
Campus de la Plaine, Boulevard du Triomphe, Bat NO 5et 1050 Bruxelles, Belgique (Belgique)
2 : Institut de Recherche en Développement (IRD)
Victoria (Seychelles)
3 : USE (Unité d Ecologie Sociale)
Université Libre de Bruxelles , Campus de la Plaine, Boulevard du Triomphe , Bat NO 1050 Ixelles Belgique (Belgique)
4 : Hawaii Institute of Marine Biology
Hawaii Institute of Marine Biology, PO Box 1346 Kane'ohe, Hawaii 96744 USA (États-Unis)
5 : University of Hawaii at Manoa
University of Hawaii at Manoa, Pelagic Fisheries Research Program, 1000 Pope Rd. MSB 312 Honolulu, Hawaii 96822 USA (États-Unis)
* : Auteur correspondant

In marine pelagic habitats, floating structures are known to affect the spatial behavior of tuna and are extensively used by fishers. However, our understanding of the associative behavior of fish with FADs is still incomplete, which prevents the scientific community from providing managers with science-based recommendations on the impacts of FADs on ecosystems. The durations of the associated (on-FAD) and unassociated (off-FAD) behavioral phases of 69 acoustically tagged yellowfin tuna (Thunnus albacares) captured in an array of FADs around Oahu, Hawaii were studied over a period of three years. These data were analyzed using survival curves with the objective of determining the rules governing the decisions made by fish to leave or join a FAD. Short and long durations were observed for both associated and unassociated phases and these patterns were characterized by memoryless phenomena that occurred at a constant average rate. Our results strongly suggest that factors involved in decisions to leave or join FADs are independent. The duration of the on-FAD period depends on local conditions existing around a FAD in a given period whereas the durations of off-FAD periods were not dependent on the period. Individuals switched between short and long modes for both on- or off-FAD phases, suggesting that distinct behavioral patterns coexist in the behavioral repertoire of each individual. Although spatio-temporal distributions of populations in heterogeneous environments are often interpreted as individual responses to physical characteristics of patches, they may also be influenced by social interactions.

Islands and FADs; just how sticky are they?

Itano David [1,*], Holland Kim [2], Dagorn Laurent [3]

1 : University of Hawaii
Hawaii (États-Unis)
2 : Hawaii Institute Of Marine Biology
University Of Hawaii (États-Unis)
3 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
* : Auteur correspondant

A wide range of projects have examined the habitat preferences and range of movement of yellowfin tuna (Thunnus albacares) in the central Pacific centered on the Hawaiian archipelago utilizing conventional, acoustic and data archiving tags. Evidence to date from all tag types indicates restricted movement parameters for yellowfin tuna in Hawaiian waters which can also be described as a strong aggregative behavior to isolated islands. Conventional tag studies indicate a high proportion of recaptures reported from anchored FADs and nearshore banks in the Hawaiian EEZ suggesting that FADs play a significant role in the behavior of ?Hawaiian? yellowfin tuna. However, these high recapture rates are confounded by high vulnerability at FADs. Coded sonic tagging of individuals monitored by acoustic receivers mounted on nearshore Hawaiian FADs suggest that they can significantly alter behavior with a high proportion of time at liberty spent within the monitored array. However, archival datasets from yellowfin tuna released on these same FADs suggest that yellowfin can also spend considerable amounts of time in offshore ? open water? areas away from islands, banks or FADs. A unique recapture dataset of yellowfin tuna double tagged with acoustic and archival tags provides the opportunity to evaluate the accuracy of light based geolocation at fine temporal scales when the animal was acoustically recorded at a receiver equipped anchored FAD. These comparisons support the importance that anchored FADs can play in the behavior and vulnerability of yellowfin tuna while reminding the research community of the practical limitations of light-based geolocation.

Behavior of Skipjack (Katsuwonus pelamis) and Yellowfin (Thunnus albacares) tuna in an array of Anchored FADs around the Maldive Islands

Jauharee Riyaz [1,*], Goviden Rodnay [2], Filmalter John [3,4], Forget Fabien [3,5], Adam Shiham [6], Soria Marc [7], Dagorn Laurent [7]

1 : Marine Research Centre (MRC)
Maldives (Maldives)
2 : Seychelles Fishing Authority (SFA)
Victoria, Mahé (Seychelles)
3 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
4 : South African Institute for Aquatic Biodiversity (SAIAB)
Private Bag 1015, Grahamstown, 6140 (Afrique du Sud)
5 : South African Institute for Aquatic Biodiversity (SAIAB)
Grahamstown , South Africa (Afrique du Sud)
6 : Marine Research Center (MRC)
H. White Waves Moonlight Higun Malé 20025 (Maldives)
7 : Institut de Recherche pour le Développement (IRD)
UMR 212
Av. J. Monnet, 34203, Sete (France)
* : Auteur correspondant

In order to investigate the spatial behavior of skipjack and yellowfin tuna around anchored FADs (AFADs) in the Maldives, skipjack and yellowfin tuna have been tagged with conventional and acoustic tags. The distance between adjacent AFADs in the array is much greater in Maldives than in other parts of the world. The conventional tagging study was a large-scale experiment within the AFAD network ranging from approximately 1°S of the equator to 7°N of the equator around the Maldives. 9688 skipjack and 2646 yellowfin were tagged around 31 AFADs in this network, with 854 skipjack and 111 yellowfin tuna recaptured. For the acoustic tagging study, 8 AFADs were equipped with automated acoustic receivers for a period of 12 months and acoustic transmitters were implanted into 17 skipjack and 21 yellowfin tuna. Residence times and movements between FADs are estimated using these two data sources. While significant amount of such information exist for denser AFAD arrays in other regions (e.g. Hawaii), this study provides information on the behavior of tunas within a more dispersed array of AFADs. As such, it provides insights into the effect of FAD densities on the behavior of tunas which is important for management.

The Influence of FADs on the Vertical Distribution of Yellowfin Tuna in Hawaii

Holland Kim [1,*], Itano David [2], Dagorn Laurent [3]

1 : Hawaii Institute of Marine Biology, University of Hawaii
Ccoconut Island, Kaneohe, Hawaii (États-Unis)
2 : Pelagic Fisheries Research Program, University of Hawaii
Coconut Island, Kaneohe Hawaii (États-Unis)
3 : IRD, France
Mahe, Seychelles (Seychelles)
* : Auteur correspondant

Previous studies have demonstrated that FADs alter the vertical distribution of bigeye tuna and there was some indication that this was also true for yellowfin tuna. However, there were very few data available to test this hypothesis. We used double tagging (implanted acoustic tags and archival tags) to observe the on-FAD and off-FAD behavior of yellowfin tuna caught in association with anchored FADs in Hawaii. The relults indicate that FADs do not alter the vertical behavior of yellowfin tuna but, rather, that their vertical behavior is influenced primarily by oceanographic conditions. These results will be discussed in terms of their vulnerability to capture and light of what is known about feeding behavior of these species when associated with anchored FADs in Hawaii.

Quantifying the spatial structure of fish aggregations around FADs at the micro- and mesoscale from field-based modeling and acoustic data analysis

Capello Manuela [1,*], Soria Marc [1], Cotel Pascal [1], Deneubourg Jean-louis [2], Dagorn Laurent [1]

1 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
2 : Université Libre de Bruxelles (ULB)
Av. F.Roosevelt, 50 1050 Bruxelles (Belgique)
* : Auteur correspondant

Understanding and quantifying the spatial structure of fish aggregations around FADs is crucial for assessing the impacts of FAD deployment and their management. In this talk we show recent results, based on modeling coupled to HTI acoustic telemetry experiments on small pelagic fish (Selar crumenophthalmus) around an anchored FAD, quantifying the main interactions playing a role in fish aggregations. Within our picture, the fish aggregation radius is modulated by the mutual contribution of social interactions and individual swimming speed. Our approach provides an explanation for the spatial structure of fish aggregations found around FADs and allows predicting the aggregation radius for different species. Finally, we discuss possible roles played by the range of fish excursions out of the FAD in shaping the distribution of fish over a full network of FADs.

Aggregation of early juvenile yellowfin tuna with payaos in the Philippines

Mitsunaga Yasushi [1,*], Babaran Ricardo [2]

1 : Department of Fisheries, Kinki
204-3327 Nakamachi, Nara, (Japon)
2 : College of Fisheries and Ocean Sciences, University of the Philippines in the Visayas
Miagao, Iloilo 5023, Philippines (Philippines)
* : Auteur correspondant

Philippine waters are important regions for yellowfin tuna stocks because they include spawning and nursery grounds. However, no information is available on the behavior of early juveniles, and no experiments had been conducted around payaos in the Philippines. Payao is a moored FAD that is made of a bamboo raft, a mooring rope, a cement anchor and suspended palm fronds. Self-recording receivers were attached to the mooring ropes of the payaos. To understand the phenomenon of aggregation of early juvenile yellowfin tuna around payaos, forty juveniles (19-31 cm FL) attached with an ultrasonic transmitter and/or a data logger were released from 2005 to 2007. The juveniles showed the similar behavior with adults in some aspects. Some individuals showed diurnal vertical swimming pattern, swam within a limited shallow range during the nighttime and dived to deeper waters during the daytime. Other juveniles performed deep diving over 100 m during excursions among payaos. Still others showed a synchronized, diurnal horizontal swimming pattern. However, no juveniles returned to the same payao after an interruption of over 24 h. Juveniles stayed around the payaos less than 12 days, shorter than in adults. It is suggested that the early juveniles in this area are in the initial phase of their migration and that stay around a payao for a few days to forage in a school.

Temporal patterns of small and large pelagic fish species under drifting and anchored FADs

Capello Manuela [1], Soria Marc [1,*], Dagorn Laurent [1], Holland Kim [2], Beeharry Sunil Panray [3], Forget Fabien [4,5], Filmalter John [4,6]

1 : Institut de Recherche pour le Développement (IRD)
UMR 212
Av. J. Monnet, 34203, Sete (France)
2 : Hawaii Institute Of Marine Biology
University Of Hawaii (États-Unis)
3 : Ministry of fisheries of Mauritius and Rodrigues
Mauritius (Maurice)
4 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
5 : South African Institute for Aquatic Biodiversity (SAIAB)
Grahamstown , South Africa (Afrique du Sud)
6 : South African Institute for Aquatic Biodiversity (SAIAB)
Private Bag 1015, Grahamstown, 6140 (Afrique du Sud)
* : Auteur correspondant

We assessed telemetry data collected during experiments carried out in Reunion Island, Hawaii, Mauritius and in the Mozambique channel. The experimental protocol was similar between the different areas, consisting of passive monitoring of various species tagged with acoustic tags around drifting or anchored FADs.. Acoustic transmitters were internally implanted in the studied individuals. In order to characterize the periodicity of visits to FADs we analyzed and compared the temporal patterns of different species know to associate with FADs: small pelagic fishes included the bigeye scad (Selar Chrumenophtalmus) and the oceanic trigger fish (Canthidermis maculatus), and large pelagic fishes included tunas (yellowfin, skipjack and bigeye tuna), silky shark (Carcharhinus falciformis), wahoo (Acamthocybium solandrii) and rainbow runner (Elagatis bipinnulata). We found periodicity in a subset of individuals of all the species and identified a diel pattern, with fish aggregating closer during the day and performing excursions at night. We investigated the consequences of this pattern on the exploratory capabilities of each species. We discussed the intra and inter specific variability in view of the knowledge on releasing factors involved in animal rhythms.

Species composition and diversity of fish assemblages associated to anchored FADs in the Western Indian Ocean

Forget Fabien [1,2,3,*], Ménard Frédérique [4], Mérigot Bastien [5], Robinson Ian [6], Gaertner Jean-claude [7], Cowley Paul [3], Adam Shiham [8], Rilwan Yoosuf [8], Hurbungs Mira [9], Koonjul Meera [9], Taquet Marc [10], Dagorn Laurent [4]

1 : Institut de Recherche pour le Developement (IRD)
Seychelles Fishing Authority Fishing Port Victoria (Seychelles)
2 : Department of Ichthyology and Fisheries Science (DIFS)
Rhodes University Grahamstown 6140 (Afrique du Sud)
3 : South African Institute of Aquatic Biodiversity (SAIAB)
Privite Bag 1015 Grahamstown 6140 South Africa (Afrique du Sud)
4 : Institut de Recherche pour le Développement (IRD)
UMR 212
Av. J. Monnet, 34203, Sete (France)
5 : Université de Monpellier 2 (UM2)
université montpellier 2 2
Place Eugène Bataillon 34095 Montpellier cedex 5 (France)
6 : Seychelles Fishing Authority (SFA)
Fishing Port Victoria (Seychelles)
7 : Laboratoire Biotem
Universite de Polynésie Francaise
Université de Polynésie française BP 6570 98702 Faa'a Tahiti (Polynésie française)
8 : Marine Research Center (MRC)
H. White Waves Moonlight Higun Malé 20025 (Maldives)
9 : Albion Fisheries Reseach Center (AFRC)
Ministry of Fisheries Albion Petite Riviere (Maurice)
10 : Centre Ifremer du Pacifique (CIP)
IFREMER
BP 7004 - 98719 - Taravao - Tahiti (Polynésie française)
* : Auteur correspondant

Species composition and diversity of fish assemblages around anchored FADs in the Maldives, Seychelles and Mauritius were investigated using the Underwater Visual Census (UVC) technique. A total of 48 UVCs were performed in all three countries on four selected FADs in each country. A total of 37 species belonging to 20 families were observed during the study in all three countries. The Carengidea family was the most dominant in all three countries with Caranx sexfaciatus, Elagatis bipinnulata and Decapeterus macarellus being the most occurent species. The fish assemblages observed consisted of pelagic fish as well as coral fish species which contributed to the higher species richness observed at certain FADs. Several indices were computed to provide an integrated view of diversity. Overall, the Maldives displayed the highest mean diversity per FAD (e.g. species richness and evenness: Shannon H' = 1.05, SD ± 0.31) followed by the Seychelles (Shannon H' = 0.81, SD ± 0.34) and lowest being in Mauritius (Shannon H' = 0.66, SD ± 0.27). Large variations in species richness of assemblages were observed during the study ranging from 2 to 16 species per observation. A Principal Coordinates Analysis (PCoA) based on Bray-Curtis distances between assemblages suggests a latitudinal effect on their composition and abundances; the Maldives and Mauritius assemblages being the most different, with an intermediate overlap with the Seychelles.

On the role of FADs in the ecology of juvenile silky sharks

Filmalter John [1,2,3,*], Forget Fabien [1,2,3], Potier Michel [4], Cowley Paul [3], Dagorn Laurent [2]

1 : Department of Ichthyology and Fisheries Science, Rhodes University (DIFS)
Department of Ichthyology and Fisheries Science, Rhodes University, Grahamstown 6140 (Afrique du Sud)
2 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
3 : South African Institute for Aquatic Biodiversity (SAIAB)
Private Bag 1015, Grahamstown, 6140 (Afrique du Sud)
4 : Institut de Recherche pour le Développement (IRD)
UMR 212
Av. J. Monnet, 34203, Sete (France)
* : Auteur correspondant

Silky sharks (Carcharhinus falciformis) are the main elasmobranch species found around drifting FADs and as such, are commonly taken by purse seiners as bycatch. Here, we investigate the role that FADs play in the ecology of this species through the use of acoustic telemetry, pop-up satellite tags (miniPATs) and dietary analysis of silky sharks caught at FADs. Residence times and vertical data were collected from 10 silky sharks (73 -109 cm TL) tagged with acoustic transmitters equating to 77.3 d of observation around 5 drifting FADs between March 2010 and June 2011 in the western Indian Ocean. Sharks were found to associate with the same FAD for several days (mean = 5.5 d, range: 2.8 ? 16.6 d) and typically undertook excursions away from the FAD at night, as has been found previously. While closely associated during the day, sharks typically remained shallow (

Do seamounts act as mooring FADs?

Telmo Morato [1,*], Hoyle Simon, Allain Valerie, Nicol Simon

1 : University of the Azores (UAç)
R Dr Frederico Machado, 9900, Horta (Portugal)
* : Auteur correspondant

Seamounts have been identified as hotspots for pelagic biodiversity and some have also been identified as aggregating locations for some tuna species Thus seamounts may act as moored FADs where catch rates can potentially be higher than in the open ocean Their importance for tuna fisheries has not been demonstrated and the contribution of seamounts to fisheries catch is still poorly estimated Although a relatively common feature in oceanic ecosystems little information is available that identifies those that are biologically important Improved knowledge offers opportunities for unique management tuna stocks which may advance the sustainable management of oceanic resources In this study we evaluate the existence of an association between seamounts and tuna longline fisheries at the ocean basin scale identify significant seamounts in aggregating tuna in the western and central Pacific Ocean and quantify the seamount contribution to the tuna longline catch We use data collected for the Western and Central Pacific Ocean for bigeye yellowfin and albacore tuna at the ocean basin scale GLMs were applied to a coupled dataset of longline fisheries catch and effort and seamount location information The analyses show that seamounts may be associated with an annual longline combined catch of 35 thousand tonnes with higher catch apparent for yellowfin bigeye and albacore tuna on 17 14 and 14 of seamounts respectively In contrast 14 18 and 20 of seamounts had significantly lower catches for yellowfin bigeye and albacore tuna respectively Studying catch data in relation to seamount positions presents several challenges such as bias in location of seamounts or lack of spatial resolution of fisheries data Whilst we recognize these limitations the criteria used for detecting significant seamounts were conservative and the error in identification is likely to be low albeit unknown Seamounts throughout the study area were found to either enhance or

Impacts of FAD fishing on the ecosystem

Dagorn Laurent, Holland Kim [1], Restrepo Victor [2], Moreno Gala [3]

1 : University of Hawaii (UH)
university of hawaii
Coconut island (États-Unis)
2 : ISSF
USA (États-Unis)
3 : AZTI
Herrera Kaia - Portualdea z/g E-20110 Pasaia (Gipuzkoa) (Espagne)

The use of drifting FADs by the purse seine fishery raises the possibility of three potential impacts on tuna stocks, biodiversity and the pelagic habitat. The large amount of catches of tunas around floating objects can cause two types of impacts on the tuna populations that we propose to review: a loss of potential yield (by catching fish too small) and a reduction of spawning biomass or stock size (by catching too many fish). Fishing around FADs also generate more bycatch than fishing on free-swimming schools. We review the amount and composition of bycatch in each ocean, and briefly present scientific efforts made by some projects in the world to find solutions to mitigate this impact. If logs and other vegetal debris have always been natural objects drifting at the surface of the oceans, FADs are now new components of this surface habitat. This change could potentially modify the migrations and biology of tunas and other associated species, the so-called ecological trap hypothesis. We review studies in this field by distinguishing between behavioural (e.g. movements) and biological (e.g. feeding behaviour, fitness indices) aspects. Finally, we conclude by recommending the monitoring and management of FADs in each ocean and dedicated research to better assess some impacts and find solutions to mitigate them. We feel this evaluation is a critical tool for informing future decisions that must be made by fisheries managers to achieve the objectives of ecological-based fishery management.

Bycatches in FAD fisheries

Hall Martin [1,*], Roman Marlon [1]

1 : Inter-American tropical Tuna Commission
8604 La Jolla Shores Dr la Jolla, CA 92037 (États-Unis)
* : Auteur correspondant

The FAD fisheries of the world share many characteristics, even between remote regions. The species and size compositions of the target and other species, and the dominance hierarchy are among those similar characteristics. The bycatches, defined as those individuals discarded dead, are also very similar, and mitigation measures developed in one ocean should be quite adaptable to other regions. The vast majority of the captures, defined as all that was captured in the seine, are tunas (up to 95% - 98%). Of the bycatches, again the vast majority are tunas (usually over 85%). The tunas discarded include undersized individuals of the main species, or individuals from other ?minor? tuna species. The next component in importance because of their biomass are the large pelagic bony fishes (the rainbow runner, Elagatis bipinnulata, the yellowtail amberjack, Seriola spp. (S. rivoliana, S. lalandi, S. dumerili) , the wahoo (Acanthocybium solandri), the mahi-mahi or dolphin fish (Coryphaena hippurus), and in some oceans, the barracuda, Sphyraena barracuda. The utilization of the mahi-mahi and wahoo is increasing, so their bycatches are decreasing. Sharks are the major conservation concern among the purse seine bycatches. The dominant species with over 75% of the shark captures are the silky sharks (Carcharhinus falciformis), followed far behind by the oceanic whitetip shark (C. longimanus), and at lower levels the hammerhead sharks (Sphyrna spp). The captures of sharks in purse seine fisheries amount to less than 5% of the overall shark captures in all fisheries. Even though finning is banned in PS fisheries, some sharks are retained. Billfishes are retained in their majority, and the overall impact amounts to 2% - 4% of the overall catches. Sea turtle bycatches are quite low and have been reduced with simple measures, although some entanglements in the webbing the fishers hang under the FADs still occur.

Benefiting from Innovations in Sustainable and Equitable Management of Fisheries on Trans-boundary Tuna's in the Coral Triangle and Western Pacific (BESTTuna)

Van Zwieten Paul A.m. [1,*], Bush Simon R. [2]

1 : Aquaculture and Fisheries Group, Wageningen University (AFI-WUR)
PO Box 338 6700AH Wageningen The Netherlands (Pays-Bas)
2 : Environmental Policy Group, Wageningen University
Postbus 8130 6700 EW Wageningen The Netherlands (Pays-Bas)
* : Auteur correspondant

The sustainability of the tuna fisheries in the Western Pacific is increasingly questioned and draws attention to complex ecological, social and economic trade-offs. All nations increase their fishing effort on underexploited skipjack stocks using purse seiners on Fish Attraction Devices (FADs), which leads to continued pressure on juvenile yellowfin and bigeye tuna. Equity problems exits where distant water fleets have access to an estimated 60% of the region's tuna catch, while juvenile and skipjack fisheries caught by domestic fleets remain important for local food security and economies. Reinvesting wealth from tuna fishing accruing to national economies in sustainable management has proven difficult given the high economic stakes of distant water fleets. A series of innovative approaches to management have emerged in the form of market-based governance arrangements, including sustainable sourcing policies by brands and retailers, the promotion of sustainable consumption through third-party certification schemes (MSC), and fisher-led stock allocation schemes. There is little understanding of how these approaches can steer tuna fisheries towards sustainable practices and reduced fishing pressure. The BESTTuna programme explores this in six sub-projects by focusing on the ecology and fisheries of the three tuna species in their interaction with FADs; the composition, behavior and interests of different fishing fleets; the incentive structure and economic and social relations of related market actors; and the response of state and intergovernmental fisheries management arrangements to new market-based mechanisms. (1) two PhDs will investigate habitat choice of juvenile tuna in relation to local ecosystem productivity, and the socio-technical relationship with fishing strategies and tactics related to FADs; (2) three PhDs will analyse and model the capacity of government and inter-governmental scientific and regulatory regimes to adaptively manage tuna fisheries given trade-offs between access rights and market demand for sustainable fishing practices; (3) two PhDs analyse the incentive structures for fishers targeting juvenile tuna for domestic and international canned markets, and the influence by ?upstream' chain actors in the global canned tuna value chain; (4) two PhDs and a Postdoc will review and model the different institutional and financial designs of alternative resource settings and assess the relevance of these designs for tuna fisheries; (5) a PhD explores the cross-cutting issue of new informational challenges across the various governance arrangements; (6) a Postdov will bring the various sub-projects together to theorize on incentivized management arrangements. The programme will run for five years.

Overview of exploitation and ecology of pelagic fish associated with offshore drifting and anchored FADs in the WCPO

Leroy Bruno [1], Allain Valerie [1], Nicol Simon [1,*], Harley Shelton [1], Hampton John [1], Williams Peter [1]

1 : Secretariat of the Pacific Community (SPC)
B.P. D.5. 98848 Noumea Cedex New Caledonia (Nouvelle-Calédonie)
* : Auteur correspondant

Tropical tuna, particularly at small and juvenile stages are known to associate with floating objects. In the Western and Central Pacific Ocean, which accounts for over half of world tuna production, purse seine effort and catch on floating objects has increased significantly due to a rapid increase in the use of fixed and free-floating fish aggregation devices (FADs). FADs have been shown to alter the behaviour and movement patterns of skipjack (Katsuwonus pelamis), yellowfin (Thunnus albacares) and bigeye (T. obesus). Aggregation to drifting objects, dramatically increases vulnerability to purse seine gear, particularly for juvenile and small size classes. Concern over floating object fishing effort on bigeye and to a lesser extent yellowfin stresses the need to understand the impacts of FADs. In this paper the purse-seine FAD fisheries of the Western and Central Pacific Ocean are characterised, including the provision of information on species composition, trophic interactions, movements of tuna and broader ecosystem impacts associations with FADs.

Mitigating tropical tuna purse seine bycatch

Dagorn Laurent [1,*], Restrepo Victor [2]

1 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
2 : ISSF
USA (États-Unis)
* : Auteur correspondant

During recent years, international research efforts have been devoted to the development of methods to reduce bycatch in tropical tuna purse seine fisheries. These include the EU funded project MADE and the ISSF (International Seafood Sustainable Foundation) Bycatch project. The main focus has been on small tunas and vulnerable species such as elasmobranchs and turtles. The major concern for other teleost species constitutes the minimization of wastage, not the reduction of fishery induced mortality. The projects aim to develop methods for bycatch mitigation at the various stages of the fishing process: (1) before the vessel reaches the fishing area, (2) once a vessel reaches a FAD but before setting the net, (3) once the net is set and (4) once animals are on deck. In addition to these categories, simultaneous investigations into the behavior of bycatch species (using electronic tagging and observers data) also allow for the assessment of spatio-temporal mitigation methods. We show that scaling up from national projects (fleets) to international (ocean basins, e.g. MADE) and then global initiatives (e.g. ISSF) provides the scientific framework to efficiently address this global issue. In addition to this synergistic approach, the ISSF initiative has provided the unique opportunity to conduct experiments onboard chartered purse seine vessels. Moreover, by maintaining regular dialogue (through regional skippers' workshops across all oceans), both scientists and fishers work together to find the most efficient methods to reduce the impacts of FAD fishing on the pelagic ecosystem.

Survival rate of silky sharks (Carcharhinus falciformis) caught incidentally onboard French tropical purse seiners

Poisson Francois, Vernet Anne-lise [1], Filmalter John [2,3,4], Dagorn Laurent

1 : IRD (IRD)
IRD BP 570, Victoria, Mahé, Seychelles (Seychelles)
2 : Department of Ichthyology and Fisheries Science, Rhodes University (DIFS)
Department of Ichthyology and Fisheries Science, Rhodes University, Grahamstown 6140 (Afrique du Sud)
3 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
4 : South African Institute for Aquatic Biodiversity (SAIAB)
Private Bag 1015, Grahamstown, 6140 (Afrique du Sud)

Currently, French purse seiners in the Indian Ocean release all sharks that are caught in order to reduce the fishery induced mortality of elasmobranchs. Through participation in two commercial fishing trips, we first recorded the number of sharks (primarily silky sharks, Carcharhinus falciformis) along with their condition once they had been sorted by the crew on the upper and lower decks. Estimations of the direct mortality rates differed between the two cruises and appeared to be directly linked to set size (tonnage), 68% from the first cruise (large sets) and 28% in the second cruise (smaller sets). Direct mortality rates also appeared to be linked with the location of the individual, as more sharks were found dead on the lower deck than the upper. In total, 20 silky sharks were tagged with MiniPATs (Wildlife Computers, Redmond, WA, USA) to study their survival after release. The silky sharks tagged in this study averaged 125.3 ± 33.8 cm (mean ± SD) curved total length. Six tags clearly showed immediate mortality, while data from three tags suggested delayed mortality after 2.5, 14 and 15 days. Nine tags showed that the sharks survived. Three tags failed to report data. Following these findings a 'best practices' manual for fishers was prepared to increase rates of survival of sharks caught by purse seine vessels. However, other methods prior to the sharks being brought onboard must also be investigated.

Using fishers' echo-sounder buoys for remote discrimination of bycatch

Lopez Jon [1,*], Moreno Gala [1], Dagorn Laurent [2]

1 : AZTI
Herrera Kaia - Portualdea z/g E-20110 Pasaia (Gipuzkoa) (Espagne)
2 : Institut de Recherche pour le Développement (IRD)
UMR 212, P.o. Box 570, Victoria (Seychelles)
* : Auteur correspondant

Echo-sounders buoys are world widely employed in the tropical tuna purse seine fishery setting on FADs. Fishers use echo-sounder buoys to know accurately where the drifting FADs are, and also, to estimate how much fish (in terms of tons/biomass) is under the object. Echo-sounder buoys provide fishers with biomass estimations every x time (depending on their configuration) with info on the distribution of the biomass within the vertical water column (10 different layers, from 3-115 m). We have identified the potential of this tool for fish behaviour studies, as well as, for remote by-catch discrimination. This will allow us to help fishers discarding not favourable fishing FADs. Among the different potential uses of this tool, we could exalt the following ones: Studies of colonization processes; designations of best fishing practices; analyses of spatial/ temporal collective fish behaviour under FADs; and, studies about fish aggregations at fine/meso/ large scales (diel, week or monthly) in relation to the environment. We have made the first step to achieve those aims. For this purpose, we have identified two main study lines: acoustic discrimination and behavioural discrimination. Within the acoustic discrimination we have characterized buoys' layers as by-catch, mix layer (by-catch + tuna), skipjack or yellowfin tuna with special emphasis differentiating by-catch from tuna and skipjack from other tuna species. We also tried to calibrate current echo-sounder buoys' algorithms to provide with better estimate of biomasses. This allowed us to make behavioural discrimination where, studying layers behaviours, we discerned about best fishing practices, relationships between tunas, aggregations and environmental conditions, among others.

Involving tuna fishers in bycatch reduction research: the ISSF Skippers Workshops

Murua Jefferson [1,*], Dagorn Laurent [2], Hall Martin [3], Itano David [4], Moreno Gala [5], Restrepo Victor [6]

1 : AZTI-Tecnalia
Spain (Espagne)
2 : Institut de Recherche en Développement (IRD)
Victoria (Seychelles)
3 : Inter-American tropical Tuna Commission
8604 La Jolla Shores Dr la Jolla, CA 92037 (États-Unis)
4 : University of Hawaii
Hawaii (États-Unis)
5 : AZTI
Herrera Kaia - Portualdea z/g E-20110 Pasaia (Gipuzkoa) (Espagne)
6 : ISSF
USA (États-Unis)
* : Auteur correspondant

Since 2010, the International Seafood Sustainability Foundation has been facilitating by-catch mitigation workshops globally at key tuna ports gathering fishers from the FAD purse seine industry. In the last year workshops where organized in the U.S.A. (fleets operating in EPO, WCPO), Ecuador (EPO), Panama (EPO), Ghana (ATL), Seychelles (IO), Mauritius (IO), Spain (IO, ATL, EPO), American Samoa (WCPO), Marshall Islands (WCPO) and Federated States of Micronesia (WCPO). The concept is to work in conjunction with captains and other fleet members to identify best fishing practices to reduce bycatch (e.g. small tunas, sharks, etc.) when setting on FADs. Some of the themes covered include species identification prior to setting, ecological FADs, attraction of sharks away from FADs, modifying selectivity of gear, best release practices of elasmobranchs and turtles. The skippers' workshops are part of the broader ISSF´s by-catch project and feedback gained from fishers is considered for research activities to be favored during ISSF's research cruises. A second round of skippers workshops is now about to begin where ISSF scientists will show which mitigation techniques and practices have worked best so far and captains can further refine them or provide new ideas. This feedback process between scientists' research at sea and skippers' workshops will continue until the best sustainable practices are adopted by the FAD-fishing fleets.

Catch composition in small-scale tuna fisheries associated to data buoy moored in the Western equatorial Atlantic

Da Silva Guelson [1,*], Hazin Humberto [1], Fonteles-filho Antônio [2]

1 : Animal Sciences Department, Universidade Federal Rural do Semi Árido (UFERSA)
Av. Fco. Mota, 572. Bairro Presidente Costa e Silva, Mossoró-RN. CEP: 59.625-900. (Brésil)
2 : Marine Sciences Institute - Universidade Federal do Ceará (LABOMAR - UFC)
Av. da Abolição, 3207, Bairro Meireles, Fortaleza-CE. CEP 60165-081. (Brésil)
* : Auteur correspondant

Due to the collapse of the lobster fishery, the fleet based in Areia Branca county, Northeast Brazil, is developing a fishing technology associated with a data buoy of Program PIRATA (Pilot Moored Array in the Tropical Atlantic) which was anchored in the Equatorial Western Atlantic and has acted as a fish aggregating device (FAD). Thus, the present study aims to characterize the production of this emerging fishery by identifying the species caught and their relative participation in the landings by weight. Data were obtained between May 2010 and May 2011 in the landings on fishing piers and on board through two cruises made in February 2011 and April 2011. The fleet is composed of wooden motorboat with 13 meters length and power engines of about 110 HP. A total of 31 landings from 6 boats were analyzed, totaling 114.774 kg of fish. The main target species in this fishery are the yellowfin tuna (Thunnus albacares) and bigeye tuna (Thunnus obesus) (92.68%) which are marketed according to individual weight. Due to their relative commercial price are also caught species such as marlin (Makaira nigricans) (2.73%), skipjack (Katswuonus pelamis) (1.72%), dolphinfish (Coryphaena hippurus) (1.69%), wahoo (Acanthocybium solandri) (0,90%), rainbow-runner (Elegatis bipinulata) (0.12%), sharks (Prionace glauca) and (Carcharinus longimanus) (0.08%) and in the category other we have occasionally swordfish (Xiphias gladius) and triggerfish (Balistes sp.) (0.08%). It's possible conclude that this fishery play an important role as alternative to the fishing sector in the Northeast Brazil. This is especially due to the high market prices of species caught. However, more studies are necessary for the better understanding of this type of fishery as well as the development of FAD program in Brazilian waters to reduce the fishing activity in the PIRATA buoys.

Historique des DCP à Mayotte

Herfaut Johanna [1]

1 : Parc naturel marin de Mayotte
14 lot. Darine Montjoly Iloni 97660 Dembeni (Mayotte)

A Mayotte les premiers DCP ont été posés à la fin des années 80. Le service des pêches et de l'environnement marin assurait la pose, le suivi et l'entretien du parc de DCP autour de l'île. Les pêcheurs ont très vite adhérer au DCP. Ils y ont vu un net avantage : la concentration du poisson sur les DCP leur évitait la recherche des bancs au large et donc leur permettait de limiter leur consommation de carburant. Cependant, la durée de vie des DCP n'était pas très bonne. Des essais de nettoyage des têtes ont été tentés mais cela ne semblait pas vraiment améliorée la situation. Par la suite, des réflexions sur le matériel ont été menées. Le choix des sites a également pu être amélioré grâce à la bathymétrie des pentes externes du lagon réalisé par le Marion Dufresne, bateau océanographique des Taaf, et grâce à la collaboration du pilote du port pour définir les routes des cargos à éviter. De 2006 à 2011, le parc des DCP n'a pas été entretenu suite à la restructuration des services en vue de la départementalisation. Mais en 2011, la chambre de l'agriculture, de la pêche et de l'aquaculture marine (Capam) de Mayotte a pu faire reposer un parc de 16 DCP autour de l'île. En collaboration avec des organismes antillais le matériel a encore été amélioré. De plus, les DCP ont été posés à moins de 5 miles de la barrière pour les barques des pêcheurs ne soient pas en infraction en s'y rendant. Un suivi va prochainement être mis en place afin de mieux connaître l'activité de pêche sur ces dispositifs.

Que mangent les poissons pêchés sous les DCP ancrés ?

Reynal Lionel [1,*], Roussel Thomas, Chantrel Josselin

1 : Ifremer - UR de Martinique
IFREMER RBE-RHANTILLES
Pointe Fort 97231 Le Robert (Martinique)
* : Auteur correspondant

Les contenus stomacaux de 783 poissons pêchés autour des DCP de la Martinique entre 2003 et 2006 ont été analysés. Ces poissons sont constitués de 322 Thunnus atlanticus, 188 Thunnus albacares, 94 Katsuwonus pelamis, 79 Auxis thazad et 82 Makaira nigricans. L'analyse porte sur le taux de remplissage des estomacs, la nature des proies, leur taille et leur niveau de dégradation en fonction de la saison, de l'heure de la capture et de la taille du prédateur.

DCP nouvelle génération : un outil de pêche comme plateforme pour l'observation des cétacés, Guadeloupe, Petites Antilles françaises.

Millon Cédric [1], Gandilhon Nadège [1,*], Gervain Paul [2], Nolibe Gilles [3], Louis Max [1], Adam Olivier [4]

1 : Laboratoire Dynamique des écosystèmes Caraïbes (DYNECAR)
Université des Antilles et de la Guyane, BP 592, 97159 Pointe-à-Pitre Cedex, Guadeloupe (Guadeloupe)
2 : PLKMarine (PLK)
Allée des cocotiers 97120 Saint-Claude (Guadeloupe)
3 : CeSigma
CeSigma
ActiClub Bât. A1, 1576 Chemin de La Planquette, 83130 La Garde (France)
4 : Centre de Neurosciences Paris-Sud (CNPS)
Université de Paris Sud, Orsay
UMR 8195, Bâtiments 440-447, Université Paris-Sud, 91405 Orsay cedex (France)
* : Auteur correspondant

Parce que les mammifères marins sont vocalement actifs, les observations acoustiques renseignent de façon complémentaire les résultats visuels. Dans le cadre de recherches sur les cétacés de l'archipel de Guadeloupe (16°14 N - 61°31O, Petites Antilles françaises), une station acoustique semi permanente intégrée à un DCP ancré à 1450 mètres de profondeur, a été déployée le 25 novembre 2010 à 22km de la côte sous le vent de l'archipel. Ce système comprend une bouée de surface équipée du processeur, d'une carte d'acquisition, d'un disque dur SSD 512Mo et un hydrophone fixé à 55 mètres de profondeur sur le câble porteur du DCP. Le mât supporte un système parafoudre et une borne Wifi assurant la transmission déportée des données. Le système est autonome via énergies éolienne et solaire. Du 25 au 29 novembre 2010, 16h d'enregistrements acoustiques ont été réalisés, représentant 951 détections indexées en 1) clics de poisson, 2) sons hautes fréquences, 3) vocalisations de cétacés et 4) sons de cachalot. Une analyse comparative des signaux acoustiques a été effectuée, par une représentation temps/ fréquence/amplitude (spectrogramme) avec une détection visuelle de ±60% des signaux considérés détectables et par une analyse automatique (LabVIEW) basée sur la comparaison d'énergies dans différentes bandes fréquentielles (67% de signaux correctement détectés). Les résultats préliminaires indiquent un nombre de sons différents enregistrés, caractérisés pour les mammifères marins. La présence simultanée du cachalot (Physeter macrocephalus) et d'une famille de delphinidés a été indiquée, ainsi que la détection d'une espèce probable de poisson non identifiée et le relevé de passage de bateaux. Les perspectives sont nombreuses (efforts de pêche, interactions avec les cétacés, estimation continue du bruit ambiant dont l'énergie pourrait être liée à la présence de poissons prédateurs...). Ces premiers résultats montrent l'intérêt des DCP comme plateforme pour la surveillance du milieu marin et sa biodiversité.

Economic Benefits of Fish Aggregating Devices in the South Pacific

Sharp Michael [1,*]

1 : Secretariat of the Pacific Community (SPC)
B.P. D.5. 98848 Noumea Cedex New Caledonia (Nouvelle-Calédonie)
* : Auteur correspondant

Fish Aggregating Devices (FADs) have been widely adopted by Pacific Islands and Territories (PICTs) as a means to improve fishery production. Significant government capital and human resource has been assigned to the fabrication, deployment and maintenance of FADs, and most importantly, significant effort has been dedicated to fishing around FADs as they are thought to provide an array of benefits to the fishing community. Some of the direct and indirect benefits of FADs are thought to be: - Increased fishery production; - Reduced pressure on reef resources; - Import substitution; - Export creation; - Driving demand for sports fishing tourism; - Commercial and cottage industry development; - Increased employment; - Reduced fuel consumption; - Safety at sea; and - FADs maintain fishing interest. These benefits have been widely adopted in the Pacific, which is apparent by the numerous FAD programs that are underway, however little work has been done to quantify the economic benefits (or cost) of FAD programmes. This is primarily attributed to the lack of available data to complete cost-benefit studies. A recent study of catch and socioeconomic data in Niue determined that FADs double catch per unit of effort (kg/hr) and reduce fuel consumption by 0.5 litres per unit of effort (L/hr). At the average annual level of fishing effort, this translates to a net financial benefit of NZ $70,614 to the fishing community, and an economic return on investment of NZ $134,658 (net present value) over a two year FAD programme lifecycle. This paper will present the results of the Niue case study and provide recommendation for the collection of catch and socioeconomic data that will facilitate further studies to justify ongoing investment in FAD programmes.

Le rôle de l'investissement dans la pêche sous DCP. Le cas de la flottille thonière française de senneurs dans l'Océan Indien

Guillotreau Patrice, Salladarré Frédéric [1], Dewals Patrice [2], Dagorn Laurent [2]

1 : Université de Rennes
Ministère de l'Enseignement Supérieur et de la Recherche Scientifique
Rennes (France)
2 : Institut de Recherche en Développement (IRD)
Institut de Recherche en développement
Sète (France)

Les Dispositifs de Concentration de Poisson (DCP) sont utilisés de façon croissante par les flottilles de senneurs thoniers partout dans le monde, modifiant ainsi la composition spécifique des captures. Cette communication analyse les déterminants de la pêche sous DCP et sur bancs libres, incluant les effets patrons, les facteurs environnementaux et économiques. Une analyse factorielle et une analyse économétrique d'un jeu de données de panel de la flotte des senneurs thoniers français de l'Océan Indien entre 1980 et 2007, complétées par une enquête auprès des pêcheurs, démontrent le rôle influent des conditions environnementales (climat, abondance de proies) sur la pêche sous DCP et met en exergue également la préférence individuelle des patrons-pêcheurs. Cependant, nous montrons que le déterminant majeur de la pêche sous DCP reste l'investissement croissant dans la capacité de pêche (utilisation de plus gros bateaux, bouées satellitaires, écho-sondeurs, bateaux d'assistance), accroissant la part des petits thons dans les prises. Toutes choses égales par ailleurs, accroître la proportion de calées sous DCP revient à augmenter les captures de listao de 1,3% et à réduire la captures de gros albacore de 1,7%. Ce résultat démontre que le contrôle de l'effort et de l'investissement en capacités de pêche pourrait s'avérer efficace pour encourager une méthode de pêche ou une autre si le besoin s'en fait sentir.

Exploring fishermen behaviour around Moored FADs : the example of air plane survey and vessels positioning system in Guadeloupe and Martinique.

Guyader Olivier [1,*], Reynal Lionel [2], Bellanger Manuel [3]

1 : Unité de recherche Economie Maritime - UMR AMURE
IFREMER 1211
Ifremer centre de Bretagne BP 70 29280 PLOUZANE (France)
2 : Ifremer - UR de Martinique
IFREMER RBE-RHANTILLES
Pointe Fort 97231 Le Robert (Martinique)
3 : UR Economie Maritime - UMR AMURE
IFREMER 1211
Ifremer centre de Bretagne BP 70 29280 PLOUZANE (France)
* : Auteur correspondant

In 2008, a first set of collective moored FADs was established in Guadeloupe. This establishment was organized in a context of previous private moored FADs system with few restriction on FADs setting. Air planes surveys were organized to estimate the FADs density in areas where the collective FADs were set in order to identify the potential interactions between them. A strait line transect methodology was used in the western and eastern waters of the Guadeloupe and Martinique islands and a detection fonction was estimated to assess FADs density. This survey shows very high densities of FADs in Guadeloupe and relative low densities in Martinique which can be linked to fishermen strategies. In Parallel, some vessels were equipped with a positioning system to follow their fishing pattern. The paper tries to identify different fishing trip pattern and landing composition to explain density in FADs. Management issues are finally discussed.

Fishing strategies, economic performance and management of moored FADs in Guadeloupe

Guyader Olivier [1,*], Bellanger Manuel [2], Reynal Lionel [3]

1 : UEM - UMR AMURE
IFREMER 1211
Ifremer centre de Brest BP70 29280 PLOUZANE (France)
2 : UEM - UMR AMURE
IFREMER 1211
Ifremer centre de Bretagne BP 70 29280 PLOUZANE (France)
3 : Ifremer - UR de Martinique
IFREMER RBE-RHANTILLES
Pointe Fort 97231 Le Robert (Martinique)
* : Auteur correspondant

Fishing on moored FADs has developed since the early 90s in Guadeloupe with the objective of reducing fishing effort on the island shelf and improve fishermen's incomes through the fishing for large pelagic species. The fishing fleet has changed significantly with the increase of size and power of vessels. The aim of the paper is to study more precisely the fishing strategies of vessels operating on anchored FADs and the economic implications in terms of investment and income generation. Data collected as part of fisheries information system set up in Guadeloupe since 2007 (vessel fishing calendar, landings surveys, fuel consumption, economic and social data, ...) are used for this paper. The paper analyses the degree of polyvalence and the economic dependence of vessels fishing for large pelagic on anchored FADs. We then tries to identify the implications in terms of fishing effort allocation towards island shelf activities (pots, nets, ...). Economic performance are finally put into perspective in relation to the issue of collective or private FADs management.

Hawaii Community FADs: strategic locations, data collection, and cooperative research

Kingma Eric [1,*], Itano David [2]

1 : Western Pacific Regional Fishery Management Council (WESPAC)
1164 Bishop Street, 1400 Honolulu, Hawaii 96813 USA (États-Unis)
2 : Pelagic Fisheries Research Program, University of Hawaii
Coconut Island, Kaneohe Hawaii (États-Unis)
* : Auteur correspondant

For generations, native Hawaiian fishermen have targeted tuna at traditional ko'a and tended these fishing areas by placing stones or food in distinct locations to attract and retain food and forage fish like opelu (Decapterus macarellus). Since 1980, the State of Hawaii fish aggregation device (FAD) Program has been maintaining a network of anchored FADs to promote recreational fishing opportunities. These modern FADs, which consist of steel buoys anchored in depths between 200 and 3,000 meters have been used in Hawaii for decades as an effective method to provide public access to pelagic species harvested by recreational, subsistence and commercial fishermen. The State FAD Program consists of 52 permitted locations easily accessible to coastal fishermen operating from harbors and launching ramps throughout the main Hawaiian Islands. In some cases, these locations may not be as productive as some areas further offshore and do they address the interests of some isolated communities for shallow-water FADs for subsistence needs. In recent years, commercial troll and handline fishermen in Hawaii have been deploying private FADs (PFADs) within State (0-3 nm) and Federal (3-200 nm) waters around Hawaii to address these concerns. All of these PFADs have been illegally deployed without appropriate authorization from the U.S. Coast Guard or, if applicable, other authorizing agencies. PFADs are constructed to minimize detection that can create hazards to navigation and owners exercise illegal proprietary rights over fishing on or near their FADs. The proliferation of PFADs in Hawaii has raised concern as to what effects, if any, these FADs may have on the seasonal movement patterns of tuna; the rate or duration of retention; and their impact on traditional fishing grounds and ko'as. FADs are popular because they can reduce search time for fish and minimize fuel costs but restricted access has contributed to user-group conflicts and market competition. The Western Pacific Regional Fishery Management Council (Council) recognizes the potential benefits of legally established, freely accessible, optimally located and maintained FADs. The Council also recognizes their ability to supplement the State FAD program currently experiencing funding shortfalls while providing community benefits through strategically located FADs. In 2006, the Council worked with fishermen from a rural community in East Maui, Hawaii to establish the first legally established community FAD in the State. Based on the success of that project, the Council has worked with other communities in Hawaii to deploy additional community FADs. This paper describes the design, data collection, cooperative research, community benefits and challenges associated with developing community FADs.

Moored Fishing Aggregating Devices development in Martinique: Review and Outlook after 20 years

Reynal Lionel [1,*], Guyader Olivier [2]

1 : Ifremer - UR de Martinique
IFREMER RBE-RHANTILLES
Pointe Fort 97231 Le Robert (Martinique)
2 : Economie Maritime (EM)
RBE-EM
Ifremer Centre de Brest (France)
* : Auteur correspondant

Depuis les années 1990, les Dispositifs de Concentration de Poissons (DCP) ont connu un franc succès dans les petites Antilles et au-delà, car ils permettent aux petites unités de pêche non pontées d'accéder à faible coût aux ressources du large auxquelles elles n'accédaient que partiellement et de façon saisonnière. Après 20 ans d'expérience, l'objectif du présent travail est de faire une évaluation de l'impact des DCP en Martinique au regard des objectifs initiaux de leur mise en place qui étaient de redéployer l'effort de pêche des ressources coralliennes trop exploitées vers les espèces pélagiques du large, de réduire la saisonnalité de la pêche, de préserver le plus haut niveau d'emploi, d'accroitre les débarquements, et les revenus des pêcheurs et de réduire les importations. Un ensemble d'indicateurs a été établi pour décrire la structure de la flottille, l'allocation de l'effort et la production par type de métier au cours de l'année. La dynamique du développement de la pêche aux DCP et la situation socio économique de la pêcherie ainsi que l'état global des ressources est analysé, donnant un exemple de ce qui peut être attendu du développement des DCP dans une pêcherie en accès libre.

Fishing technology associated to a data buoy moored in the Western Equatorial Atlantic: impacts and benefits

Da Silva Guelson [1,*], Fonteles-filho Antônio [2]

1 : Animal Sciences Department, Universidade Federal Rural do Semi Árido (UFERSA)
Av. Fco. Mota, 572. Bairro Presidente Costa e Silva, Mossoró-RN. CEP: 59.625-900. (Brésil)
2 : Marine Sciences Institute - Universidade Federal do Ceará (LABOMAR - UFC)
Av. da Abolição, 3207, Bairro Meireles, Fortaleza-CE. CEP 60165-081. (Brésil)
* : Auteur correspondant

Due to the collapse of the lobster fishery, the fleet based in Areia Branca, RN, Northeast Brazil, is developing a fishing technology associated with a data buoy of PIRATA program (Pilot Moored Array in the Tropical Atlantic), which is anchored in the Western Equatorial Atlantic, and has acted as a fish aggregating device (FAD). Thus, the present study aims to describe the fishing technology by fleet, fishing gears and baits employed, as well as identify the possible impacts and benefits. Data were obtained on board through three cruises in February, April and July 2011. The fleet actually consists of seven wooden boats with an average length of 13 meters and power engines of about 110 HP. Are employed miscellaneous fishing gears, all with nylon monofilament, and natural or artificial baits like: bamboo poles with silicone lure; hand lines at different depths with silicone lure, strips or live small tunas; trolling with silicone, rubber or fiberglass lures; dip net to catch live bait such as flying fish or squids. As the main impact, were recorded some boats tied on the buoy structure. On the other hand, some masterfishermen developed a technique to aggregate the schools under the boat and work drifting until complete the fish hold, and thus, transferring them to other boat. As benefits, we can point the reduction of fishing effort in the coastal areas, the generation of jobs, increased income, especially due to the high market price of target species. This fishery plays an important role as alternative to the fishing sector in the Northeast Brazil. Education and outreach programs should be conducted to raise fishermen's awareness about the importance of data buoys, as well as the development of FAD program in Brazilian waters to reduce the fishing activity on PIRATA buoys.

Towards sustainable FAD fishery in the WIO region. Efforts and milestones explored

Mbaru Emmanuel [1,2,*]

1 : Rhodes University (RU)
P.O. Box 94, Grahamstown, 6140, South Africa (Afrique du Sud)
2 : Kenya Marine and Fisheries Research Institute (KMFRI)
P.O. Box 81651-80100, Mombasa, Kenya (Kenya)
* : Auteur correspondant

Due to the ongoing malthusian overfishing and degradation of near shore coastal areas, efforts to overcome it have been increasingly coming under the spot light with numerous calls and support for a paradigm shift in resource exploitation strategies. The question has become not one of ?do we need a change in exploitation philosophy? but rather one of ?what new approach to resource exploitation is most appropriate?? It is within this context that a major World Bank collaborative research project dubbed South West Indian Ocean Fisheries Project (SWIOFP) focused on development of FAD fishery programs in all the nine SWIO countries. Fish behavioral studies through acoustic tagging have been emphasized as part of the research around these FADs. In this regard, a framework based on, and in compliance with, the needs of the various countries is presented.

The Secretariat of the Pacific Community's library

Watt Stéphanie [1,*]

1 : SPC Library
Noumea (Nouvelle-Calédonie)
* : Auteur correspondant

The Secretariat of the Pacific Community's library is a private corporate library that aims at enhancing and servicing SPC's professional and technical staff, its projects and programmes. It provides information resources, including research, current awareness, acquisitions and information management to SPC staff. The library also seeks to promote and enhance information access and delivery to SPC member countries and territories.
It has a staff of 6: the Librarian, 4 Assistant Librarians and 1 Library Services Officer responsible for Geosciences documentation.
The current collection has regional and international publications in French, English and to a limited extent, some Pacific languages. Of the approximate 70,000 total holdings, one quarter deal with marine science and fisheries, making it the largest subject area collection in the library, and of that, approximately 300 items are FADs related.
The SPC library is a contributor to the Aquatic Sciences and Fisheries Abstracts and is responsible for entering bibliographic information on SPC publications in all areas of fisheries, including Aquaculture. Access to this database has enhanced our service delivery with regard to Fisheries information to our focal points in member PICTs.
Recent library activities in fisheries included developing a bibliography on FADs for the 2011 Tahiti FAD conference, training on the ASFA database in 2009, and training to PIMRIS partners on Koha, the library software, in April 2010. Updating the serials list for the IAMSLIC Z39.50 union list is ongoing. The IAMSLIC Z39.50 tool provides research support to SPC fisheries staff.
A key element of collaboration between the library and Fisheries sections is the Fisheries Digital Library. The library catalogues all the meeting papers and reports related to fisheries, these are then scanned and OCRed. This is made accessible using Greenstone. DVD versions were distributed throughout the PICTs, and it is also available online via:http://www.spc.int/DigitalLibrary/FAME

Index des auteurs