

WSFC

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BOOK OF ABSTRACTS

TRANSDISCIPLINARITY
& TRANSFORMATION
FOR THE FUTURE OF
SMALL-SCALE FISHERIES



Name	Affiliation	Title	Abstract
Abdul Wahab bin Abdullah	WorldFish, Malaysia	Technical and social innovations to help fish processors shift in pathway out of a social-ecological trap in the Barotse Floodplain fishery, Zambia	The Barotse Floodplain fishery is an important source of livelihood for women and men in western Zambia. Sub-optimal efforts by Department of Fisheries and the traditional authority to manage the fishery have resulted in unsustainable fishing practices, and a decline in fish stocks and average sizes over the past decade. It is thought that such rigid behavioural responses are applied due to having a lack of capacity to adapt, leading to overdependence on the fishery and, ultimately, unsustainable outcomes— referred to as social-ecological trap. This presentation expands this often-cited trap framing by applying a gender lens and looking beyond the primary sector (fishing) to include considerations of a secondary sector (post-harvest processing). Post-harvest losses create economic and food/nutrition security challenges for value chain actors and increase the need for more fish as fishers, processors and traders attempt to recover their losses. Research shows that, on average, more women than men experience losses across this fishery value chain, and that women processors experience significantly higher losses than men processors. Gendered barriers, along with lack of access to technologies, contribute to these losses. To address this development challenge, a research project tested both improved fish processing technologies and a communication for social change innovation as a possible escape pathway from the trap in this fishery. The results suggest that approaches that combine technical innovation to reduce losses with social innovation to enhance gender equality may hold promise for enabling value chain actors to shift in pathway out of social-ecological traps, especially women.
Adi Susanto	University of Sultan Ageng Tirtayasa, Indonesia	Seawater battery with common electrodes as energy source for fishing lamp of lift net fisheries	The key problem in the application of seawater battery is lying on the expensive cost of anode material manufacture, especially for fishing activity. Seawater battery with a common electrode such as Al-Cu, Zn-Cu, Gal-Cu is expected for selecting fixed lift net application through innovation of Light Emitting Diode (LED) fishing lamp. This research is evaluated the performance of seawater battery with various common electrodes to drive LED lamp during the discharge process. The laboratory experiment was conducted on December 2016 to January 2017, in order to measure a potential and current output of aluminium (Al), zinc (Zn), and galvalume (Gal) anode of seawater battery without load and load condition. The results showed the zinc anode had the higher performance in term of voltage and current output than galvalume and aluminium anode. The maximum power output of zinc (704.17 mW) was not significantly different from galvalume (726.41 mW), nevertheless, these have a significant difference to aluminium (175.75 mW). It was a good evidence that the performance of seawater battery was affected by anode material. Zinc was sufficient enough to be developed as seawater battery anode due to their higher number of potential, current and power output. Further development of seawater battery with Dual In-line Package (DIP) LED is appropriate for the new innovation of an effective and efficient fishing lamp for lift net fisheries.
A K M Firoz Khan	WorldFish, Bangladesh	Community based fisheries management (CBFM) in inland capture fisheries and its importance on to productivity, bio-diversity and income: An example from Bangladesh	Bangladesh is gifted with huge inland capture fisheries resources, largely the contribution of favorable natural conditions within the country for the growth of living aquatic resources. In a developing country like Bangladesh, problems are numerous while resources are limited. Despite of numerous challenges to fisheries sectors in Bangladesh flourishing. In recent years contribution of fisheries sector is more than 4% GDP, 22% to agricultural GDP, 3% of total export earnings, in addition capture fisheries provided 28% of country total fish production. This study attempted on assessing achievements and issues with CBFM of inland capture fisheries. Attempt of CBFM in Bangladesh undertaken more than two decades, more than 700 community based organization (CBO) established for effective fisheries management by providing access rights over the resources. Study captures results of CBFM undertaken in deep floodplains contain different types of perennial waterbodies with extended floodplain. CBFM initiatives in Bangladesh enhances productivity and fish bio-diversity by restoring fish habitat. Community-based efforts also improved wetland ecosystems, access to fisheries resources by poor and promoted an increasing trend of income in households associated with in CBFM waterbodies. Coordinated management waterbodies is essential for addressing the common issues in individual or in cluster of waterbodies where, resources such as fish are highly migratory and move wherever water is connected. Study concludes with consideration of factors affecting CBFM and impacts on production, bio-diversity and livelihoods of people involved in the initiative. Distribution of benefit depends on the strength and appropriateness of the institutions, attitudes and social cohesion.
Akiko Ikeguchi	Yokohama National University, Japan	Adaptive governance of coastal fisheries resources in response to Isoyake (seaweed deforestation): a case study in Ojika island, Japan	This paper discusses analytical framework to understand regional capacity for adaptive governance of small-scale fisheries in response to Isoyake, a dynamic resource change caused by seaweed deforestation triggered by changing oceanographic condition. Previous studies on adaptive governance suggested critical role of fisher's knowledge, learning, and value sharing in institutional change. However, what regional conditions foster these abilities have not been fully explored. We employed evolutionary approach to describe the change of institutional change in fishing grounds use, by analysis of annual reports of 1961-2017 kept by fisheries cooperative association (FCA), and interview to fishermen in Ojika island, southern Japan. The result show how new institution emerged after major resource depletion in abalone and other benthic resources. Significance of new concept of ownership, FCA activities and communal norms will be presented.

Akintola Shehu Latunji	Fisheries Department, Lagos State University, Nigeria	Sustainable small-scale fisheries in Nigeria-adopting open transdisciplinarity paradigm for transformation	<p>Overarching objective of fisheries policies, management and science in Nigeria is attainment of sustainability. However, the pathways present both adaptive challenges/ wicked problems. This article examines some fisheries and policy indicators, (via fisheries data and fisheries policy documents) and fisheries curriculum within the precepts of sustainable indicators. While there have been some commendable sustainable development, there are many hurdles that will need to be overcome to achieve sustainable small-scale fisheries as a result of knowledge imbalances. Adopting open transdisciplinarity paradigm not only provide a panacea to knowledge imbalances but will reduce the conflict associated with inter-sectoral governance of inland fisheries. Open transdisciplinarity in this context is not restricted to the process and outcome of knowledge generation but extended as a means to enhancing the process for collaborative efforts. Scientist, government and civil society organisation and other stakeholders would need to work more closely to achieve the transformation envisaged to drive sustainable fisheries development through producing both new sets of knowledge and action required to deal with a future of small-scale fisheries where complex and unprecedented issues of global change will play out as wicked problem. This paper concludes that many of the present inhibition towards sustainable fisheries development present arrays of adaptive challenges which will be overcome with paradigm shift towards open transdisciplinarity through principles of meta- governance.</p>
Akintola Shehu Latunji	Fisheries Department, Lagos State University, Nigeria	Small-Scale Fisheries Guidelines implementation in Nigeria: Challenges and prospects	<p>The Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) was adopted by member countries of the Food and Agriculture Organization of the United Nations (FAO) and were officially approved as an international instrument in June 2014. The first real effort from the Nigeria was by our team participating in the first global transdisciplinarity study on the implementation of the SSF Guidelines i.e “The Small-Scale Fisheries Guidelines Global Implementation” in which we contributed a chapter titled- Applying the Small-Scale Fisheries Guidelines in Nigeria: Status and Strategies for Badagry Coastal and Creek Fisheries. The mandate by Too Big To Ignore (TBTI) to lead the process of implementation of the SSF Guidelines was taken back to Nigeria. This paper presents our experience in building a transdisciplinary team for the implementation of the Guidelines. It highlights the lessons gained from the field from interactions with the fishers, government, Non-Governmental Organisation, and researchers (with background in science, law and social science) with regards to their knowledge, expectations and questions of benefits accruing to the fishers and the country. Furthermore, we are working closely with experts in Law and Language to have the SSF Guidelines translated to the Yoruba language which is the dominant language among fishers with whom we are engaged presently. Activities are in the advance state to create a blog that specifically provide information on the small-scale fisheries of Nigeria. We also providing the concept note on creating and raising national awareness and implementation planning process, as well as reviewing the existing regulatory and institutional framework in the context of the SSF Guidelines. Baseline information on the sustainable indicators of the small-scale fisheries sector in Nigeria is being developed. Our work as reached an advance stage on the legal framework for implementing the Small Scale Fisheries Guidelines in. While, our efforts may be considered low key, we understand that success in this direction is cumulative and additive. The team is further encouraged by the positive vibes emanating from the government and will keep the tempo going on at least to preserve the little but important gain made so far. It is safe and heart-warming to conclude that while the process leading to the full implementation of the Guideline is seeing positive light, adoption of open transdisciplinary research is driving the transformation of the small-scale fisheries to a sustainable one.</p>
Alba Aguión	Universidade de Vigo, Spain	The stalked barnacle in Southern Europe: a comparison of bottom-up and top-down management systems of a benthic resource	<p>Fisheries management has been shifting globally from the classic top-down approach towards bottom-up efforts as a new paradigm emerges based on the principles of exclusive fishing rights, fishers participation and adaptive management. In this paper we discuss these principles in the context of the stalked barnacle (<i>Pollicipes pollicipes</i>) fisheries in Southern Europe. This barnacle is heavily exploited by artisanal and recreational fishers, and it is the most important economic resource in the intertidal rocky shores of Northern Spain and continental Portugal. Fisheries management systems greatly differ along the European coast, from bottom-up approaches in Galicia and Asturias (NW Spain) based on TURF systems, to a diverse set of top-down approaches in Portugal and France. In this study we analyse trends in catches, fishing participation and regulatory measures under the different management systems as factors defining their effectiveness. We find common problems such as overexploitation, poaching and competition between fleets in all study areas. Co-managed areas in Galicia and Asturias present major advances to overcome these challenges. In Asturias, the incorporation of fishers’ knowledge has led to the fragmentation of the management units down to single rocks. In Galicia, harvesters count with internal technical advice from biologists that provide good quality fishery data and acts as a link between stakeholders. However, top-down approaches in Portugal and France are precluding fisheries to solve these problems. Our results show the potential of co-management for the sustainable use of the resource providing general pathways to improve governance in other benthic fisheries.</p>

Alejandro Acosta	Gulf Caribbean Fisheries Institute, USA	Gulf Caribbean Fisheries Institute: 70 years providing services to Caribbean and Gulf of Mexico Fisheries	<p>The Gulf and Caribbean Fisheries Institute (GCFI) was founded in 1947 to promote the exchange of current information on the wise-use and management of marine resources in the region by fostering the conversations between scientists who study Caribbean marine resources and people who use these resources. GCFI mission have been to involve scientific, governmental, academic, artisanal and commercial fisheries sectors to provide a broad perspective on relevant issues, and to encourage dialogue among groups. GCFI is uniquely well-suited to making science understandable to the common citizen, educators, and policy makers. GCFI annual meetings are hosted every year in a different country of the region. The host country provides an overall vision of their capacity needs and GCFI provides a scientific program that meet their needs and enhance their local capacity. An example, is the “Fishers field trip” this activity promotes the exchange of information between local fishermen and fishermen from the region. GCFI have become the leader in regional networking for addressing important emerging issues such as conservation of fish spawning aggregations, effective regional governance, marine protected areas capacity building (MPAConnect network), the lionfish invasion, the sargassum influx, and marine pollution (as co-host of the Caribbean Node of the Global Partnership on Marine Litter). Today, more than ever before, the role of GCFI is crucial for the future of the region marine resources. The future of these resources depends very much upon public understanding of those resources and how they are affected by human activities as well as natural processes.</p>
Alfredo Giron-Nava	Scripps Institution of Oceanography, USA	Managing at Maximum Sustainable Yield may not ensure economic well-being for small-scale fishers	<p>Maximum Sustainable Yield (MSY) is perhaps the most common management target for fisheries, particularly across the developing world. Although achieving MSY may ensure the long-term sustainability of fish populations, we ask whether it can provide economic security for regions with many fishers and limited alternative income sources. Here we use 16 years of daily landing records from 11 subregions in Mexico to estimate potential catches and revenues per capita if fish stocks were exploited at MSY. We then compare estimated revenues per capita against national poverty line incomes. Our results show that even if MSY is reached in artisanal fisheries, the overcapacity of fleets in the Gulf of California threatens the economic well-being of fishers and their families, pushing revenues per capita below poverty levels. Moreover, increasing numbers of fishers, decreasing total landings, and concurrent power and access dynamics will likely further jeopardize the situation as revenues per capita continue to decline. This transdisciplinary approach demonstrates the importance of equally weighing human livelihood and environmental conservation objectives when managing for the long-term sustainable use of natural resources.</p>
Alice Joan de la Gente Ferrer	University of the Philippines Visayas	Assessing impacts of Marine Protected Areas on the welfare of small scale fishers in Southern Iloilo, Philippines	<p>This study assessed the impacts of marine protected areas on the small scale fishers’ fishing income and volume of fish catch. Focus group discussions and key informant interviews were conducted to supplement household survey data collected in March to June 2016 from 240 fishing households in San Joaquin and 240 fishing households in Miagao, Iloilo. The 15 marine sanctuaries (with three as pilot projects) in the limited shallow waters of 19 coastal barangays in San Joaquin were established between 2009 and 2011 to protect, conserve, and rehabilitate the marine resources. Results show that these objectives are being realized for the three pilot marine sanctuaries. Seventy fishers living near the pilot marine sanctuaries in San Joaquin (treatment group) and 240 fishers in Miagao (control group) were matched. The volume of fishers’ catch in San Joaquin was significantly higher by 0.70 kg to 1.23 kg per fishing trip than catches of fishers in Miagao (under the Nearest Neighbor Matching only). Meanwhile, the monthly fishing income of fishers in San Joaquin was higher by about PhP200 to PhP495 but the increase was not significant. The small scale fishers were poor and highly dependent on fishing. They were shifting fishing grounds and targeting more the small pelagic fishes than the reef-associated species. The MPA should be part of a larger scheme of fishery management that includes complementary tools and techniques for habitat protection, conservation, and rehabilitation, especially when the resource base is already degraded and the institutions are weak.</p>
Alicia Said	Memorial University of Newfoundland, Canada	Aligning the sustainable development goals to the small-scale fisheries guidelines: a case for EU fisheries governance	<p>Since the launch of the Sustainable Development Goals (SDGs) in 2015, several countries, funding organizations, environmental groups and research communities have pledged support and made commitment to help achieve these goals. SDG14: Life Below Water, for instance, has been embraced as the global goal for conservation and sustainable uses of the oceans, seas and marine resources. Despite being the largest sector utilizing the oceans and a significant contributor to food security, poverty alleviation and employment, small-scale fisheries are mentioned only in one target (14b), related to access to marine resources and markets. The under-rating of small-scale fisheries in the SDG14, as well as in the overall SDGs, points to a major disconnect between development policies that aim at particular sectors and the need for integrative and holistic approach for environmental sustainability. In the context of small-scale fisheries, efforts to rectify this would begin with aligning SDGs with the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (SSF Guidelines), adopted in 2014 by member states of the Food and Agriculture Organization of the United Nations. Using European small-scale fisheries as illustrations, we argue that such an alignment can help facilitate the implementation of these global instruments in ways that not only optimize human and financial resources required but also result in concerted and sustained efforts for the sustainability of fisheries worldwide.</p>

Alicia Said

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Transforming the
small-scale fisheries
markets in Malta:
Bringing underutilized
species to the
forefront

Transformation of markets through innovation are fundamental for the economic, environmental and social sustainability of small-scale fisheries, especially given the challenges that fishing communities undergo due to effects of the global market on the local fishing economies. By drawing on a recently enacted culinary initiative in Malta, this article demonstrates how market innovation can be based on the promotion of underutilized species that are not popular amongst consumers and not sought in local restaurants. By bringing underutilized species to the forefront and enhancing their demand at the local market level, small-scale fishers can benefit from better prices of their fish. This article describes the different schemes that are in place by the Mediterranean Culinary Academy to promote and educate locals and tourists about underutilized small-scale fisheries catches including courses on different types of seasonally available fish, and skills on how to choose and cook such fish. From its one-day and hobby courses to its professional training for chefs, the academy provides every participant with a wealth of information and skills on how to make delicious, fresh food in the most sustainable manner possible. This initiative, which is based on fish supplied directly by the local fishing communities, seeks to heighten the demand for underutilized species, and simultaneously strengthen the link between fishers and consumers through the concept of direct sales. Moreover, by reducing the reliance on overexploited species, this transformative vision engenders a sense of ecological awareness towards the sustainability of fisheries, and sustains the socio-cultural traits of the local and traditional cuisine.

Alicia Saldaña

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Whose vulnerability,
how viability? A
participatory
diagnostic approach
for sustainable small-
scale fisheries

Small-scale fishing people face a variety of threats and challenges that make them vulnerable and affect their ability to have viable livelihoods. Efforts to address these concerns often come from outside of the community, based on lessons and experiences in other locations. We argue that many of these pre-determined methods make implicit assumptions about the nature of impacts and threats being experienced, which may not reflect well what and how the communities feel. Considering that local communities need to be part of any effort to promote sustainability, we propose that the meaning and sources of vulnerability as well as the opportunities for enhancing viability be understood from their perspective. In this paper, we present the 'participatory diagnostic' approach as a tool to help elicit fishers' interpretation of the biophysical, social, economic, institutional, and technological conditions that constrain their viability or that need to be overcome in reducing vulnerability. We report the results of the empirical application of the approach to a fishing community in Sisal, on the Yucatan coast of Mexico, using individual surveys and workshops as elicitation tools, and conclude with the discussion about lessons learned and ways forward.

Coastal-marine systems, including small-scale fisheries, are particularly vulnerable to the multiple challenges imposed by global change, often with consequences far beyond those anticipated. Such challenges have led to widespread system degradation, undermining the functioning of the coasts and oceans and their provision of goods and services. This condition creates hardship for local communities and businesses that depend on ocean services for income, food, livelihoods, and well-being. Awareness about global change has increased and been accompanied by heightened concerns for the future, yet, there is limited knowledge and understanding of effective responses and adaptive strategies. We will explore the potential for harnessing existing strengths in small-scale fisheries coastal-marine social-ecological systems, by developing multilevel partnership arrangements and collaborative networks, which will help to build strategies and counter the various vulnerabilities imposed by global change. The objective is to create viable coastal communities that can effectively respond to existing vulnerabilities and establish novel governance arrangements for achieving social-ecological sustainability. Viability is used here not just in an economic sense but also to include social, political ecological and governance aspects. Taking a systems approach to global change responses that can help achieve viability of small scale fisheries, we propose to address questions in four key areas: 1) Awareness, perception, and communication of vulnerabilities and strengths – To what extent are coastal-marine actors aware of their communities' vulnerabilities and strengths? How are these perceived and communicated, and how does this vary across scales (i.e., local to global)? 2) Drive to move toward viability - What drives coastal-marine actors to work towards reducing vulnerabilities and increasing strengths to achieve viability? How is this developed? 3) Governance of global change response - What governance arrangements can support coastal-marine actors to effectively engage in global change response processes? 4) Transformation to viable coastal-marine systems - How do coastal-marine actors achieve transformative change through establishing and maintaining viable coastal-marine systems? What approaches can be used to document and monitor this process for learning by future generations? To address these questions, a range of tools and a transdisciplinary approach are required. We present the I-ADaPT framework, a decision support tool for analysis and response to global change in coastal-marine systems and invite presentation and discussion of additional approaches. We will also draw on a common set of conceptual and methodological tools, and add insights from the literature on governance, systems thinking, participatory management, and knowledge co-productions. The session will highlight that understanding and addressing these four key question areas is crucial if progress is to be made towards making our coasts and oceans socially, ecologically, economically and politically viable. It has the potential to lead to conceptual development, policy formulation and implementation, and collaborative practices around sustainable and viable coastal-marine systems. We will maintain a specific focus on viability of small-scale fishery systems in this session. The ultimate objective of the Session is to build on the ideas discussed during the session and develop a transdisciplinary research proposal, inviting interested parties as partners that can collaborate to explore these four questions.

Global Change
Response for creating
viable coastal
communities:
Developing an
International
Partnership

Fisheries and Oceans,
Canada

Alida Bundy

Aliou Sall	Mundus Maris, Senegal	The feminization of poverty as an impact of globalisation in west African SS. Case Study of Senegal, Guinea Bissau and Guinea Conakry	<p>The artisanal fishing communities in West Africa are traditionally characterized by the presence of women with real power and a certain social status compared to other rural women (those dependent on agriculture or livestock for example). The social status they enjoy is due and maintained by certain roles they used to play, essential for the functioning of fisheries both upstream and downstream of fishing operations and other related activities within the SSF themselves. Among the roles assigned to women in fisheries, we can cite in particular their strong involvement in the pre-financing of the tides on the one hand and they used to be the first links of the marketing chain. This indispensable presence of women who have largely contributed to the perpetuity of this activity over time is all the more appreciable when we know the reluctance of banking financial institutions to get involved in the financing of SSF. In return and in favor of the latter, their role as holders of informal financial markets for small-scale fishing has been the basis of the entire process of social accumulation, whether in monetary form or as a store of value. Despite the various development projects initiated by the States of the sub-region in collaboration with their partners, none of them has been able to satisfactorily meet the financing needs of the fishing communities. Most of the financial resources used to keep the fishing units in operation come largely from the family patrimony, which is very dependent on women's contributions. If globalization is a concept (a reality too) that refers to the expansion of markets, it is a phenomenon not new in the artisanal fisheries in West Africa. However, for a little over a decade, under the combined effect of several factors, the inability of public authorities to recognize the true value of the importance of small-scale fishing, we are witnessing a process of de-regulation in the social organization of communities whose first victims are these women. Among these factors, Among these factors, it is the new strategies developed by the international seafood market that is the main vector that has led to some de-structuration of fishing communities, progressively relegating women to the supporting role. In many cases, we can say that they have passed the role of subject to simple actresses. Indeed, the international market, through its intelligent adaptation to the informal sector has managed to penetrate the fishing communities, with an increasingly will to control the Capital (means of production) in SSF. The purpose of this contribution is to explain the process by which women, losing the predominant place in the informal financial circuits and marketing, are the main victims of the social crisis of the fishing communities under the effect of globalization. Then, on the basis of illustrations, we will show how this loss of prerogative is reflected on the social and economic levels, without forgetting their consequences on the solidarity chains characteristic of fishing communities.</p>
Amalendu Jyotishi	Bangalore Campus, Amrita University, India	Understanding change and continuity in urban fish markets: Implications for food security	<p>Liberalization and globalization have created new opportunities in the fisheries sector at the same time they have increased the integration of subsistence economies into commercial markets in urban spaces of India. New geographies of fish production, marketing, and consumption have evolved that impact access to fish protein that urban populations enjoy. In this paper, we seek to understand the spectrum of retail fish trade in two urban areas of India and how this has evolved over time to service different groups within cities in different ways. Using a commodity (or value) chain analysis that integrates historical analysis and insights from Polanyi, Boserup, and political economy, we map the spatial arrangement of fish trade in different urban contexts and theoretically explore how the nuances of change and continuity within fish trade may be explained through technology, transactions relations, and historical dimensions of production and market relations. Chennai and Bangalore are selected as the two urban centers as the former is a port city with fish landings and the latter a land-locked city. Each present a different trajectory of fish market development. We observe that the evolution of urban fish markets is uneven and often maladaptive to the changing composition of urban populations. Our analysis suggests that growth in the urban market for fish caters to upper income groups while fish markets serving low income groups have either stagnated or declined. Given the increasing level of urban poverty, food insecurity and malnutrition, such development is a concern.</p>
Amanda Lejbowicz	Marine Stewardship Council (MSC), UK	Fisheries certification standards as a tool to implement the Sustainable Development Goals and FAO's Voluntary Guidelines for Securing Sustainable Small-Scale fisheries: A Case Study	<p>Environmental stewardship and social development are key components of two internationally agreed instruments of key significance to Small Scale Fisheries (SSFs) - the FAO's Voluntary Guidelines for Securing Sustainable Small-Scale fisheries (VGSSSF) and the Sustainable Development Goals (SDGs). Governments, businesses, NGO's, and civil society have accordingly made commitments to work to achieve SDG goals that relate to fisheries, and to the implementation of the VGSSSF. The multi-faceted attributes of fishery certification initiatives, which is inclusive of measurable standards, independent evaluation, multi-stakeholder engagement, continuous improvement, transparency and value chain gains, suggest that certification could provide a mechanism to achieve and demonstrate compliance to internationally-endorsed goals. A case study review of the Marine Stewardship Council (MSC) programme, one of the more prominent fishery certification programmes illustrates how fishery certification standards contribute to the SDGs and the VGSSSF. Qualitative review of several small-scale fisheries engaging, or working towards MSC certification highlights how certification operates in practice to achieve environmental sustainability components such as resource management, increased scientific knowledge and monitoring control and surveillance. In addition, several social outcomes, integral to these two global instruments including market benefits, participatory approaches to decision making and improved governance are amongst the direct and indirect ways that standards operationalise and catalyse a pathway to global targets. While there is clear evidence of the environmental and social significance of certification standards in more localised contexts, the paper outlines how new and innovative tools and approaches could see social and environment outcomes aggregate to more significant levels for small-scale fisheries at a global scale.</p>

Amanda Lejbowicz	Marine Stewardship Council (MSC), UK	Improving SSF sustainability through a multi-stakeholder collaborative approach: The MSC PPA Model	<p>Nearly 35% of assessed fish stocks worldwide are considered to be overexploited. This is the result of overcapacity, lack of scientific information to inform appropriate regulations, insufficient political will, poor involvement of the fishing sector in the decision-making process, and weak market incentives for promoting sustainable exploitation of natural resources. All these factors are particularly relevant for small-scale fisheries (SSF) globally, because the level of economic and human investment in those is traditionally lower than that in large scale industrial fisheries. Bearing this in mind, management authorities are beginning to utilize the Marine Stewardship Council (MSC) standard as an independent and credible ground-truthing exercise before making wide-sweeping adjustments and efficiencies to their management framework, for the benefit of all fisheries and not just those seeking certification. This collaborative approach is now known as the “multi-fisheries pre-assessment project” or PPA. Through a combination of mapping and pre-assessment exercises, the PPA model offers governments, fishers, scientists, market players, and local NGOs the chance to collectively find the most efficient route to make environmental improvements at the most appropriate scale. The goal of this panel is to share the methodology applied in the current PPA being developed, to learn from the experiences of different stakeholders involved in different PPAs around the world, and to collect all inputs, ideas, and criticisms from the audience in order to improve the model for future projects in SSFs.</p>
Amy Diedrich	College of Science and Engineering, James Cook University, Australia	The role of social capital in livelihood diversification in small-scale fishing communities in Papua New Guinea	<p>Growing concerns about the pressures of global change on small-scale fishing communities have resulted in a proliferation of livelihood diversification initiatives. Many of these are linked to tourism, intended to provide new economic opportunities and increased environmental sustainability from a non-extractive use of natural resources. However, such initiatives often fail to deliver their intended benefits. Where the dominant discourse emphasises financial, physical, and human capital as integral to positive outcomes, we argue for more consideration of the role of social capital in this transformative process. For isolated communities and marginalised groups, limited or negligible access to physical, human and financial capital means that social and natural capitals play more central roles in people’s livelihood choices. Moreover, because livelihoods are socially differentiated, in the absence of mediating factors such as reciprocity and social networks, the introduction of new opportunities can provoke unequal distribution of new or existing forms of capital, thus exacerbating inequality. We implemented household-level surveys in three small-scale fishing communities in Papua New Guinea and modelled the relative influence of social and other capital assets on people’s perceptions of how easy it would be to become involved in sportfishing tourism. We found that social capital had a stronger influence relative to other forms of capital, with perceptions of reciprocity and satisfaction with leadership in the community being the most influential aspects. Based on these findings, we stress the importance of developing strategies that focus on measuring, building, and maintaining social capital in communities transitioning into alternative livelihoods.</p>
Amy Hudson Weaver	Sociedad de Historia Natural Niparaja A.C., Mexico	The importance of strong fishing organizations for fisheries sustainability: A global to local perspective	<p>The session focuses on SSF governance and the relevance of having strong fishing organizations to improve governance, responsible fishing and sustainable outcomes. Duke University will start the session by presenting the results of an empirical global analysis of the scientific literature on the status of theory and practice on governance of SSFs based on the recent published report Strengthening Governance of SSF: An Initial Assessment of Theory and Practice. The report emphasizes the role of capacity building and empowerment of SSF organizations as key elements for reforming fisheries governance. Next our FAO colleague will introduce the perspective of FAO as an agent of capacity building and empowerment themselves, and share their view on how initiatives to strengthen fisheries organizations relates to SSFs guidelines implementation. COBI and Niparajá will be presenting the results of an empirical study: the National Diagnostic of Fishing Organizations in Mexico, co-produced by academia, civil society organizations, and the fishing sector in collaboration with the federal government. This two-year project explored a novel process for collecting data involving a combination of tools (surveys, interviews, pile sorting, focus groups) and different scales of organization (cooperatives, federation, and confederations). In only two years this collaboration resulted in concrete changes to the rules of operation of the Mexican fisheries agency (CONAPESCA) and direct inputs for the development of a program for strengthening fishing organizations in Mexico as well as important insights for the ongoing global initiative presented by FAO. Finally, a member from the Mexican Confederation of Fishing Cooperatives (CONMECOOP) will present his own perspectives on how these initiatives fit into practice and how resulting information can be translated to policy, better governance and better use of marine resources. Overall the session invites us to reflect on the role of SSF organizations, the importance they play in fisheries sustainability and livelihoods, and how they can elevate the profile of SS fishers.</p>

Ana Carolina Esteves Dias	University of Waterloo, Canada	Depicting wellbeing-ecosystem services bundles in fisheries as a path for conflict resolution in Marine Protected Areas	<p>Marine protected areas are a recognized strategy for coastal and marine conservation, increasingly gaining attention in the international setting, especially with agreements such as the Aichi targets for biodiversity conservation. Despite the conservation appeal and participatory guidelines for its implementation, the creation of MPAs often discounts the interaction between local communities and the area being set aside for conservation. In this paper, I suggest the use of Photovoice method to depict the benefits coastal ecosystem services provide to fishing communities, under the perspective of social wellbeing, accounting for material, relational, and subjective dimensions of fisheries. Wellbeing-ecosystem services bundles are used here as the integrated benefits fishers obtain from coastal ecosystem services. Photovoice is a qualitative method aiming to provide more in-depth information regarding how ecosystems services contribute to the three dimensions of social-wellbeing. This method is appropriate due to the subjective and less straightforward information it can reveal through images and explanations of each image. I argue that better understanding of the attachment of fishers to the coasts and to fishing activity - including not only material benefits of fisheries, but also underlying factors that contribute to their wellbeing (e.g., the father and son relations mediated by fishing) – will favor the implementation of sound conservation efforts and reduce conflicts between environmental agencies and coastal communities. Thus, this research will provide theoretical and empirical contributions to MPA governance through an adaptive approach, favoring the incorporation of sound and adequate social-ecological knowledge to deal with environmental conflicts.</p>
Ana Carolina Esteves Dias	University of Waterloo, Canada	Wellbeing-ecosystem services bundles for adaptive governance of coastal systems experiencing rapid change	<p>The identification of linkages between ecosystem services (i.e., the benefits people obtain from nature) and social wellbeing (e.g., material needs, social relations and subjective wellbeing) is fundamental to coastal conservation. Our objective in this presentation is to (i) examine the bundles of interactions between people’s wellbeing and the benefits they derive from ecosystems (what we refer to as ‘WEBs’ or wellbeing-ecosystem service bundles); and (ii) assess how a better understanding of WEBs can support more adaptive and collaborative forms of management under conditions of rapid coastal change. We present preliminary insights from three study regions, including Chilika Lagoon, Bay of Bengal (India), Port Antonio (Jamaica), and the southeast coast of Brazil. Preliminary findings highlight the relevance of WEBs as a strategy to guide socially just and ecologically sound conservation measures. In the Chilika Lagoon, for instance, a WEBs perspective draws attention to the trade-offs between fisher wellbeing and ecosystem services in the context of a wildlife sanctuary that has displaced multiple fishing villages from their customary fishing grounds. In Port Antonio, a WEBs perspective is showing that livelihood diversification efforts have resulted in changes in fishing activities, but their impacts on exploitation of nearshore fisheries have been minimal. For ‘Caiçara’ communities in Brazil (i.e., descendants from Indigenous people, African slaves, and Portuguese colonizers), fisheries represent more than a source of income and food security; rather relational processes (i.e., fishing identity) are as important as the outcome (i.e., amount of catch). These insights point to the limitations of livelihood diversification as a core strategy to reduce human impacts, and the importance of maintaining or enhancing the wellbeing of those that have historically depended upon coastal resource. Ongoing outcomes of this project will involve linking WEBs insights in each case study site with efforts to foster more adaptive and collaborative management of coastal systems, and further unpacking the implications of a WEBs perspective for coastal communities and ecosystems.</p>
Ana Crisol Méndez Medina	El Colegio de la Frontera Sur, Mexico	Crime and punishment in Sian Ka’an fisheries: Community Enforcement Committees as networks of cooperation	<p>Artisanal fisheries in Mexico represent a huge challenge to management, because catch levels are not recorded in full, and poaching and violation of closed seasons are part of the daily reality. State control strategies are not effective at the federal level. The enforcement and punishment system has significant gaps at implementation and some legislation ambiguities. However, lobster cooperatives within the Sian Ka’an Biosphere Reserve have found a way to cope with the absence of state actors: they have created a local, fishermen-led system of enforcement and punishment, which has been reinforced by NGOs. Sian Ka’an is located in the Riviera Maya corridor. It is one of Mexico’s main tourist regions and rich in natural resources, making it a target area for conservation, tourism, and extractive interests. This attracts private investment, NGOs and academics. Fishing in the area has been developed by cooperatives; they obtained exclusive territorial rights of use, giving the cooperatives a strong sense of belonging and impetus to defend their territory. In this paper, we thoroughly explore state regulation of the territory and explain how cooperation occurs among local actors involved in the management of the Reserve. Collective action has been the basis of a successful institutional system, including punishment mechanisms, which compensate for the lack of government enforcement. We are focusing on Community Enforcement Committees (CEC) as social scenarios where cooperation is a collective action that addresses a serious resource management dilemma (absence of state agencies and lack of confidence in the legitimacy of official institutions).</p>

Ana Fraga

CICS.Nova - Human and Social Sciences Faculty, New University of Lisbon, Portugal

Sustainability challenges for artisanal fisheries in the Azorean islands part of UNESCO's Biosphere Reserves: Local conflicts, social actors and the opportunities of a new ecosystemic approach

Located in the middle of the northern hemisphere of the Atlantic Ocean, the Portuguese Autonomous Region of the Azores is composed by nine volcanic islands: S. Miguel, Santa Maria, Terceira, Graciosa, Faial, Pico, S. Jorge, Flores and Corvo. These islands belong to the Macaronesian area and extend along an area of approximately 600 kilometers (373 miles) wide and present very different characteristics in all aspects: each island has a unique natural beauty, totals of inhabitants and demographic density diverge drastically between S. Miguel or Terceira and the other islands and even the way how economic activities are organized in each island reflects local peculiarities. Four Azorean islands (the four smallest ones: Graciosa, S. Jorge, Flores e Corvo) are UNESCO's Biosphere Reserves, where solutions reconciling the conservation of biodiversity with its sustainable use are being promoted. The reserves are 'Science for Sustainability support sites' where interdisciplinary approaches should focus on understanding and helping to manage changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity, by reinforcing scientific research, monitoring, training and education. Nowadays, artisanal fishery activity in the Azorean 'Biosphere islands' face a peculiar set of problems and challenges. To accomplish an effective sustainable use of these islands coastal ecosystems, a new legal framework brought the awareness of the need to promote a responsible fishing in order to ensure both environmental balance and sustainable development of the professional activity, which has a very significant role in these islands social-economic situation, especially in the smallest islands. Based on a larger investigation that aims to bring out the social representations of Azorean small-scale fishermen about public policies for environmental preservation, this poster proposes an ecosystemic approach on the issue of fisheries management and sustainable governance. We propose to discuss the role of the effective participation the local administrations and communities in the decision-making process concerning the implementation of strategic national and regional policies (which are, nowadays, grounded in main guidelines draft at the European level, which in turn come out of major global goals). Although today in Europe the governance paradigm is anchored in the assumption that governance must be based on a strategic vision, implementing strategic plans which should attend both to global goals and local needs and particularities, namely by considering local actors contributions, the fact is that in what fisheries in the Azores are concerned this process seems to be failing. Focusing on the opinions of the local actors involved in the Azorean 'Biosphere islands' artisanal fishery activity, the proposed thinking itinerary has Elinor Ostrom's contributions as main conceptual background. Considering her contributions on the role of the men-environment interaction in the governing of the commons (namely when talking about mobile common pool resources as fisheries) we invite to a critical questioning about the need of hearing local actors voices and taking their contributions into account when building regional policies with local incidence. This sociological approach stands on the principles of the hermeneutic-comprehensive attitude towards the human action and having in mind the constructivist premise about the social reality genesis, which states that social reality is constructed by social actors in a dynamic process of interactions anchored in social representations (meaning that top-down policies which aren't understood or assumed by local actors won't be efficiently implemented).

Ana Fraga	CICS.Nova- Human and Social Sciences Faculty, New University of Lisbon - Portugal	Sustainability challenges for artisanal fisheries in the Azorean islands part of UNESCO's Biosphere Reserves: What happens when fisher's find fisheries management lacking legitimacy and resist complying?	<p>Located in the middle of the northern hemisphere of the Atlantic Ocean, the Portuguese Autonomous Region of the Azores is composed by nine volcanic islands: S. Miguel, Santa Maria, Terceira, Graciosa, Faial, Pico, S. Jorge, Flores and Corvo. These islands belong to the Macaronesian area and extend along an area of approximately 600 kilometers (373 miles) wide and present very different characteristics in all aspects: each island has a unique natural beauty, totals of inhabitants and demographic density diverge drastically between S. Miguel or Terceira and the other islands and even the way how economic activities are organized in each island reflects local peculiarities. Four Azorean islands (the four smallest ones: Graciosa, S. Jorge, Flores e Corvo) are UNESCO's Biosphere Reserves, where solutions reconciling the conservation of biodiversity with its sustainable use are being promoted. The reserves are 'Science for Sustainability support sites' where interdisciplinary approaches should focus on understanding and helping to manage changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity, by reinforcing scientific research, monitoring, training and education. Nowadays, artisanal fishery activity in the Azorean 'Biosphere islands' face a peculiar set of problems and challenges. To accomplish an effective sustainable use of these islands coastal ecosystems, a new legal framework brought the awareness of the need to promote a responsible fishing in order to ensure both environmental balance and sustainable development of the professional activity, which has a very significant role in these islands social-economic situation, especially in the smallest islands. Based on a larger investigation that aims to bring out the social representations of Azorean small-scale fishermen about public policies for environmental preservation, this manuscript proposes an ecosystemic approach on the issue of fisheries management and sustainable governance. We propose to discuss the role of the effective participation the local administrations and communities in the decision-making process concerning the implementation of strategic national and regional policies (which are, nowadays, grounded in main guidelines draft at the European level, which in turn come out of major global goals). Although today in Europe the governance paradigm is anchored in the assumption that governance must be based on a strategic vision, implementing strategic plans which should attend both to global goals and local needs and particularities, namely by considering local actors contributions, the fact is that in what fisheries in the Azores are concerned this process seems to be failing. Focusing on the opinions of the local actors involved in the Azorean 'Biosphere islands' artisanal fishery activity, the proposed thinking itinerary has Elinor Ostrom's contributions as main conceptual background. Considering that legitimacy and compliance are key issues in artisanal fisheries management and governance, we invite to a critical questioning about the need of hearing local actors voices and taking their contributions into account when building regional policies with local incidence. This sociological approach stands on the principles of the hermeneutic-comprehensive attitude towards the human action and having in mind the constructivist premise about the social reality genesis, which states that social reality is constructed by social actors in a dynamic process of interactions anchored in social representations (meaning that top-down policies which aren't understood or assumed by local actors won't be efficiently implemented).</p>
Anastasia Quintana	Duke University, USA	Weakly defined MPAs make space for small-scale fishers to pursue own interests	<p>Protected areas for the purpose of recuperating fisheries are controversial in whether or not they represent conservation. At the international level, the line between conservation and fisheries management is increasingly demarcated, for example in a 2017 paper by Dan Laffoley arguing that fisheries protected areas do not count towards global conservation targets. Yet small-scale fisheries resist, blur, and transform this line because conservation and fisheries outcomes are often intertwined. In this paper we examine how a novel and experimental type of marine protected area designed to sustain small-scale fisheries, called "Fishing Refugia," challenges the divide between conservation and fisheries management. This paper is based on three months of ethnographic fieldwork in Baja California Sur, Mexico, where the first-ever network of Fishing Refugia was established in 2012. These Fishing Refugia were designed by small-scale fishers, legalized by the national ministry of fishing, and facilitated by a local environmental non-governmental organization (NGO). Whether the goal of the Fishing Refugia is conservation, fisheries management, or something altogether different (for example increased international visibility) depends on whether you ask fisheries officials, NGO staff, or local fishers. We argue that it is the weakly defined quality of the Fishing Refugia that has allowed these very different actors to agree to implementation. In addition, this plastic definition has made space for previously marginalized actors such as a women's cooperative to pursue their own interests. We discuss the implications of weakly defined policy objects for small-scale fisheries and the livelihoods of local people.</p>

Andrew Song	ARC Centre of Excellence for Coral Reef Studies, James Cook University, and WorldFish, Australia	Multi-scale policy diffusion and translation in pacific island coastal fisheries	<p>Multilateral consensus forged among heads of states must be made relevant and actionable at the national level to facilitate on-ground implementation. Yet, despite general optimism and advances in policy understanding, multi-scale diffusion remains a challenge with little certainty in outcomes. This study focuses on examining intermediary dynamics that occur within national policy apparatus that can mediate the domestic uptake of policy innovation. We analyse the anticipated spread of two supranational policies on coastal fisheries in the Pacific region – the ‘Small-Scale Fisheries Guidelines’ and ‘the New Song’ – in three countries: Kiribati, Solomon Islands and Vanuatu. Our approach combines instrumental perspectives on policy coherence (through a document comparison of the policies produced at two levels) with cognitive–normative understandings of government officers in charge of policy deliberation and delivery (through interviews). We find supranational-to-national policy coherence across most prescribed policy themes except for emergent social themes such as ‘gender’ and ‘human rights–based approaches’. The views of government managers substantiate, and further augment, this finding. Crucially, managers’ images (encompassing judgements, aspirations and convictions) represent the personal and practical attributes involved in policy interpretation and implementation. Multi-scale policy diffusion is thus a translational process facilitated by national-level staff, and their policy images offer nuanced and dynamic insights into why some policies are slow to take root while others take different shape from their original intentions. Analysts and policymakers must consider and mobilise translational approaches and policy images if they are serious about successful local diffusion of international agreements.</p>
Anne Hayden	Manomet, USA	Case studies in co-management from the Gulf of Maine: Challenges and opportunities	<p>Many, if not most, fish populations are now understood to occur as hierarchical metapopulations, which are emergent properties of the dynamics of their fine-scale subpopulations. Under certain conditions, most often associated with small scale fisheries, fishermen self-organize to locate subpopulations and later to sustain harvests. Administrative necessity generally leads government agencies to manage fisheries at a broad scale. The resulting socio-ecological mismatch often generates poor results for fish abundance and fishermen's livelihoods. Co-management, the sharing of authority for fisheries management between government agencies and groups of fishermen, is a mechanism for integrating government oversight with the fine-scale knowledge and self-regulating capacity of fishermen, improving fisheries outcomes. Fisheries governance organized to reflect metapopulation structure generates useful feedback regarding the effects of management strategies. As a result, it allows for adaptation based on experimentation, unlike poorly parameterized and deterministic models of fisheries productivity and optimum yield. As noted by Ostrom and others, co-management is not a universal solution for solving tragedies of the commons. Based on case studies of small scale fisheries for lobster, cod, clams and scallops in the Gulf of Maine, my research addresses the resilience of co-management regimes in the face of changes in exogenous drivers such as climate impacts, markets, technological capacity, and societal values related to fisheries, aquatic ecosystems and their many uses. It also considers the potential for incorporating principles of co-management in an ecosystem-based approach to fisheries management.</p>
Annie Lalancette	Saint Mary's University, Canada	Competing Voices: indigenous rights in the shadow of conventional fisheries management in the tropical rock lobster fishery in Torres Strait, Australia	<p>Much progress has been made in recent decades in achieving high-level recognition of indigenous fishing rights. Unfortunately, the translation of international declarations, legal principles and court decisions into fisheries regulations and management approaches has proven challenging. We argue that a sea change in conventional fisheries governance arrangements is needed to respond to new imperatives and expectations around indigenous fishing rights and interests. Through an examination of the tropical rock lobster (TRL) fishery in TS, Australia, we show: (1) how current fisheries management structures, processes and discourses are at odds with indigenous Islanders’ conceptions of the fisheries; and (2) how the existing regime excludes and renders silent the priorities of Islanders, in particular those related to Islander ontologies. We believe our findings extend to indigenous-State relations in other State-managed fisheries and are also relevant to many non-indigenous small-scale fisheries. We conclude that conventional fisheries management requires a fundamental shift in institutional alignments and existing power relations that can only be achieved through the creation of a new governance system.</p>
Antônio Marcos Muniz Carneiro	Federal University of Rio de Janeiro, Alberto Luiz Coimbra Institute for Graduate Studies and Engineering Research, COPPE / UFRJ - Production Engineer, Brazil	Ardentia Project: Sustainable valorization of artisanal fishery without increasing the fishing effort	<p>Artisanal fishery (AF) in Brazil has been devalued by public policies that emphasize increase in fishing production, by prioritizing export of primary goods. Impacts of such policies has been reduction of fish stocks, partly due to increase in fishing effort (CPUE), whose management has been hampered by lack of consistent data on AF in the country. This framework has turned AF rather “invisible” and contributed to a low autonomy of fishermen in the management of their fisheries, resulting in a strong devaluation of fresh and processed fish in the marketplace, and in a fall of the consumption index below the minimum recommended by WHO. In face of this unsustainable framework, the Ardentia Project, an initiative of Federal University of Rio de Janeiro, was conceived as a participatory fishing extension activity, aiming at promoting profitability for artisanal fishermen through sustainable investments upstream and downstream the AF production chain, without increase in CPUE. In order to reach this proposed goal, a participative fisheries extension program (ATEPP) was designed based on participatory action-research with the assumptions of the interactive methodology of complex projects (Carneiro, 2005) and the tools of the participatory technology of Berkes et al (2001). The project was carried out along the coastal region of Costa do Sol, in the State of Rio de Janeiro, Brazil, where a rare marine upwelling phenomenon seasonally benefits AF activity. Outcomes of the Ardentia Project allow inferring that cost reduction and aggregation of AF through investments constitute a strategy for eco-development of the coast.</p>

Anukorn Boutson	Department of Marine Science, Faculty of Fisheries, Kasetsart University, Thailand	Small-scale fishing practices and the catch according to the monsoon around the coastal area of Laem Phak Bia, Petchaburi province	<p>Small-scale fisheries are important for Leam Phak Bia coastal communities. This study aimed to examine the practice of small-scale fishing and analyze the catch in the coastal area according to the monsoons. The monsoons categorized as pre-monsoon (Mar-Apr) (summer), S/W monsoon (May-Oct)(rainy) and N/E monsoon (Nov-Feb)(dry). The data were collected every month from Mar 2017-Feb 2018. Interview the fishers and onboard surveys with them had done every month, 2-3 days/month including the GPS tracking in the fishing ground. The log-books were recorded daily by 6 fishers. The results revealed that each fisher possess 2-5 fishing gears. The fishing practice depended on monsoon which related to the different target species those enter/approach to the fishing area. The crab gillnet targeting blue swimming crab, <i>Portunus pelagicus</i>, was the main small-scale fishing gear, conducted around the area which could operate almost all year but less operation days in N/E monsoon since the poor catch. The other typical gears were shrimp trammel net (during S/W monsoon), fish gillnets (almost all year) and octopus pot (dominant in S/W and pre-monsoon). The catch estimation by the fishers effected to the decision to go for fishing more than the effect of monsoon. The CPUE and the catch compositions from each fishing practice according to the monsoon will be analyzed and discussed. The impacts of the season on the fishing practice should be considered to the implementation of policy and management actions for small-scale fisheries for sustainable fisheries resources use in the study site.</p>
Archita Chatterjee	Research Scholar, Department of Humanities and Social Sciences, Indian Institute of Technology Kharagpur, India	Understanding linkages between women empowerment and community well-being: Insights from the East Kolkata Wetlands and Deepor Beel (wetland), Assam	<p>Empowerment is one of the most important buzzwords in the 21st century so far as gender equality is concerned. Evolving in the late 20th century (1960), with the civil rights movements in the United States of America, the concept of ‘empowerment’ highlights increase in education, awareness and livelihood of women. In a way, it talks about the equal rights of women in relation to men. In this context, women face numerous challenges that hinder their positions and roles in the society. According to some scholars, well-being, particularly psychological well-being functions as a contributor to empowerment, while to another group of scholars, empowerment leads to well-being. Some scholars are of opinion that the role of both wellbeing and empowerment as a process rather than outcome. In the Indian context, challenges to women empowerment constitute a serious problem in fisher communities of wetlands. This paper aims to examine linkages between women empowerment and community wellbeing. In particular, we analyze the role of women self-help groups (SHGs) in achieving gender empowerment and subsequently leading to community wellbeing. We use qualitative data collected in two villages of peri-urban East Kolkata Wetlands and two adjoining villages near Deepor Beel (wetland) of Assam to conduct a comparative analysis of linkages between women empowerment and wellbeing. Use of multiple cases studies from two distinct wetland contexts (east and north-east India) helps shed light on local nuances surrounding empowerment and wellbeing, and what does it really mean across specific regional and political-economic contexts.</p>
Agustinha Duarte	WorldFish, Timor-Leste	Steady, reliable and low technology: Recognizing the role of women in fisheries & food security in Timor-Leste	<p>Coastal communities in small-island states are reliant upon marine resources, and there is a growing realization that women not only fish, but are key actors both as providers of food security at household level, and as environmental stewards. However, greater understanding of gender roles in fisheries is required to improve social-ecological approaches to management. Fishing is a crucial activity in the multiple livelihood strategies of coastal communities in Timor-Leste, and women are an integral, yet almost entirely neglected group in decision making. Using participatory fishing diaries and landings data from 6 communities in Timor-Leste, we summarise the fishing activities of women, and unpack contributions to household food and income to compare to traditional (men’s) fisheries landings data. Across all communities women were engaged with all nearshore fisheries, with the most frequent activity being gleaning. Income generated from women’s fishing was equivalent to that of men’s fisheries, and women had a zero-catch rate of 1% of trips, compared to a 16% rate in men’s fisheries. Gleaning trips returned catch 100% of the time. Our results highlight the importance of women’s fishing activities for food security, but furthermore, suggest that the reliability and small-scale nature of their fishing outweighs the small sale volume, and results in higher mean incomes for women than men. The relationship of women with nearshore fisheries resources implies that they are not only invisible and their catches underrepresented, but that women are a critically underutilized resource for marine stewardship and ecosystem based fisheries management.</p>

Aung Kyaw Thein	Pyoe Pin Institute, Myanmar	A participatory vulnerability study to assess the state of social protection and poverty dimensions in the Myanmar fisheries sector.	The FAO is exploring evidence of the linkages between poverty, social protection and natural resource management with a view to implementing programmes to empower rural communities in the transition to sustainable natural resource management and poverty reduction. In Myanmar, it commissioned analyses of social protection needs and opportunities in the context of rural development (across all agricultural sectors) and poverty reduction with a view to enhancing understanding of the role of social protection in the transition to sustainable natural resource management and poverty reduction. Initial work highlighted that priority should be given to vulnerable fishing communities for poverty reduction and rural development, particularly to increase their access to social assistance, with a focus on natural resource management, climate change and livelihood diversity. In line with these findings, FAO and the WorldFish carried out a participatory-based vulnerability study to assess the state of social protection and poverty dimensions in the Myanmar fisheries sector. In early 2018, the study assessed the social protection and poverty dimensions at five locations in the Ayeyerwady Delta in Myanmar. The research started with the design and field-testing of site-specific Participatory Rural Appraisal (PRA) instruments including wellbeing and livelihood analyses. Full results available April 2018. Key words: Fishing communities, vulnerability study, livelihoods, climate change, small-scale fisheries management.
Ayumu Matsui	Department of Geography, Graduate School of Environmental Studies, Nagoya University / JSPS Research Fellow, Japan	Who has rights for managing the coastal zone? —Conflict between fishery and tourism industry in Noto-Jima, Noto Peninsula, Japan	In this paper, the possibility of coastal zone management by diverse actors will be explored through the case of conflict between the fishery - tourism industry in Noto-Jima island, located in the eastern part of Noto Peninsula, the center part of Japan. A coastal zone is a place of various human activities, and with the recent economic development, globalization, the development of tourism industry, it is becoming challenging to consider management only by fishermen. In the study area, with the discovery of one Bottlenose dolphin in 1999, tourism industry by dolphin watching developed. This development was accompanied by livelihood transformation, such as entering the tourism industry by quit the fishery and remodeling the fishing boat to a sightseeing boat. It can be said that with the discovery of dolphins as a tourism resource caused a change of local socio-economic structure. On the other hand, dolphins for fishermen are represented as large mammals, the top of the ecosystem, and harmful to catch. However, fishermen have not composed a monolithic group, there are fishermen have side jobs in tourism industry such as guesthouse, then, they are from an inconsistent standpoint. Moreover, several factors such as international politics on the conservation of large mammals and gaze of tourist are making conflict complex. To resolve problems, therefore, these conflicts should be carefully interpreted from social, cultural, economic, and also ecological context. Also, making comprehensive discussion arena is needed to adjust the interests of stakeholders.
Beatriz Mesquita Pedrosa Ferreira	Fundação Joaquim Nabuco, Fundaj, Brazil	Trade-off between artisanal fishing communities and marine protected areas as a strategy for sustainability	Marine Protected Areas (MPAs) are conservation tools as well as fisheries management, both of them difficult goals to achieve simultaneously. It is important to make integrated assessments aimed not only at investigating the ecological success of MPAs, but also the socio-ecological, economic and cultural consequences. This study applied a methodology in order to measure the effectiveness of an MPA in ensuring the sustainability of fisheries. Based on 99 interviews with fishers and managers in two communities - one an MPA with fisheries management tools defined, including the fishing exclusion zone, and the other without specific fisheries management -, 54 indicators for the assessment of fisheries in economic, social, institutional, ethical, technological and ecological dimensions were established and assessed. The fishing systems were grouped and analyzed through the Rapfish method. A canonical correlation analysis was also conducted in order to correlate the attributes of those groupings. The Coral Coast MPA of sustainable use (Brazil) served as a case study. The results do not show significant differences between the analyzed communities. In the Coral Coast MPA, management and supervision are more present. The methodology can be applied even in cases where scientific data are scarce and can provide important indicators to evaluate the implementation of MPAs, seeking not only the traditional ecological success, but an integrated view of sustainable development.
Ben Belton	Michigan State University, USA	The quiet revolution in aquaculture value chains	This paper identifies seven key trends in the transformation of Asian aquaculture value chains. Together, these represent an urban domestic-market-driven “quiet revolution” that is one of the defining characteristics of Asian aquaculture development. First, urbanisation has stimulated demand for fish as wages rise and diets diversify, during a period when capture fisheries landings have declined. Aquaculture has emerged in response to the opportunities created. Second, the growth of fish supply has been enabled by, and contributed to, a proliferation of non-farm enterprises providing inputs, logistics, trade, and other services (many, though by no means all of them, small and medium scale enterprises). Third, farms and supporting businesses have emerged in a largely ‘immanent’ or ‘unplanned’ way, supported by the provision of infrastructure (e.g. roads, waterways, irrigation, wholesale markets). Fourth, value chains have undergone rapid technological change in all segments as they have modernized. Fifth, structural changes have occurred throughout the chain as farms and related firms have proliferated and become more specialized, diversified and, (occasionally) more concentrated or vertically integrated. Sixth, product differentiation has occurred over time in line with the product cycle, as species become commoditized, prices have fallen, and new ‘niche’ species have been introduced as alternatives. This process has resulted in farmed fish becoming accessible to greater numbers of low income consumers. Seventh, development pathways are forged in the context of pre-existing relations of class, power and gender that structure access to productive resources (land, capital, technology), but have also contributed to the reworking of these relations, sometimes deepening existing inequalities, sometimes attenuating them.

Ben Belton	Michigan State University, USA	Emerging trends in aquaculture value chain research	<p>The aim of this sessions is to reinvigorate the application of value chain analysis as an analytical lens for understanding the aquaculture sector. This is particularly important given the global nature of the sector, its rapid growth, importance for nutrition security and livelihoods, and persistent questions regarding its environmental and social sustainability. Aquaculture production, trade and consumption is concentrated in the global South. To date, most attention has been focused on species and modes of production targeted at Northern export markets. The extent of the Southern dominated domestic geography of aquaculture production, trade and consumption is only now starting to be fully appreciated. This session aims to bring together a diverse set of papers that at the cutting edge of value chain research on aquaculture. The papers speak to four themes. First, the emergence of multi-polar global geographies of aquaculture development. Second, the "quiet revolution" taking place in off-farm segments of domestic aquaculture value chains as their structure and conduct transforms in response to new opportunities and challenges, and the implications of this transformation for farmers, workers, communities, and consumers. Third, moving beyond polarised characterisations of aquaculture that foreground marginalised smallholders and multi-national firms, to recognize the central role of a missing middle segment of dynamic small and medium scale farms, and supporting enterprises up- and downstream in the chain. Fourth, the changing role and forms of value chain governance arrangements and their potential for moving the sector toward social and environmental sustainability goals. The session draws on contributions to a special issue of the journal Aquaculture on the same topic, but will move beyond the papers submitted to the journal, by encouraging invited authors to develop analysis that explicitly addresses the four emerging themes identified above. The intention of the session is to provide a foundation for an edited volume on the same subject, with the intention of drawing to new empirical realities of aquaculture development and encouraging more grounded critical scholarship and debate on the subject.</p>
Bertha Simmons	Barbados National Union of Fisherfolks Organizations, Barbados	Caribbean small-scale fisherwoman learning exchange in Costa Rica: Women's voices	<p>The Small-Scale Women in Fishery Learning Exchange, facilitated by CoopeSoliDar R.L. in July 2017, strengthened the capacities of women in fisheries from several Caribbean countries as well as their Costa Rican hosts and counterparts. The Caribbean women, learned from experiences in Costa Rica, while contributing their knowledge on Caribbean artisanal fishery value chains. The women were from the fishery sectors in Barbados, St. Kitts and Nevis, Grenada and Belize. They shared experiences with the women from the Tarcoles Fishing Cooperative and Chomes Mollusks Cooperative. They visited Consorcio Por La Mar, and had a close look at the co-management process of Cahuita National Park and the South Caribbean Diving Centre: Embajadores del Mar. This knowledge exchange sought to build links and shared experiences among women from fishing communities from personal, economic and political/organizational empowerment perspectives, strengthening bridges among islands of the Caribbean and Costa Rica. It was designed with a participatory approach, favouring a horizontal transmission of knowledge. Each experience showcased significant and different aspects of learning such as social, economic, cultural and organisational present in Costa Rica's artisanal fisheries, with special emphasis on women. The visitors shared their perceptions, recommendations and learning, maintaining a two-way communication with the women from Costa Rica. The women co-designed an Innovation Plan that was formulated along the sharing and learning exchange route. In this way they could progressively include new visions and strategies observed on site visits. Parallel to the site visits there was the design of artistic material representing the discussions and learning.</p>
Brice Trouillet	University of Nantes, France	A critical review of Marine Spatial Planning experiences worldwide and challenges ahead for Small-scale Fisheries	<p>My presentation deals with a critical review of Marine Spatial Planning (MSP) experiences worldwide and, in so doing, aims to look at the real functions of MSP and forms taken by planning that hide behind a consensual and performative narrative. The review shows that, while following several ways, MSP experiences converge in the sense and role given to space and to 'spatial' in technical processes of planning designed as much within formal MSP processes as outside. Small-Scale Fisheries (SSF) are in the blind spot of these technical processes, largely because data, mapping and metrics are critical to reflect its importance. While illustrating by several examples SSF challenges in 'MSP devices' (necessarily viewed in a large sense), this presentation will lead to question about the political meaning of such planning processes and, in so doing, will call to pay a greater attention on spatial justice issues in order not to compromise the future of SSF.</p>

Brennan Lowery	Memorial University of Newfoundland, Canada	Telling stories for sustainable rural coastal communities: exploring a storytelling approach for local sustainability indicators and global implementation	Local sustainability indicators (SIs) have been widely used to monitor progress towards sustainable development. They began as expert-driven tools but have evolved to take on communicative roles that facilitate local stakeholders in constructing shared visions to balance global priorities like the SDGs with local values. However, the role of SIs in local governance remains poorly understood, especially in rural coastal regions. Often peripheral and dependent on fisheries and other primary industries, these areas have been overlooked by top-down models of sustainable development. These framings often rely on externally-derived visions for sustainability that highlight the dysfunctions of such regions while undervaluing their assets and capacities. Resulting problem-based sustainability assessments disempower rural coastal regions and impede governance processes that engage multiple stakeholders in identifying and building on local strengths. One potential way forward is the use of storytelling for sustainable development monitoring and implementation. In such an approach, SIs can become part of the vocabulary for stakeholders in rural coastal regions to describe their own sustainable development narratives based on local values and assets. In areas such as Newfoundland and Labrador, where rural coastal regions are inextricably linked to the past and present of small-scale fisheries, stories can highlight assets such as heritage, existing and untapped fisheries resources, and sense of place. This paper highlights the potential for a storytelling approach to using sustainability indicators in rural coastal regions. It draws on theories of governance, transdisciplinarity, and sustainability, and the context of rural Newfoundland and Labrador.
Carmen Pedroza	Universidad Nacional Autónoma de México, Mexico	The gender dimensions of fish processing in Lake Chapala and the determinants of bargaining power	Lake Chapala's artisanal fisheries have been the support of an important economic activity for centuries. Moreover, its processing industry has employed hundreds of families for the drying and salting of fish since the end of the XIX century. Later, the introduction of carpe and tilapia forced a change in the market structure, including the processing activities. Currently, filleting-fish is a successful growing industry, which employs mostly women from the communities around the lake. This paper aims to identify the elements influencing the division of labor in fish-processing and the determinants of bargaining power for women. Fieldwork was carried out in three communities riparian to Lake Chapala (Jamay, Petatán, LaPalma), during 2015-2017, using a survey strategy based on questionnaires and formal and informal interviews to obtain qualitative and quantitative data. Results show that fish-processing, as a labor market opportunity for women, is a source of bargaining power, is flexible in working hours, and a constant and reliable source of income, unlike fishing. In Petatán, fish-processing is a women's dominated activity, highly valued, with the largest average income, complementary to household. Jamay, has male (20%) and female (80%) fish-processors, fish-processing is their only source of income, and is considered an activity for single mothers (35%) or those who cannot get better jobs. In both communities, married women's contribution to household income depends on their husband daily earnings, ranging between 25-75%. In LaPalma, fish-processing is a male-dominated activity, where women do not dare to work among the young fileting workers.
Cesar Augusto Chiroso Horie	CEPAM/ICMBio, Brazil	Fishing agreements in the Brazilian Amazon: Challenges of participative management for strengthening sustainable fishing.	We analyzed the levels of governance of fishing resources in Protect Areas (PA) located in the Legal Amazon using online questionnaires responded to by 34 managers and 11 researchers working with regional fishing communities, and the importance of fishing among infractions reported in 45 PA during the period 2009 - 2017. The principal conclusions were: i) ICMBio has few staff to oversee large areas, and co-administration of resources will be necessary to obtain better results; ii) fishing violations are the second greatest type of infraction, representing 23% of all fines in the responding PA; iii) researchers have generally positive views of the functions of intermediaries in commercializing catches, although there is inequality in their economic relationships and increased pressure on fish stocks; iv) there appears to be a increasingly distant relationship between managers/researchers and the association representatives; v) social organizations are perceived to be poor representatives of fishing colonies.
Chikondi Lydia Manyungwa	University of Western Cape	An analysis of perceptions and social relations on women fish collectors on Lake Chilwa	Understanding women's relationship to environmental resources in fish value chains is critical in designing for gender responsive strategies in small scale fisheries. This paper provides findings for a study that was undertaken to examine the perceptions and social relations on women fish collectors locally known as "macheucheu" in communities' dependent on fisheries at Kachulu beach on Lake Chilwa in Malawi. The objectives were to 1) examine the roles of the women fish collectors; 2) analyse the perceptions related to their participation in the value chains as fish collectors and 3) to determine the obstacles that that affect them in their roles. Qualitative methods were used to generate information. A case study approach was adopted to assess the perceptions about women participating as fish collectors. Focus Group Discussions were held with the fish collectors and Key Informant Interviews were conducted with local leaders and frontline staff. The results demonstrated that discriminatory social perceptions exist that have negative effects on the empowerment for women fish collectors and affect their whole life cycle. The study established that there are poor career opportunities for those involved in the node of collectors demonstrated by the lack of support services to this node. In the context of obstacles, the research found the social institutions that limit women's empowerment including early marriages. The research will contribute to deepening understanding of transformation in the gender discourse within the small scale fisheries. Importantly, findings will contribute to integrating transformation in values and practices affecting women in small scale fisheries.

Christian Barrientos	Wildlife Conservation Society (WCS), Equatorial Guinea	Spatial temporal patterns in artisanal fisheries in Equatorial Guinea	<p>In recent years there has been a worldwide decline in fish stocks attributable to over-exploitation. Most fisheries in coastal Equatorial Guinea are considered artisanal. Because artisanal fisheries are usually small-scale and spatially structured, the communities in the coastal areas largely carry out fishing. Similar to other artisanal fisheries, data scarcity is a problem in Equatorial Guinea, in part because it is expensive to collect and because of the poor spatial resolution. However, Small-scale fisheries provide an essential source of food and employment for coastal communities, yet the availability of detailed information on the spatiotemporal distribution of fishing effort to support resource management at a country level is scarce or inexistent. Here, using a national-scale study in the continental area of Equatorial Guinea we survey fishers from 5 communities, in 3 coastal protected areas. We combined community engagement and relatively low cost Global Positioning System (GPS) trackers can rapidly provide fine-scale information on: (1) the dynamics of the fishers that operate within this sector; and (2) the location, size and attributes of important fishing grounds upon which communities are dependent. This approach should be considered within a global context where uncertainty over marine and terrestrial resource-users can lead to management decisions that potentially compromise local livelihoods.</p>
Christopher Giordano	Naturaleza y Cultura Internacional- Peru	The emergence of self-governance within Northern Peru SSF communities and implications for future regulation	<p>This paper reports the results of a series of workshops and interviews which identified biophysical, political, and social drivers that led to fishers' empowerment in a set of communities within the region of Piura, Peru. The coastal region of Piura is important for environmental and social reasons. It is estimated to contain 70% of Peru's marine biodiversity, provided nearly a third of national marine capture since the turn of the millennium, provides 50-60% of capture consumed in-country, and has the highest concentration of artisanal fishing for the entire Peruvian coast with 30% of fishermen, 33% of artisanal boat owners, and 35% of the artisanal fleet (PRODUCE, 2013; CENPAR, 2012; Hooker, 2009). Additionally, it has a rich maritime cultural history dating back over 7,000 years (Rostworowski, 2005). Political changes and economic development within recent decades, as well as environmental stressors, led to the emergence of self-governance in small scale and artisanal fishing communities within what was otherwise a de facto regime of open access. Our comparison of the socioecological systems of six coastal communities points to vested interest, strong leadership, environmental knowledge, weak enforcement of regulations, and a resource crisis as the impetus for the shift in governance. However, despite the change, legitimacy of the fishers' power remains in question, and requires recognition by the state and further decentralization of regulatory power structures for its continued existence.</p>
Claire Collins	Exeter University, UK	Actors, social dynamics and trends in shark fisheries in South Indian fisheries	<p>The environmental impact of elasmobranch fisheries is currently receiving international attention due to increasing awareness of the vulnerability of populations due to their life-history strategies. India has the Worlds' 2nd largest catch of sharks per annum, and yet research into the location, scale and socio-economic drivers behind these fisheries is relatively unexplored with catch data non species-specific, heavily extrapolated and not representative of the socio-economic picture behind these fisheries. This poster will summarise the state of shark fisheries within Tamil Nadu, reflecting on the extent to which sharks are "targeted". It will recreate supply chains and their socio-economic value, compliance with government regulations pertaining to fin exports and the degree to which these fisheries are regulated. It will utilise open source secondary data corroborated by qualitative information collected from fisheries stakeholders during a field-trip in 2018. This will outline the socio-economics of these fisheries and highlight changes in catches, which are widely reported, and examine socio-ecological driving factors. Importantly, it will also reflect on the traditional and cultural importance of shark fisheries in these coastal communities and what changes to subsidies, fish populations and regulations mean for traditional practices that embody community identity. It will also outline future plans for a more detailed data collection process to examine fisher perceptions to regulation and conservation changes with respect to sharks.</p>
Clara Obregón Lafuente	Centre for Fish and Fisheries Research, Murdoch University, Australia	Golden Fish: evaluating and optimising the biological, social and economic returns of small scale fisheries in Western Australia	<p>Fish and crustacean stocks are under pressure from a range of sources, such as a growing population, improvements in technology for locating and capturing fish and anthropogenic-induced changes in coastal and estuarine environments. These pressures and the small-scale nature of many fisheries in terms of their economic return, highlight the need to develop cost-effective tools for assessing and valuing the social and economic dimensions of commercial and recreational fisheries. There is also increasing interest from recreational fishers in enhancing their fishing experience through aquaculture-based enhancements. Recent development of government policies for such programs have focused attention on restocking as an option for resource managers to restore or enhance target fish and/or crustacean populations through releasing aquacultured individuals. However, to maximise the likelihood for success, tools are needed for evaluating the potential effectiveness of such programs in enhancing the target populations. Golden Fish aims to provide a set of multidisciplinary tools to help manage small-scale fisheries in an integrative and sustainable manner. This research will produce a "business case" which will combine modelling of biological impacts of potential release programs scenarios with social and economic information, such as the increased yield and thus revenue generation for commercial fisheries with the economic and social values of recreational fishing. These results will provide resource managers with an improved ability to make decisions on the management of a fishery stock and predict the social and economic implications of those decisions.</p>

Clara Obregón Lafuente	Centre for Fish and Fisheries Research, Murdoch University, Australia	Social dimensions of a small-scale crab fishery in Western Australia	<p>Traditional fisheries management has typically focused on the biological and economic dimensions, leaving the social aspects and the impact that policies have on fishing communities largely overlooked. The Blue Swimmer Crab (<i>Portunus armatus</i>) fishery is a small-scale fishery in south-western Australia. Although it directly employs 10 commercial fishers and is the most popular recreational fishery of the state, its social elements are yet to be understood. Semi-structured interviews, together with an online survey, were used to understand the social values, perceptions on management and views of commercial and recreational crab fishers. Despite receiving the Marine Stewardship Council certification in 2016, concerns regarding the status of this iconic fishery, such as the decrease in numbers of crabs, have been reported by most fishers within the commercial sector and more than half of the recreational fishers interviewed. Recreational fishers stated that other values are equally or more important than the actual catch, for example time spent with family, and relaxation. Commercial fishers also emphasised that fishing is a means to sustain a living, but it is also a lifestyle. Responses from the online questionnaire suggest that many recreational fishers would support different management methods, including reduction in bag limits, increasing policing and aquaculture-based stock enhancement, to manage the crab populations state-wide. Gear restrictions, no-fishing zones and maximum size limits appeared as least favourite. Understanding the social dimensions of small-scale fisheries can contribute to better management decisions as part of a step towards a transdisciplinary approach to secure fish for the future.</p>
Cristina Pita	Department of Environment and Planning & Centre for Environmental and Marine Studies (CESAM), University of Aveiro, Campus Universitário de Santiago, Portugal;	Marketing strategies in small-scale fisheries: Efforts to differentiate and add value to small-scale fisheries products	<p>Seafood has long been traded internationally, and nowadays seafood products constitute the most highly traded food commodity internationally. Plus, trade in fish and fishery products is increasingly complex, dynamic and diversified, a reflection of a better-informed consumers exhibiting their tastes and preferences, and markets offering more diversity ranging from live aquatic animals to a wide variety of processed products. This global trend in seafood trade impacts on small-scale fisheries (SSF), which is increasingly faced with market competition from larger scale fisheries products, imports and aquaculture products, together with stricter regulations, rising costs, and depleted stocks. Over the last decade several strategies have been developed to increase the visibility of SSF products in the markets and thus increase their profitability. This paper presents the results from a survey which collected information from 107 strategies in place around the world. It will identify and describe the several types of strategies already in place, e.g. strategies to differentiate SSF products in the market, strategies to retain value of SSF products for the sector, strategies to add-value to SSF products, strategies to improve environmental and social conditions, etc., including: direct marketing (e.g. Community-supported fisheries (CSF), direct selling, fish box/basket), certification (e.g. labels of sustainability, labels of origin), events (e.g., seafood festivals, showcooking). It will also discuss the challenges, difficulties and opportunities of each type of initiative, motivation behind it, who started and funded the several initiatives, their target markets, fisher organizations involvement and the type of fisheries most commonly involved in these initiatives.</p>
Danika Kleiber	Joint Institute of Marine and Atmospheric Research (JIMAR), USA. World Fish and the ARC Centre for Excellence in Coral Reef Studies, Australia	The multiple dimensions of contemporary cultural fishing	<p>Cultural fishing is an emerging term being used in fisheries regulations. While people fish for a variety of reasons, managers seek to categorize different types of fishing for quotas, constituents, and effective governance. Attempts to use cultural fishing as a management category is difficult because it is relatively new, and the term has not been well defined in theoretical terms, academic scholarship, or used consistently in practice. Recently, defining cultural fishing has become important in American Samoa, where a lawsuit successfully challenged a rule to allow longline vessels to fish closer to the island archipelago in waters that had previously been reserved for smaller vessels. Using American Samoa as a relevant and timely context we explore the different factors to be considered when defining cultural fishing. We developed a framework that can be used to evaluate the tradeoffs across multiple dimensions of cultural fishing. This framework can be used by managers, scientists, and regulators to frame a dialogue about cultural fishing in American Samoa and elsewhere and as a powerful tool to analyze fisheries governance arrangements.</p>
David C. Little	University of Stirling, Institute of Aquaculture, Scotland	Sustainable intensification of aquaculture: Lessons from value chain actors	<p>Efforts towards sustainable intensification (SI) of aquaculture have mainly been focused on grow-out production system design and management. This paper looks at how progress towards the main tenets of SI has been achieved by actors elsewhere in the value chain. Examples of both market-led and local-to-production incentives are used to illustrate how the private sector has progressed towards more sustainable outcomes. Barriers to innovation and the role of external agents are also examined in this assessment based on on-going fieldwork in Europe, Asia and Africa. In particular, the impacts of certifiers and standards are assessed in the context of trends towards consolidation and/or specialisation in the sector. The relative importance of local and introduced technologies in progressing SI are investigated and the functions of collaborative learning reviewed; the increasing multipolarity of world trade in aquaculture in terms of inputs and outputs makes opportunities particularly dynamic. The perspectives of both upstream and downstream actors in value chains, particularly producers and suppliers of juveniles, nutritional and health inputs, those involved in co-product value addition and marketing are critical to this analysis. Priorities for key research, development and policy actions are discussed.</p>

David Mills	WorldFish, Australia	New forms of co-management for small-scale fisheries in Timor-Leste	Commitments laid down in the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication, adopted by FAO member states, align well with the participatory, collaborative and decentralised characteristics of co-management. The appeal of co-management has captured national political attention in Timor-Leste, where small-scale fisheries are considered to be critical for food security and livelihoods. Timor-Leste is only in the preliminary stages of understanding and testing the role of co-management for securing the benefits that small-scale fisheries provide, yet is in the unique position of needing to boost fishing effort to achieve development goals. We review progress made in co-management in other Asia-Pacific countries and utilize two case studies of community co-management in Timor-Leste to assess if co-management offers a valid and viable governance solution fit for its fisheries, social and governance characteristics. Despite limited customary marine tenure mechanisms in Timor-Leste, some sea and landscapes are managed at community level under tara bandu, a ritual prohibition of harmful activities under threat of spiritual sanctions. Through our case studies, we find that communities are capable of effectively managing marine resource extraction under these pseudo-customary regimes. The next step towards achieving the principles and ambitions of the SSF Guidelines in Timor-Leste, will be to use these local level successes to transform policy and management, and adjust governance capacities at district and national scales, and to facilitate the spread a legitimate and effective form of co-management throughout Timor-Leste.
Deirdre Duggan	Masyarakat Dan Perikanan, Indonesia	Collaborative and innovative approaches to achieving sustainability in Indonesian small-scale tuna fisheries	Indonesia is one of the largest seafood-producing countries in the world; it is the source of 16% of the world's tuna catch. Yet very limited data exists on the status of these fisheries, limiting management capacity and leading to unsustainable fishing practices. Indonesian marine resources are threatened by overfishing; illegal, unreported and unregistered (IUU) fishing; unregulated use of fish aggregating devices (FADs); and limited spatial management of vast and complex coastal ecosystems. The road to successful fisheries management involves many challenges, but MDPI, an Indonesian non-profit, has been tackling these challenges for the past five years. Working directly with the fishing industry and seafood supply chains, MDPI has built a program that is achieving measurable steps towards sustainable small-scale tuna fisheries in Indonesia. MDPI tackles several aspects of fisheries sustainability, working on fisheries improvement projects (with the goal of MSC certification), traceability and technology implementation, community development through Fair Trade certification, education and outreach, and more. The organization works in communities across Indonesia, engaging directly with small-scale fishermen (who comprise almost 70% of the roughly 3 million Indonesian fishermen). By partnering with seafood supply chains and associated industries, who have a commitment to engage in sustainability work, MDPI's work contributes to sustainable fisheries and the development of robust fisheries management. We address the persistent sustainability issues through improved data collection, the development of effective fisheries management, involvement in market certifications, private sector engagement, and capacity development for government institutions and industry professionals.
Denis Bailly	University of Brest, France	Harnessing research to policy and training to support small-scale fisheries in the South	Access to research results and further research investment is much needed to support the implementation of small-scale fisheries guidelines in the South. This applies to policy development, to international funding agency strategy setting and to capacity building. Better harnessing research to policy and training calls for the development of new research lines, and a different approach to the place and role of research. This has been debated in an international workshop that took place at the University of Brest, France, 25-26 June 2018, at the invitation of the Ocean University Initiative, IRD, TBTI and Preface. The main conclusion of this workshop will be presented.
Deo Namwira	University of Birmingham, UK	Coping with and adapting to change on Lake Tanganyika: Changes in fisheries and fisherfolk's responses to sustain their livelihoods	Lake Tanganyika, an ecosystem of exceptional importance providing livelihoods to millions of people, has been adversely affected by changes brought by human factors including overexploitation and deforestation. The Global Nature Fund declared it "Threatened Lake of 2017". Management of the lake is challenging given its transboundary location, bordered by Tanzania, Zambia, Burundi and Congo (DRC). The decades-long DRC conflicts, insecurity, and associated transnational migration, has led to pressure on fish stocks and change in the lake's ecology. Such changes and people's responses to them can be understood and explained using interdisciplinary approaches. The research question of "how do small-scale fisherfolk secure livelihoods in situations of change", was addressed through fieldwork in six shoreline villages of Tanzania and DRC. Recognizing the non-linearity of human systems' processes and the complexities of fisheries, insights and perspectives from social and natural science guided the research design. Hence, qualitative data were collected through 120 semi-structured interviews. The data concerned fishers' socioeconomic characteristics, vulnerability context and resilience, institutional arrangements, and coping strategies. Secondary data on fish stocks, ecosystem health and biodiversity were collected to identify and analyse trends in ecosystem services. Included in these analyses, were cross-sectional comparisons between samples from the two geographic regions. Preliminary findings indicate that small-scale fisherfolk, faced with uncertainties including chronic insecurity, violence, displacement, and instability, draw on dynamic institutional arrangements to sustain their livelihoods, and can be influenced towards sustainable resource exploitation.

Diego Salgueiro Otero	Future Oceans Lab, University of Vigo, Spain	Understanding adaptation and transformation to climate change in small-scale fisheries	<p>There is broad scientific evidence on the observed impacts of climate change on marine systems, but less so about how these impacts affect small-scale fisheries and its adaptation and transformation processes. To cover this gap, we need to better understand the components of a social-ecological system (SES) that compromise these processes. A SES approach allows to understand interactions between ecological and social dimensions at different scales and from a complex and transdisciplinary perspective, which is much needed for small-scale fisheries (SSF) adaptation to climate change. This paper goes a step further and compiles the available scientific knowledge on adaptation and transformation in SSF facing climate change, and evaluates to what extent existing studies have addressed the complexity of SES. To do this, we conduct a systematic comparison of different approaches including social-ecological systems theory and practice, vulnerability assessments, adaptive capacity, resilience and adaptation and transformation actions in SSF. All the variables considered in theory and measured in different case study applications are compared, contrasting their definitions, classifications, gaps, mismatches and implications. A regional stakeholder analysis is also developed to test the relevant variables for adaptation processes. As a result of the analysis, we find that studies on adaptation processes need to consider the interactions between social and ecological dimensions of SSF, as well as context settings and governance variables. We conclude with a list of recommendations for measuring and better understanding of adaptation and transformation of SSF that is relevant for future research, practitioners and participants of decision-making processes.</p>
Dilanthi Korlagama	Department of Agric. Economics, Faculty of Agriculture, University of Ruhuna, Sri Lanka	Socio-economic issues of women dried fish processors in southern Sri Lanka	<p>Dried fish processing is a post-harvest technique attached to small scale fisheries yet important income generating activity in fishing communities. It reduces post-harvest losses while adding value to excess and low quality fish. Although, it is an economic venture mostly at household level extending up to international sphere, less research and discussions are held to explore the socio-economic issues. Focusing this lacuna in the dried fish processing industry at cottage level this paper examines the socio-economic issues encountered by women processors in Southern Sri Lanka. A mixed method approach was adapted with a questionnaire survey (n=120) and in-depth interviews as quantitative and qualitative data collection respectively. By being the only source of income generation, majority of women (64 percent) are fulltime processors employing inherent knowledge and life long experience from childhood. Despite, the average monthly income is 300 USD, the processing is subjected to seasonality. Less fish availability and high prices curb dried fish processing during the off-season. Moreover, high labour cost, uncertain weather (climate), less fish for processing, and poor storage facilities were highlighted as main hindrance. Higher labour cost prompted to utilize family labour extensively thus motivated to absorb idling family labour (76%) into the production. However, women in dried fish processing are socially less recognized with numerous restrictions over accessibility including fish resources (input), beach (place), market (dominancy), and finance (decision making). This evokes for an egalitarian resource allocation that lessen socio-economic vulnerability and social exclusion of dried fish processors especially from a gendered perspective.</p>
Dirk Steenbergen	University of Wollongong, Australia	The role of collective action institutions in the management and development of small-scale fisheries across the Asia Pacific.	<p>Establishing and formalizing local institutions, such as community-based organizations, cooperatives, associations or committees, have become primary means to establish collaborative arrangements between external agencies and local communities, to deliver services and organize people into managing small-scale fisheries (SSF). These forms of social organizations are seen as a required vehicle to achieve various sustainability and development objectives. However, external attempts to formalize collective action generally fail to generate lasting social, economic and environmental impacts. Collective action institutions are often established as an assumed necessity to achieve inclusion and local empowerment without explicitly questioning how such new organisational structures fit within existing socio-economic and political arenas. We examine the form and function of externally motivated collective action institutions in Asia-Pacific, and under what conditions they promote and/or undermine the sustainability of SSF. We distinguish four main functions for which collective action institutions are most commonly established in practice; namely (i) as entry points into communities for various projects to gain local legitimacy; (ii) to develop local capacity to (autonomously) govern resource use; (iii) to regulate, control, and improve market access and benefit distribution (e.g. cooperative model); and finally (iv) to address particular injustices and ideologies forming from social movements. To illustrate these dynamics, we draw on four case studies, from respectively the Philippines, Indonesia, Solomon Islands and Vanuatu. In doing so, we illustrate the kind of challenges associated with the formalization and legalization of collective action, that arise universally across different contexts and others that arise due to particularly contextual conditions.</p>
Dohyung Kim	Pukyong National University, South Korea	Low-value fish used as feed is a source of disease in farmed fish	<p>Low-value fish is the most commonly used feed in Asian fish farms despite the fact that its application is controversial in regard to the sustainability and biosecurity of aquaculture. In this study, the causal agent of a disease outbreak at a Korean rockfish <i>Sebastes schlegelii</i> farm was investigated to determine whether the low-value fish used at the farm was the source. Infected Korean rockfish and Pacific sand eel used as feed were sampled from the farm, and bacterial cultures recovered from the internal organs of all sampled rockfish were isolated as pure cultures and later identified as <i>Vibrio harveyi</i>. The causal agent of the disease was also isolated from the kidneys of some of the sampled Pacific sand eels. This study provides additional evidence that the low-value fish used as feed at fish farms can be a key source of infectious diseases.</p>

Domingo Flores-Hernández	Instituto EPOMEX-UNIVERSIDAD Autónoma de Campeche. Campeche, Mexico	Small-scale fisheries of the South of Campeche, Mexico: Identification of management units through the métiers approach.	Like in other cases around the world, small-scale fisheries in Campeche, Mexico are facing problems widespread expansion of fishing activities responding to an increasing demand for seafood. Limited knowledge about the characteristics of the fisheries and the way they operate became a constraint for improvements in management actions. We contend that in mixed fisheries like small scale fisheries in Campeche, the identification of management units (MU) can help to improve management response. We aimed to identify the MU of small-scale fisheries in Campeche by analyzing information of two contrasting fishing communities (number of boats and access to fishing grounds) through the “métier” approach. We used official records that include monthly catches and we also gather information about the fishing trips (species targeted, fishing gears, fishing season, travel costs) through interviews of fishermen at their arrival at the deck. We used multivariate analysis (Cluster analysis and Principal component analysis) to identify the target species and its association with the fishing gears and methods to identify métiers. Our results showed four possible MU based on these factors: the selection of fishing zones near the coast (shallow areas or deep areas), the mesh size of fishing gears and the catches volume. The management based in MU or metiers could provide a more detailed knowledge of fishing artisanal activities. These approaches should enhance the conservation of environment and fishing resources, fishers’s wellbeing, and fisheries profitability.
Edgar Torres	Facultad de Ciencias, UNAM, Mexico	Disentangling catch profiles given fishing gears used by small-scale vessels in Yucatán, México	Dynamics of small-scale fishing fleets is complex due to their multi-species and multi-gear nature. These vessels shift their fishing gears throughout the year given the interaction of several factors such as species availability, environmental conditions, price of target species, management regulations, among others. Therefore, there is a relationship between catch profiles and fishing gears that must be explored to better understand fishing effort allocation of small-scale vessels. Métiers approach has allowed disentangling these relationships, where a métier is a combination of fishing gear used, assemblages of species caught, fishing zone, and season. In this study we used multivariate statistical analyses (Hierarchical Clustering, and Indicator Value) to identify métiers as well as the species that characterized catch profiles. Our results depicted four métiers made up by vessels fishing with 1) hookah or longline; 2) line or apnea; 3) line-net or jimba-line; and 4) jimba or jimba-line. Catch profiles from these métiers were characterized by 1) Hogfish; 2) Blue runner; 3) Lane snapper; and 4) Octopus respectively. Métiers 1 and 2 caught around 20 species while 3 and 4 caught less than 10 species. Under unispecific management scheme this type of dynamics is rarely observed. These results support the usefulness of métiers approach for an ecosystem-based management approach. We discussed the implications of our results.
Emily Farr	NOAA Sea Grant, USA	Local ecological knowledge in managed fisheries: A Maine case study	Local ecological knowledge is produced from regular and persistent interactions with the environment. Therefore, management systems that constrain access to natural resources likely have an effect on the quality of that knowledge. Here, we investigate local ecological knowledge among fishermen in the eastern Gulf of Maine using a network approach to analyze cognitive maps of the ecosystem structure and dynamics described by fishermen. These interviews provide insight into local fluctuations in water temperature and weather patterns, predator-prey dynamics, interactions between species of commercial interest with their predators, competitors, and prey species, and complex interactions between fisheries and their habitat. The ecological knowledge described by fishermen tends to be high-resolution, temporally continuous, and place-based, providing a complement to coarse-scale scientific assessments and monitoring programs. We find a significant positive relationship between individuals’ diversification in fisheries and the scope of their knowledge. Namely, fishermen who have more diversified fishing portfolios appear to have a seemingly more holistic understanding of the marine environment and its dynamics. We hypothesize that this is because of regular interactions with a broader range of components in the system. This is of particular significance in the context of increasing specialization in Maine’s commercial fishing fleet over the past several decades, which may lead to the erosion of local ecological knowledge. Continuing to examine the effect of management strategies on knowledge production is critical to understanding the role that local ecological knowledge can play in informing management of complex and multi-scalar ecosystems

Eranga Galappaththi	McGill University, Canada	Adaptations to change: Lessons from Coastal Vedda indigenous fisher communities in Eastern Sri Lanka.	The “Coastal Vedda” indigenous population in Sri Lanka is undergoing rapid social-ecological change. This paper examines how Coastal Vedda fishers in Eastern Sri Lanka experience and respond to change. We studied the Kunchankatkulam Coastal Vedda community located in Vakaraai, Eastern Sri Lanka. The Sri Lankan ethnic war (1983-2009), devastation from the tsunami (2004) and climate change impacts are key sources of change in the Coastal Vedda. Specific changes are: continued disturbances to livelihood activities during the war; an increase in the number of human-elephant conflicts during the post-war period; an increase in the unpredictable nature of weather patterns; climate extremes such as floods and droughts; policies against the use of hunting weapons; and the loss of traditional knowledge. Presently, the key livelihood activity and main protein source for Coastal Veddass is fish grown in the village tank (reservoir). The Coastal Vedda respond and adapt to changes in various ways. First, households have moved from lowland traditional housing (made of palm leaves) to elevated cement housing so they can withstand climate extremes such as floods. Second, livelihood diversification exists in non-fishery activities such as rice farming, dairy farming, daily labour for beach seine fishing, home gardening and firewood selling. Third, community members work with government institutions and non-governmental organizations through community organizations (Sangam) for tank aquaculture management and development. Finally, insurance is used as an aspect of fisheries and aquaculture management. Continuous learning and adaptation is the necessary pathway to sustainability of Coastal Vedda fishers.
Erica Ferrer	UC San Diego - Scripps Institution of Oceanography (SIO), USA	Exploring cooperation and small-scale fishing outcomes in Northwest Mexico	Small-scale fishing communities in Northwest Mexico are organized in a variety of ways, ranging from highly-structured cooperatives to groups of independent actors who share common fishing grounds. Using geospatial and landings data from different communities in Baja California, we will present lessons learned and preliminary results from our work exploring how cooperative behavior and infrastructure (or lack thereof) underlie fishing outcomes. We achieved this using Empirical Dynamic Modelling (“EDM”), a non-linear method used to identify the “equation-free” mechanisms operating in systems. We analyzed the relationship between fishermen’s “cooperativeness” and organization on fishing outcomes such as average earnings and hours spent at sea. Ultimately, we plan to use the results of this analysis to develop financial and environmental risk assessments.
Erin Loury	FISHBIO, USA	Salty stories, fresh spaces: Lessons for aquatic protected areas from marine and freshwater experiences	Marine protected areas (MPAs) and freshwater protected areas (FPAs) share many commonalities in their design, establishment and management, suggesting great potential for sharing lessons learned. However, surprisingly little has been exchanged to date, and both realms of inquiry and practice have progressed mostly independent of each other. Both MPAs and FPAs, collectively Aquatic Protected Areas (APAs), are frequently used as community fisheries management tools to support the sustainability of small-scale fisheries. In a transdisciplinary effort to explore crossover lessons between marine and freshwater realms, a team of researchers synthesized case studies of four MPAs and five FPAs (or clusters of FPAs) from nine countries, including Bangladesh, Cambodia, Chile, Madagascar, Mexico, Myanmar, Lao PDR, Thailand, and the United States. This presentation explores similarities, differences, and transferrable lessons between MPAs and FPAs under five themes: 1) ecological system; 2) establishment approaches; 3) effectiveness monitoring; 4) sustaining APAs; and 5) challenges and external threats. In particular, the findings indicate many similarities around the human dimension of both MPA and FPA establishment and management, which highlight clear opportunities for exchanging lessons related to stakeholder engagement and community support. Additionally, similar socioeconomic and governance assessment methods could be used to address gaps in effectiveness data in both realms. Continued exchange between MPAs and FPAs, as well as increased transdisciplinary collaboration would benefit both realms, and practitioners could work together to address shared challenges, such as developing mechanisms for diversified and sustained funding, and employing integrated coastal/watershed management to address system-level threats.
Erwin Prayogi	Diponegoro University, Indonesia	The Way forwards for sustainable development of Ujung Kulon Waters, West Java – Indonesia	Krakatau is one of wild volcano which was erupted in 1800’s, lies in Sunda strait (between Sumatra and Java Islands) nearby Ujung Kulon waters. In local language “ujung” means corner or edge, and “Kulon” means West, thereafter “Ujung Kulon” means a place in the edge of the west of Java Island. The National Parks of Ujung Kulon composed by 33 small-islands. The nucleus zone of National Park covered 22,235.93 Hectare, which is consists of terrestrial (20,778.72 Ha) whereas 17,517.55 Ha of inland and 3,261.17 Ha is Honje mountain. Further, the most famous of Ujung Kulon parks is Rhinoceros Sondaicus. The zone for marine park is about 906.27 Ha in peninsula of Ujung Kulon. The national parks consists of marine and inland and for each one has a protected area. Those parks are utilised as fisheries resource, recreational, resorts, natural laboratory, etc. These parks is under the management of Board of Taman Nasional Ujung Kulon. While the fisheries resource of Ujung Kulon and its surrounding area is managed by under the West Java Government. The problem seek in this study is to analyze the non-compliance behaviour among the fisheries users. The choice theory was applied in this study to answer how to balance the consideration between economic motives versus ecology or environment motives are taken placed. Several exploitation of fisheries resource and its ecosystems are found in Ujung Kulon. Improper management of waters and land-used for property of privatisation. It is indeed need to set up the strategy for sustainable resource management. The most suitable approach for marine and inland is by Co-Management among the stakeholders to achieve the certain target, namely: sustainable development.

Evan Andrews	University of Waterloo, Canada	Human behaviour and its implications for the governability of the Northern Shrimp Inshore Fishery, Newfoundland, Canada	Human behaviour is an underexamined aspect in ongoing efforts to improve the governability of small-scale fisheries. Human behaviour is defined here as individual action that results from the cognitive processing of sensory information, past, current, or imagined, from social and biophysical environments. As a result, human behaviour is an important lens through which we can improve governability by understanding stakeholders' motivations to cooperate and share resources, tendency to follow rules, and diverse responses to social-ecological change. Yet, an integrative and practical understanding of human behaviour and its manifestations under conditions of rapid change is not well developed in governance (e.g., leveraging social science, priority setting, balancing social, economic, and ecological objectives in coastal systems). This research draws on experiences in the northern shrimp inshore fishery in Newfoundland, Canada, to document motivations for critical behaviours such as decisions to leave, diversify or join a small-scale fishery. Data from this research emerges from a systematic review of the literature, storytelling methods with fishers, fish processors, and fishing community residents, and cognitive-affective analytical techniques, such as measurement of expressions of emotions and values. My research contributes a novel methodology for transdisciplinary research purposed with improving governability of small-scale fisheries with uncertain futures.
Eva Coronado	CINVESTAV, Mexico	Governability index for small-scale fisheries: A methodological development	Fisheries governance is considered a wicked problem because of the diverse and complex systems that it has to deal with. This is particularly the case with small-scale fisheries where information and knowledge are limited. "Getting the governance right" is imperative, given the contribution of small-scale fisheries to food security, and poverty alleviation. This paper presents a 'governability index' as a way to systematically examine what features of small-scale fisheries that make them more or less governable. Through a review of literature, web-based resources, and official records, we determine 17 indicators that capture various aspects of small-scale fisheries systems. These include: 10 indicators about the natural and the social systems-to-be-governed, 4 for the governing system, and 3 for the governing interactions. We applied the indicators to 23 coastal communities in Yucatan Peninsula, Mexico and found that "high" governability is often related to small number of species landed, lower fishing pressure, lower changes in population growth rate in the communities, and fewer types of fishing licenses. "Low" governability, on the other hand, is associated with high target groups landed, high number of fishing licenses, and high reports of conflicts between fishers and authorities. While components of governability vary amongst communities, we contend that the proposed indicators can help unveil important features about the fisheries, as well as the communities. Because these indicators are applied at the local level, they can be used as part of the community-based decision support tool to help promote viability and sustainability of small-scale fisheries in any location.
Fabio Hazin	Federal Rural University of Pernambuco, Brazil	The bycatch reduction devices tested in the shrimp trawling fishery in Sirinhaém- PE, northeast Brazil	As part of the activities of the REBYC Project in Brazil, various bycatch reduction devices have been tested by the project DEFA (Projeto de Dispositivo de Exclusão de Fauna Acompanhante- DEFA), financed by the Brazilian Government, Secretary of Fisheries and Aquaculture, in the fishing community of Barra de Sirinhaém, Pernambuco State, located in northeast Brazil. After the results were compiled and analyzed, time had come to present them to the fishing community. Although the shrimp-trawling fishery is an important economic activity in Sirinhaém, because of its bycatch, which includes many small fish, part of the community has long held a suspicious view of this fishing method, thought to be very harmful to the marine environment and also impacting other fishing activities carried out locally. The DEFA project has been developed in very close collaboration with the local fishers, who were much interested in demonstrating that the shrimp-trawling fishery can be done in a more sustainable manner, by significantly reducing the amount of bycatch, with the use of the proper technology (BRDs).
Felipe Monteiro Gomes de Mattos	Grupo de ictiologia Marinha Tropical (IMAT), Brazil	Monitoring trap fish composition at Sirinhaém, south coast of Pernambuco, Brazil	By-catch is one of the most significant issues affecting fisheries management today, once it can affect biodiversity through impacts on top predators, the removal of individuals from many species, or by elimination of prey. The bycatch issue is also one of waste; the millions of tons of protein dumped in the ocean, and the waste of animal lives is often condemned on moral grounds. That is why an understanding of by-catch is fundamental for fishing stock assessment and management. Small-scale fisheries predominantly exploit fishing resources off the coast of Pernambuco, and trap fishery is one of the main method applied, targeting the Spotted goatfish (<i>Pseudupeneus maculatus</i>). From July 2011 to July 2012, we monitored the trap fishery at Sirinhaém, south coast of Pernambuco, Brazil, and although the spotted goatfish represented 47% of the catches, the low selectivity of the fishing gear generated a huge by-catch, with a composition of 20 species caught from a sample of 1,237 individuals. The mean TL for the Spotted goatfish was 18.8cm and the CPUE was 3.9 kg/trap and 19.4 kg/day, which is similar to previous studies conducted during the 90s, when a CPUE of 22.8 kg/day was found, and a mean TL of 20cm. The study allowed examining management strategies aiming at minimizing the impacts of commercial fishing on this species fish stocks, considered being of slow growing and susceptible to overfishing, towards a sustainable fishery, once the 53% rate of by-catch is almost 7x higher than the 8% considered acceptable by FAO.

Fikret Berkes	University of Manitoba, Canada	Rebuilding healthy communities and healthy fisheries	The premise of the paper is that the health of marine coastal resources requires healthy fishing communities. Our starting points are that (1) many coastal resources need restoring/rebuilding, (2) but small-scale fisheries (SSF) have been losing ground over time, (3) however, SSF are now increasingly recognized for their social (not just economic) importance, such as food security. Accordingly, the 2015 FAO Guidelines for SSF, Article 5.4 calls for 'preferential access to resources' for small-scale fisheries. We start by arguing, first, that the social-ecological system (SES) is the appropriate unit of analysis for SSF: the fisher and the fish stock is a coupled, interdependent, co-evolutionary, and multi-level system. Second, the resilience of a system (capacity to absorb disturbance and reorganize while undergoing change) is what makes it possible to respond to change, enabling learning and adapting. Third, community health has many determinants but here we focus on two: values and empowerment. Fishers are guided by shared values such as self-restraint, prudence and community solidarity important for local stewardship. 'Healthy communities, healthy resources' captures the wisdom of many indigenous and local communities. Recognizing the value of SSF will require changing resource managers' mindset. Empowerment is the big political challenge, especially regarding the ability of communities to manage their local commons. 'Preferential access' for SSF is probably not enough: territorial use rights in fisheries (TURFs) may also be needed, together with community quotas in ITQ-based fisheries.
Francis M. Nwosu	University of Calabar, Nigeria.	Socioeconomic and sociocultural considerations for the management of the artisanal fisheries of the Cross River Estuary, Nigeria	The artisanal fishing communities of the Cross River Estuary exhibit dynamic diversity in various aspects of their socioeconomic and sociocultural lifestyle. Often times, these aspects are either neglected, overlooked or considered trivial, hence accorded only transient attention. However, the diversity of linguistic groups, number of fisher-families and non-fishing occupations and livelihoods tend to be indicative of the productivity of the adjoining waters and its seasonality. Our study verified and mapped these characteristics and noted their implications for the management of the fisheries resources in the area. We recorded about eleven (11) distinct languages and dialects, namely; Ibibio, Oron, Efik (or Effiat), Mbo, Okobo, Andoni (or Obolom), Ijaw, Efaghi, Igbo, Yoruba and Ghanaian languages. Number and size of families ranged from 7-10,000 and 5-15, respectively. Non-fishing livelihoods in the area included boat-building, carpentry, petty-trading, wood cutting (especially mangroves), hunting and farming. Management considerations should take into account the diversity of this sector for sustainable resource utilization.
Francis M. Nwosu	University of Calabar, Nigeria	Status and spatial distribution of urban, peri-urban and rural aquaculture in Cross River State, Nigeria and the implications for artisanal fisheries	We mapped the operational status and spatial distribution of fish farms in areas of Cross River State from 2012-2015. The objective of this study was to identify the growth pattern and map the spatial distribution of urban, peri-urban and rural aquaculture practices within the State. Of the eighteen (18) local administrative units (Local Government Areas) in the State, eleven (11) so far studied were distributed as follows: two, five and four representing the urban, peri-urban and rural areas, respectively. A total of 89 fish farms were identified and mapped. These included 28 in the urban, 41 in the peri-urban and 20 in rural areas. However, abandoned fish farms represented approximately 29%, 10% and 35% for urban, peri-urban and rural areas, respectively. Sources of finance for take-off were predominantly personal savings (93.3%), Bank loan (3.4%), Cooperative Society (2.2%) and NGO donated fish farm (1.1%). Sources of water, types of aquaculture systems and socioeconomics were also reported. The observed spatial distribution of fish farming, especially among the traditionally fishing communities is indicative of a shift in dependence on the declining fish production of the artisanal fisheries sector. This development should be encouraged while insisting on best practices for benefits of the society and environment.
Francisco Fernández-Riveramelo	Comunidad y Biodiversidad A.C, Mexico.	Fishery management tool in Mexico	Mexico is one of the top 20 fish producing nations. More than 500 species are caught (for human consumption, animal feed or the aquarium trade), along the Pacific coast, the Gulf of Mexico and the Caribbean. These diverse fisheries require strategies that maintain stocks, healthy ecosystems, food security and prosperous coastal communities. Different management tools are defined by Mexican law, development plans, regulations and management plans. These tools look to promote sustainable catches in the different species that are caught in the oceans, coasts, estuaries and internal waterbodies. Tools are available that provide access rights (permits, concessions and quotas); limit catches (closed seasons, minimum sizes); provide spatial and temporal restrictions (refuge zones, zones with gear limitations, spatial management); and limit fishing gear (size and number of hooks, mesh size, motor potency, use of exclusion devices etc.). This present work identifies the management tools that are used for each fishery in Mexico. Selecting the correct tool or combination of tools for a fishery is no simple task, it require significant information and knowledge about the species, its biology, ecology and interaction with the fishery. Additionally, to determine success, each tool must be evaluated to assure that it is meeting the needs of the fishery.

Gazi Md Nurul Islam	Universiti Tun Abdul Razak, Malaysia	The role of governance on social and ecological conditions of marine protected areas in Malaysia	In peninsular Malaysia, the government has established 42 MPAs in offshore islands since the 1980s. The main objective of establishing these MPAs in Malaysia are to increase fisheries resources through the protection of coral reef and fisheries habitat. The government of Malaysia has promoted tourism industry in marine parks over the last two decades and substantial revenue has been generated through various ecotourism activities. The main challenge for the government is to how the overexploited marine resources can be protected and restored for sustainable use. Marine resources in MPA in Malaysia suffer from natural and anthropogenic disturbances mainly caused by increased tourism activities, siltation and pollution from land-based activities (Islam et al. 2013; Reef Check Malaysia, 2011). The consequence of tourism and other human activities can undergo large, sudden and long-lasting changes in ecological systems and functions (Scheffer et al. 2001). These changes are often called critical transitions or regime shifts (Scheffer et al. 2009) is found in a range of ecological systems, including degradation of coral reefs and collapse of fisheries (Biggs et al. 2012). Human activities influence the ecological system and adapt their behavior in response to ecological changes (Folke et al. 2010; Millennium Ecosystem Assessment 2005). The negative consequences of human activities to coral reefs have not been given due consideration in formulating the tourism management policy in Malaysia (Islam, 2013). This study examines how social and ecological factors are influenced by governance and management of MPA. The main objective of the study is to understand the ecological and social factors that affect the MPA management.
Grace Orirana	WorldFish, Solomon Islands	Spreading community-based resource management: Testing the “lite-touch” approach in Solomon Islands	In Solomon Islands, community-based resource management (CBRM) is the main strategy for managing small-scale fisheries. Although hundreds of communities have implemented CBRM already, the majority of Solomon Islands communities have not, and it is not realistic for partner organisations such as non-governmental organisations and government agencies to spread CBRM by engaging communities individually. More efficient and cost effective approaches, such as the “lite-touch” that uses relatively few, infrequent visits and appreciative facilitation methods, are required to facilitate a transformation towards widespread CBRM. In this article we describe how the lite-touch approach was used to support the Mararo community to successfully implement CBRM, and to act as a “core” community to inspire and guide surrounding communities to follow suit. Training workshops designed to accelerate CBRM spread were also provided to the community, and these increased community confidence to be better CBRM advocates in their visits to adjacent villages. The approach helped build community ownership of and pride in their own CBRM programme. In this test case we found the lite-touch approach worked well, in part because this community was well organised, with relatively few apparent conflicts over resources. We found that the use of the community’s informal networks was effective for spreading CBRM information, and helped to overcome challenges of geographic isolation and high costs of logistics. Building from our findings here we lay out a transdisciplinary research approach to test a range of other approaches to accelerate the spread of CBRM in the Solomon Islands and other Pacific contexts.
Ignacia Rivera	Bren School of Environmental Science and Management, University of California Santa Barbara; Centro de Investigación en Complejidad Social (CICS), Universidad del Desarrollo, Santiago, Chile	The interplay between formal access regimes and peer-enforcement determines stewardship behavior of small-scale fishers	Formal exclusive access regimes are increasing globally to manage fisheries under the premise that promote local stewardship. Peer-enforcement is a stewardship behavior that has proven key for the success of common pool resource management under traditional tenure. However, less is known about how it interacts with modern forms of exclusive access to determine harvest in small-scale fisheries. To explore this and the extent to which stewardship has been internalized by fishers operating under formal exclusive access, we implemented economic experiments among fishers from Chile. We compared their overharvesting and peer-enforcement decisions in a common pool resource game under two access regimes. These were simulated by framing the game as the fishing of two resources – loco, harvested under formal exclusive access in real life, and hake, fished in a more pseudo open access regime. Our results show that peer-enforcement helped sustain low overharvesting in the loco and not in the hake game, but only among members of associations that demonstrated good management under real-life exclusive access. This suggests that formal access regimes interact with internalized informal institutions to determine fishing behavior. We also contribute to the experimental literature by demonstrating the external validity of economic experiments across frames and communities.
Ignacio Sobrino	Instituto Español e Oceanografía, Spain	Definition of fishing trip types and fleet components in the Spanish artisanal fishery of the Gulf of Cádiz: A new approach for study of artisanal fisheries.	The Spanish artisanal fishery in the Gulf of Cadiz is of a marked multi-gear and multi-species nature, where a fleet composed by about one thousand vessels captures more than forty commercial species. From this complexity arises the necessity for defining fishing trip type and fleet components (i.e., groups of vessels developing the same fishing pattern through the year), which permit to make a monitoring of the fishing effort and to design simpler and more efficient sampling schemes. The fishing trip types were objectively characterised from the species composition of these landings by using hierarchical Cluster Analysis techniques (CA). A non-hierarchical k-means CA was applied for re-classifying the data in the future. In a second stage, only those vessels with more than 50 daily landings regularly distributed through the year were selected, and a matrix with 636 variables (53 trip types x 12 months) and as many cases as selected vessels, was designed. A new CA was applied to this matrix which grouped vessels exhibiting the same fishing annual pattern. From the results obtained was possible to define eleven fleet components. Two basic features of these components could be emphasized: they are highly related with the landing (home-) ports and the fishing gears used, and show definite seasonal fluctuations according to the main fishing trip types developed.

Irna Sari (co-presenting with Nilam Amalia)	Sustainable Fishery Advisor USAID-SEA PROJECT, Indonesia	USAID-SEA Project is taking the Indonesian small-scale fisheries to the next level of management	Indonesia is the second largest capture fishery producing nations which is mostly dominated by small-scale fisheries. Indonesian fishery statistics recorded around 650,000 of fishing units that fall under this category with more than two million fishers. This contributes to a significant degree of fishery resources extraction and pressure. However, small-scale fishing effort and access is not monitored and controlled, and sufficient management for this scale is lacking. Since 2016, a five-year USAID funded project, Sustainable Ecosystems Advanced, is supporting the Indonesian government to strengthen and to establish management tools for small-scale fisheries. The initiative includes monitoring of fish landing, strengthening an integrated small-scale fishing vessel database, establishing a fishing logbook system, and building the capacities of national- and provincial-level government. A co-management approach is being applied for implementing this initiative engaging government agencies, private sectors, non-government organizations, and communities. This presentation shares the innovative approach used in establishing the partnership across the parties, and to date lessons learned. It highlights that horizontal and vertical integration is a critical approach. A function of a development project should not only be focusing on activity implementation, but should act as a catalyst and facilitator for the integration that depends on strong leadership and promotes active and direct engagement of the stakeholder parties. This is not only to ensure internalization of the initiative but also a pathway of capacity building of the related agencies for sustainable long-term impact of the transforming initiative and project investment together with the Government of Indonesia.
Ishaan Khot	Dakshin Foundation, Bangalore, India	Community-based monitoring of pole and line tuna fisheries in the Lakshadweep Archipelago, India: Inclusive approaches for sustainable management	Lack of adequate scientific information is often a limitation in small-scale fisheries management in developing countries. Most conventional fisheries monitoring systems, run by institutions or researchers, are limited by funding, manpower and logistics. However, they fail to recognize and utilize a resource with great potential to contribute towards fisheries monitoring and management. Local fishing communities, who are primary stakeholders in marine ecosystems, interface with the ocean daily and have nuanced, largely undocumented observations about oceans and fisheries. To leverage this potential, we initiated a community-based fisheries monitoring programme on 4 islands in India's Lakshadweep archipelago in January 2014. The programme involves local fishers in voluntary monitoring of Lakshadweep's pole and line tuna fishery, to fill critical data gaps. Datasheets for monitoring were developed in consultation with fishers. The programme generates valuable data on biological as well as socio-economic aspects of the pole and line fishery such as limitations to fishing, inter-island differences in tuna catches, baitfish preferences, fishing strategies, diesel consumption etc. which can inform sustainable management of the fishery. Interactions with participants reveal that keeping detailed records helps them plan and manage their fishing better. Till date, 18% of active fishing boats have participated in this on-going programme. We are scaling it up by transitioning from logbooks to phone-based monitoring. The process of developing and implementing the programme with the community over the past 4 years has laid the foundation for us to move beyond monitoring and initiate dialogues with them around sustainable and participatory management of the fishery.
Jack Daly	Memorial University of Newfoundland, Canada	Community responses to global trade: CETA, sustainable fisheries, and coastal communities in the Great Northern Peninsula, Newfoundland	The Great Northern Peninsula (GNP) of Newfoundland is one of the most fisheries reliant regions in Canada. The Canada-EU Comprehensive Economic and Trade Agreement (CETA) has been promoted by the federal and provincial government as opening up a vast new market for fish and seafood products for Newfoundland to take advantage of. Building off a previous governability assessment of the region, this paper examines the community opinions on the trade agreement as well as input from government officials, industry actors, and other relevant perspectives. These early responses to the agreement, which preliminarily went into force in 2017, can inform how well CETA aligns with the governance system of the region, and propose possible areas of improvement. This research touches upon how the objectives of CETA and the principles of free trade interact and affect the sustainability of the region's fisheries and communities. Documenting the early responses to this agreement in one geographically distinct area offers a unique outlook on global trade agreements whose consequences are generally portrayed in national and international scales rather than local ones. The responses to the trade agreement show the anticipated change the fishery faces and what informants think needs to be done to prepare for it. Establishing a baseline of the state of the current fisheries and communities in the region can inform further studies of how free trade will shape similar regions and contribute to the literature regarding free trade's effects on fisheries in the global north.
Jariya Sornkliang	Southeast Asia Fisheries Development Center (SEAFDEC), Secretariat office	Understanding gender dynamics, livelihood opportunities and markets along the value chain in Pu Lone Tone Tone, Myanmar	Regarding with the sustainable practices and promotion of small scale fisheries in the face of climate induced disasters, stakeholders in Southeast Asia are concerned about food security and nutrition, legal rights, access to resources, gender, fair livelihoods and resilience. Under this overarching framework, this paper tries to explore mechanism of small-scale fisheries' fish distribution with reference to gender and understand the existing potential livelihood opportunities and markets along the value chain in Pu Lone Tone Tone village, Kawthaung province, Myanmar and around the fish markets in Ranong province, Thailand. This study has done surveys in more than eighty households belonging to coastal fishing communities. The interviews were done with both male and female members of households and in-depth interviews with ten middle men that were conducted this year (2018). Gender analysis revealed that gender differentiated roles are based on characteristic of fishing and there is a strong stereotype of gender division of labor delineating tasks, those are regarded as low status and of less economic value, for example, processing task such as cleaning, cutting and sun drying of fish for women. Men are involved in activities that require intensive physical labor and produce high economic return development for the future of small scale fisheries.

Jennifer Beckensteiner	VIMS (Virginia Institute of Marine Science) / IRD-MARBEC, USA	Unintended impacts of the Chilean TURF network on open-access areas	<p>About 1,000 Territorial User Right Fisheries (TURFs) are currently designated in Chile. Recently, the profitability of many Chilean TURFs has declined, potentially leading to fishing effort increases in unregulated areas outside of TURFs. Increased exploitation rates in open-access areas may reduce TURF benefits via reduced recruitment and overall ecosystem integrity. We analyzed harvest of benthic resources in Chile to evaluate potential impacts of the large network of TURFs. Landings of red sea urchin (<i>Loxechinus albus</i>), keyhole limpet (<i>Fissurella</i> spp.) and kelp (<i>Lessonia</i> spp.) were used to estimate catch-per-unit effort (CPUEs) indices inside and outside TURFs. For these species, it was found that CPUEs were significantly higher inside TURFs, suggesting unregulated areas were less productive. This finding could be due to selective implementation of TURFs in the most productive fishing grounds or, conversely, the displacement of fishing effort from TURFs. A regularized linear regression model, the elastic net regression, was used to explain catches in the open-access areas, including variables related to proximal TURFs' characteristics and activity. Contrasting results between species suggest that a) displacement of fishing effort may be heterogeneous and b) differences in catch are mostly driven by exogenous environmental factors. However, when TURFs do have an impact that impact appears to be negative. These results contribute to a better understanding of TURFs' limits and associated unintended costs in Chile and provide future directions for policies bridging biodiversity conservation and fisheries management globally.</p>
Jeppe Kolding	University of Bergen, Norway	Small fish for food and nutrition security	<p>The 'SmallFishFood' consortium is a multidisciplinary international research team from Norway, the Netherlands, Germany, Ghana, Kenya and Uganda, with associated partners from FAO, WorldFish, NGOs and the private sector. It covers the fields of fish stock assessment, processing, marketing, nutrition, risk assessment and governance. The overall objective is to renew the food security discourse by focusing on the nutritional value of small fish (e.g. small pelagics and small indigenous species, SIS). We aim for transformation to ecological sustainability and food security by asking: How can socio-cultural, economic and institutional transformations of the fish value chain, as well as technical and infrastructural innovations, contribute to improved, sustainable utilisation of small fish resources for low-income populations in the global South? The fact that the exceptional nutrients in fish, particularly those consumed whole, can play a significant role in combating the triple burden of hunger, micronutrient deficiencies and non-communicable diseases is the starting point of the project. However, the unique qualities of fish are seldom recognized in the global food security discourse, and fish is strikingly missing from nutrient deficiency strategies among disadvantaged groups. Small fish are ubiquitous in all aquatic environments from large marine ecosystems to seasonal ponds, as well as in market places and low-income household diets, but their significance is underrated and little understood as they are consumed locally and often go unrecorded in catch statistics. Fisheries are the most energy efficient producers in comparison to other food production systems and have the least environmental impact in terms of greenhouse gases and use of freshwater, fertilizers, insecticides/herbicides. Catching small fish, which are simply sun-dried and consumed whole, is the most high-yielding, eco-friendly, low CO2-emission and nourishing way of utilizing aquatic resources. However, a range of social, technical, economic and legal barriers inhibits the full potential of utilizing small fish. It is the aim of this project to contribute to solving these with global scalability.</p>
Jeremy Prince	Biospherics, Australia	Empowering community-based management through the Indo-Pacific with length-based spawning potential surveys	<p>This presentation presents case studies from the Pacific Islands, Sri Lanka and Kenya illustrating how a new simple form of length-based assessment is empowering community based management of crab and reef fish fisheries. In each application the process of teaching members of 'beach-head' communities to collect size of maturity, and length composition data, provides the medium for raising awareness about overfishing, its causes and remedies, and facilitating processes of national change. Our experience shows that our new assessment methodologies ability to put a simple understandable number on stock status makes a real difference. Changing the way communities, non-government and government agencies perceive declining local resources, energizing community and national discussions about improving management, and galvanizing the trialling of new practices. Length based assessments of spawning potential are easily translated into management prescriptions for conserving the spawning potential of stocks by managing the size at which fish are caught, with minimum size limits or gear restrictions, or controlling fishing intensity.</p>

Joe Zelasney	Food and Agriculture Organization of the United Nations (FAO), Italy	Implementing the FAO's Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication to achieve the 2030 Agenda for Sustainable Development	A high-level United Nations conference process (The Ocean Conference) to support the implementation of Sustainable Development Goal 14 – Conserve and sustainably use the oceans, seas and marine resources for sustainable development – has commenced. In June 2017 at UN headquarters in New York, during the inaugural Ocean Conference, close to 1,400 voluntary commitments for concrete action to advance implementation of SDG 14 were made. Following the inaugural Ocean Conference, The United Nations launched nine thematic multi-stakeholder Communities of Ocean Action (COA). The nine COA's are working together with the United Nations Secretary-General's Special Envoy for the Ocean, Ambassador Peter Thomson, and the UN Department of Economic and Social Affairs to follow-up on the implementation of these voluntary commitments; to catalyze and generate new voluntary commitments; and to facilitate collaboration and networking amongst different actors in support of SDG 14. FAO, along with UNDP, are co-focal points for COA #9 – Sustainable Fisheries. This COA contains all of the voluntary commitments in support of SDG 14.b - Provide access for small-scale artisanal fishers to marine resources and markets. The Ocean Conference process represents an opportunity for SSF actors to promote their work while connecting with partners to collectively work toward implementation of the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication to achieve the 2030 Agenda for Sustainable Development.
John Gabriel Ramirez	Institute of Marine Sciences CSIC-ICM, Spain; Fishery Resource Analysis and Monitoring Division, Northwest Fisheries Science Center, USA	Participative monitoring and exploration of uncertainty in life-history parameters of target species to improve stock assessment in data-poor situations: the case of small-scale fisheries in South America	Undetected but underlying biases in the model input data strongly reduce the reliability and value of stock assessments of data-poor fisheries. Additionally, accuracy in stock assessment outputs of data-poor species is usually hindered by lack of knowledge of biological parameters. We assess the stock status of the target species of the Amerindian Wayuu fishery in the Colombian Caribbean and of the Beach fishery in the Central coast of Peru in order to address the challenge of advising the status of data-poor fisheries in developing countries. Our findings highlight the key role of the participative monitoring to provide the reliable status of these fisheries. The uncertainty in life-history parameters may lead to wrong interpretation of the stock status of data-poor fisheries, meaning that further attention should be put on the underlying assumptions of biological traits of the assessed stocks (e.g. estimates of natural mortality) and stock assessment models (e.g. dome-shaped selectivity). Decentralization of fishery management structures and the participation of local communities are required to obtain improved data. If stock assessments produce a more reasonable population status for key species, reliable advice can be offered for participatory management of small-scale fisheries in data-poor contexts.
John Gabriel Ramirez	Institute of Marine Sciences CSIC-ICM, Spain; Fundación Ecosfera, Colombia	Improving stock assessment and management advice for data-poor small-scale fisheries through participatory monitoring	Undetected but underlying biases in model parameterization strongly reduce the reliability and value of assessments of data-poor fisheries. We explore the effects of missing and misunderstood data on single-species stock assessments used to provide management advice. From 2006 to 2014, the Colombian government monitored landings of small-scale fisheries. During the same period, communities implemented a participatory monitoring program in the Central Guajira region. We found that the two data sources gave different results for the population status of the highest-valued fish, lane snapper (<i>Lutjanus synagris</i>), and the largest-landed species, white grunt (<i>Haemulon plumierii</i>). Recordings of landing points by the government monitoring program led to year-to-year underestimations and therefore misconceptions regarding population status and fishery trends. Overexploited and underexploited population statuses were seen to arise from the same fishing pressure as a result of the interplay between natural mortality and erroneous estimates of fishing mortality. The tested von Bertalanffy growth parameters affected the exploitation level, but not the population status, of the species. When data from the participatory monitoring program were incorporated, higher landings and a more severe overfishing trend emerged for both species. The management scenarios simulated using the best verified data available provided reasonable advice for recovering the lane snapper and white grunt populations. Furthermore, simulation of management measures sustained the employment and incomes of fishers. Our findings indicate that participatory monitoring should be incorporated into the assessment and management of data-poor resources.
John Matias Wojciechowski	World Fisheries Trust – WFT, Canada	Multidimensional and transcalar predicaments of small-scale fisheries in the northern Pernambuco estuarine complex, Brazil	At the northern estuaries in the state of Pernambuco, Brazil, small-scale fishing activities are intensively carried-out, mostly targeting shellfishes. A compelling number of fishers make this activity their main source of income or as a complementary activity to salaried work, being an important supply of protein and food security for their families. Social inequality remains critical in most rural communities, and ongoing lack of visibility and economic perception affect household income. There are considerable conflicts associated with access to beaches, as well seas and estuaries, mostly through private land or like tourism, aquaculture, agriculture and urbanization. The highly contested and entangled socio-spatial and institutional contours of small-scale fisheries in the study region turn the story of this fisher population into an emblematic struggle for “defending the beach”. We describe the wicked-nature of the challenges faced by small-scale fisheries in the region, and their struggles to gain land ownership and access to the beach and even in coastal fishing areas such as estuaries.

Jorge Torre	Comunidad y Biodiversidad A.C. (COBI), Mexico	Crafting and scaling up a leadership program towards sustainability in small-scale fishing communities in Mexico	After reviewing 130 cases of fisheries management in 44 countries, Gutiérrez et al (2011) concluded that the main factor for achieving sustainable management is leadership in the communities. In addition, Evans et al (2015) highlighted the importance to test desirable leadership competencies. Based on these conclusions and with more than three decades of accumulated experience working with small-scale fishers, we designed and implemented a program of community leaders in Mexico. The program was based on the strengthening of human dimensions (i.e., affective, cognitive, communicative, cultural, ecological, economic, ethical and spiritual) as well as the development of skills and knowledge to sustainably manage their resources. The participants also had a coaching process. The applied curriculum included leadership and cooperation courses for the common good, effective communication, negotiation and conflict resolution, fisheries management and organization, basic finances, and tools for the sustainable management of marine resources fisheries. The model was replicated with adaptations by other two civil society organizations, and in 2017 a total of 13 women and 25 men from 18 coastal communities graduated from this program. Each of them is developing projects aimed at conservation and sustainable fisheries, including teaching best practices, promoting sustainable fisheries, fostering strong fishers' organizations, ecosystem restoration, recycling, and fishing alternatives. A participant summarized his experience as: "I learned that being a leader does not mean being sit in a throne giving orders". In 2017, a new generation of leaders started with the common theme of "Gender equality at sea".
Jorge Torre	Comunidad y Biodiversidad A.C. (COBI), Mexico	New women roles towards sustainable small-scale fisheries: lessons from field stories, Mexico	Gender roles are not given, they are socially constructed, and are changing over time and by locality. In fisheries, women's contributions are often invisible and remain unrepresented in statistics. They are commonly recognized as men's helpers, even in situations in which they fish or participate in closely related activities. We reviewed the current status of women's roles in small-scale fisheries through the revision of governmental information and programs; and by comparing and extracting lessons learned from seven case studies in Mexico. In the last ten years women's roles have been changing and contributing to fisheries sustainability. Women have become active practitioners of good practices, including: 1) fisheries and ecosystem restoration, 2) environmental changes monitoring, 3) cooperative leaders, 4) participants in decision-making processes, 5) entrepreneurs, and 6) promotion of marine conservation. As women have become pioneers in these roles they have faced hard criticism from community members and have been used politically by the government. We identified that the successful element to achieve these best practices are the willingness to learn and change the status quo by both, women and men.
Jose J. Pascual-Fernández	Instituto Universitario de Ciencias Políticas y Sociales, Universidad de La Laguna, Spain	Market and trade challenges for small-scale fisheries: The need for innovation	Securing the livelihoods of small-scale fishers entails improving their capacity to sell their catch, receive remunerative prices and to add value to their catches. In general, catches from small-scale fisheries (SSF) have a superior quality and freshness, but this does not always facilitate a better price or higher demand. This is mostly because local fresh fish obtained by SSF with sustainable gears are often not adequately differentiated from the catches of industrial fleets, or even furtive fishing. Furthermore, small-scale fishers are not empowered to control the value chain and the price they obtain for their fish. Traditional small-scale catches marketing strategies are ill-adapted to new scenarios dominated by global markets, where supermarkets chains and large companies take the control. Research needs to be carried out into actual or potential strategies to add value and improve the market penetration of small-scale fisheries. It is important to know about existing strategies (e.g., certification, eco-labelling, direct selling, alternative food networks, collective labels, local small-scale processing), and under what circumstances they could provide a real alternative for small-scale fisheries. In this context, a special focus must be placed on how fisher organizations play a role or have the potential to engage in innovative fish marketing strategies for their members. It is also important to know what consumers are buying and why, and in what ways consumer preferences could be refocused to an efficient use of local potential resources. In summary, market innovation for SSF is a key factor to improve its long-term viability.
Jose J. Pascual-Fernández	Instituto Universitario de Ciencias Políticas y Sociales, Universidad de La Laguna, Spain	From transdisciplinary research to implementation: market innovations in small-scale fisheries in Tenerife, Spain	Traditional selling practices for small-scale fisheries are ill-adapted to current markets' changing circumstances. In 2014, an analysis of the value chain of local catches for the Island of Tenerife was conducted by a transdisciplinary team. The data gathering for the project aimed at involving as many of the actors related to SSF markets as possible: fishers and their organizations, middlemen, supermarket chains, fish shops, hotels, restaurants and consumers were all involved. After this analysis of the market, two proposals were placed on the table. First, the need to differentiate local products from fresh fish imports was clear, and a collective label was developed by the Island Government (currently implemented). The second initiative is related to tuna, because relevant catches of these species (7000-13000 tons/year) are mainly exported (85-95%). The proposal was to add value and enhance the penetration of these catches in local markets, involving producer organizations in the process. Currently, a pilot experience with schools is being developed for the introduction of skipjack and tuna loins in school meals in Tenerife, with the perspective to expand to all the islands, funded by a project (http://www.macarofood.org/) aimed at increasing the relevance of SSF catches in local markets, including forging alliances with iconic chefs. As a practical lesson of this process, we conclude that a transdisciplinary and holistic focus is necessary to cope with the complexities for defining viable marketing alternatives for SSF catches, and for devising the social conditions that would create and foster these alternatives.

Joseph Ginindza	Institute for Poverty, Land and Agrarian Studies, South Africa	Considerations for the future of small-scale fisheries in South Africa	<p>Small-scale fishing plays a significant role in coastal communities and support food and nutrition security, and livelihoods. The small-scale fishing sector has been historically sidelined, excluded, deprived investment opportunities, and exploited by established fishing operations. The resultant has been poverty, inequality, unemployment and other socio-economic challenges. The South African government is implementing the small-scale fisheries policy (SSFP) that aims to redress the injustices of the past, create jobs, and reduce poverty and inequality. The initial phases of the implementation happens at the time when there are already established norms and ownership of the fishing industry, particularly a view that seeks to maintain or protect the status quo. At the same time the inshore resources key to the livelihoods of small-scale fishers are either over-utilized, overfished, formed part of the illegal trade (abalone and west coast rock lobster) adds to the complexity of the implementation of SSFP. The future and potential contribution of small-scale fishing on sustainable resources, livelihoods, and food security depend on participatory transdisciplinary approaches that consider the complexity, diversity and dynamic processes of the natural, social, political, and governance systems. To achieve this, our empirical work will be situated in the transdisciplinary perspectives of multiple existing and new social actors in the small-scale sector through in-depth interviews with representatives of small-scale fisher associations, natural and social scientists, government officials and two non-governmental organisations. Our empirical work will specifically focus on the capacity development needs of local community-based organisations, inshore resources, resource allocations, community value chains and markets.</p>
Juan Carlos Villaseñor-Derbez	University of California, USA	Effectiveness of community-based marine reserves in small-scale fisheries	<p>Coastal marine ecosystems provide livelihoods for small-scale fishers and coastal communities around the world. However, overfishing and unsustainable fishing practices threaten the marine environment and jeopardize the wellbeing of coastal communities. A common approach to protect the environment and recover overexploited stocks is to implement no-take marine reserves (areas where all extractive activities are off-limits). In small-scale fisheries, these are sometimes implemented as community-based reserves, where a group of fishers collectively agree to close an area to fishing. While we know that reductions in fishing effort are followed by a series of ecological benefits (increased biomass, abundance, and species diversity), we do not fully understand how environmental and governance dynamics influence the conservation and fisheries benefits of community-based marine reserves. In this work, we evaluate the ecological outcomes of four reserves established by three coastal communities in temperate and tropical ecosystems of Mexico. By combining causal inference techniques with an operationalization of the social-ecological systems framework, we identify the environmental and social conditions that enable reserve effectiveness. Our results show a strong interaction between environmental variation and community organization, which influences reserve effectiveness. For example, the most effective reserve had strong governance structures accompanied with low environmental variability. Thus, even when a community is well organized (and reserves are well enforced), environmental variation can hinder the benefits of a reserve, and vice versa. Our results are particularly relevant under present changing climate conditions, as they can better inform management and decision making.</p>
Julia Ramos Miranda	Instituto EPOMEX- Universidad Autonoma de Campeche, Mexico	Social, economic, demographic, biological aspects of the artisanal fisheries in Champoton, Mexico: elements towards transdisciplinarity	<p>Fisheries around the world and especially artisanal fisheries contribute significantly to human nutrition and social and economic progress. In Campeche, Mexico there are 7 428 people registered in this activity (CONAPESCA), although in 2013 the State Fisheries Secretariat indicates more than 12,000 people. In 2015, 3836 artisanal boats were registered, of which almost 550 are based in Champoton port. One of the seven artisanal fishing ports of Campeche. This port is highlighted for its great fishing activity. This study focused on characterizing artisanal fishing in this port (fisher number, fishing strategies, fish production, fishing gears, profits), in order to provide elements for fisheries management in the Campeche State. Champoton in 2015 contributed with 12,720 tons of fish production corresponding to 59 resources among fish, crustaceans, mollusks and elasmobranchs, with a value of \$ 142, 879 millions of pesos. There are differences in fishing activity such as the "lanceo" and the "lisereo" with different fishing gears and boats' technology, which make the difference in economic profits for the fisherman. In this port there are 207 registered fisher organizations that carry out services, processing, transport and marketing; these aspects represents a high social, economic, political and cultural importance. The characterization of these fisheries will support elements to improve their management in Campeche. Another necessary point is to take into account fishers, businessmen, and fisheries administrators for planning, diagnostic and fisheries decision making.</p>

Kafayat Adetoun Fakoya	Lagos State University, Nigeria	Diagnosis of opportunities and barriers to co-management of small-scale fisheries in Nigeria: the case of Badagry and Epe Lagoons.	<p>In Nigeria, many inland small-scale fisheries (SSF) have characteristics of common pool resources and exhibit little integration with State-led governing systems. Decades of ineffective management and marginalization among other weaknesses and threats have contributed to gross undervaluation and low organization capacity of the fisheries. Hence, they have been unable to fulfill their full potential as drivers of socio-economic development despite significant contributions to food security and poverty alleviation. Seamless implementations of the SSF Guidelines and the strategic ten-year Action Plan for small-scale fisheries development in Africa to address food security, poverty alleviation and sustainable livelihoods will require fostering linkages between ecologic, socio-economic and governance subsystems. This will necessitate adoption of holistic and participatory approaches in which fishing communities will assume responsibilities for sustainable use of fisheries resources. Co-management is a popular theme recommended to achieve sustainability but consequent upon different collaborative arrangements between the State and resource users, no blueprint models exists and the factors which determine success or failure are often context – specific. Thus, the objective of this research was to identify opportunities and barriers that facilitate or hinder co-management. In this paper, Ostrom’s design principles for collective action were used to analyze certain characteristics of two fishing communities, Badagry (Badagry Lagoon) and Ikosi (Epe Lagoon) and determine whether they meet the necessary criteria of co-management. The paper presents key findings on capacity development of the communities and elucidates strategies to enhance collective action in the context of adopting and implementing the SSF Guidelines.</p>
Karly Miller	University of California, USA	Promise or Peril: the role of tourism in transforming small-scale fisheries	<p>Small-scale fisheries (SSF) are an inherently coupled system between people and the environment, and any study should consider both spheres - in this case - how does tourism impact community and ecological wellbeing? Since the answer to this question is obviously varied, the real question becomes - what are the mechanisms through which tourism alters the social and ecological role that SSF plays in the coastal ecosystem? This research provides a conceptual framework that "maps" out the influence of tourism on fishing, using a livelihoods approach that encompasses household and community scales across a timeframe of development. This offers a framework through which to estimate ecological impacts of tourism, specifically within fisheries. I then use this conceptual framework to explore the household and community-level factors that may be the drivers or determinants of these outcomes. Finally, I overlay an analysis of household and community food security, wellbeing, and socio-economic status to this framework to investigate the social impacts of tourism development - again through the lens of changes in livelihoods, and particularly fishing. This research combines the theoretical and empirical. It builds on rich literatures in fisheries, development, and tourism studies - and is empirically based in ethnographic observation and interviews and household survey data collected in eight fishing communities in the Colombian Pacific between 2015 and 2018. These findings, grounded in field experience and translated into the theoretical literature, seek to empower more community-centric policy and planning within the realm of conservation-development projects that relate to small-scale fisheries.</p>
Kashiefa Parker	International Ocean Institute - African Region, South Africa	Building partnerships for enhancing sustainable fishing practices in South African coastal communities	<p>In light of the Policy development and implementation for small-scale fisheries in South Africa, a new skills development project is being rolled out across coastal South Africa to educate and empower small-scale fishing communities around the importance of sustainable fishing. This new undertaking, the Small-scale Responsible Fisheries Training Project, was conceptualised by WWF-SA and is being coordinated nationally by the International Ocean Institute - African Region (IOI-SA). It is overseen by a partnership of transdisciplinary steering committee members. The training takes the form of a 1-day workshop that explains the Ecosystem Approach to Fisheries, responsible fishing practices, fisheries management approaches and local environmental issues through a series of discussions, videos, interactive games and presentations. It is designed to be interactive, and promotes discussion and debate through engagement. The focus is on a two-way transfer of knowledge. Fisher communities have much knowledge and experience to share; creating a space of mutual trust and respect builds a platform for their challenges to be raised and their voices to be heard. Fisher communities have extraordinary diversity and face challenges that are too complex for a single project or party to address. Sharing knowledge and fostering partnerships amongst community, biological, social and governance partners forms a catalyst for the development of further community training needs and challenges to be addressed. The workshops are delivered by a pool of members from small-scale fishing communities who are trained as trainers and empowered to deliver the workshops to small scale fishing communities around South Africa. While the workshop is aimed at the small-scale fisher communities, relevant stakeholders are invited and encouraged to attend in the interest of building stronger relationships, communication and engagement with the fisher community. In 2017, 22 training workshops conducted in communities across South Africa’s coastal provinces trained up to 409 participants. Participants have shown an understanding of sustainable practices, and trainers are noticing the positive changes being made within communities who have received the training. The project will conclude in December 2018 with the aim of training a further 441 participants. The hope is that the project can thereafter be institutionalised within existing partner bodies or seek further sources of funding. The aim is therefore to build the capacity of the community trainers through on-going training, as well as enhancing their abilities with multidisciplinary training so that they may be champions in taking this project forward and other future training initiatives. The hope is also to empower coastal communities to pass on the knowledge gained to others and encourage responsible decisions for the sustainability of fisheries and the marine environment, in this way fostering conservation stewardship and a sense of ownership within fisher communities.</p>

Kate Barclay	University of Technology Sydney, Australia	Integrating gender into fisheries management and development: designing a toolkit for Pacific Island countries	In the Island Pacific small but growing numbers of people working in fisheries agencies believe that gender is important in small scale fisheries. Even for those who do not yet see the relevance of gender for fisheries, donor and government requirements are making gender considerations a part of their work. This paper outlines a small project to find out how to support fisheries agencies to better address gender considerations, within a larger project on community-based fisheries management in Solomon Islands, Kiribati and Vanuatu. The gender project research consisted of 40 semi-structured interviews with staff from agencies for fisheries and women's affairs, people from stakeholder organizations, and key informants from regional and research organisations, qualitative document review, and some institutional relationship analysis. One of the key findings was that most of the staff working in fisheries management and development have marine biology training and do not know how to integrate gender into their work, beyond increasing numbers of women working in government agencies, and having women in fishing communities attend consultation meetings. Social science, specifically understanding of gender in local contexts and cultural and institutional norms, is necessary for identifying how gender plays out in fisheries and designing interventions to improve equality. The project steering group decided the most useful output from the project be a toolkit to help staff do gender better. In this paper I outline key research findings, the process taken in designing the toolkit, and the contents of the toolkit.
Katia Frangoudes	UMR AMURE, University of Brest, IUEM, France	Socials Transformations of SES of seashore seaweed, Brittany, France	In 2007, seashore seaweed gatherers on foot in Brittany obtained a legal recognition which granted them legal status (access to social security and all other social rights). This recognition ended illegal harvesting and opens new perspectives to seashore seaweed gatherers. Since, they build their own organization (union), initiate discussions on resources management, on the allocation of harvesting licenses but also about the improvement of their legal status and recognition. But they never become full members of the Regional Fisheries (fishers organization) as they were not included in the fisheries law (2010). Their recognition was strength through the data collection of catches. All gatherers in possession of harvesting license must declare their monthly production, specie by specie, as well as their harvesting areas to the fisheries administration. This decision was a result of a common agreement reached between gatherers, scientists, processing industry and local fisheries administration. However, national Fisheries law should be modified in a way to give full access to these harvesters to the regional fisheries committee only organization allowed by law to manage fisheries. Through semi-structure interviews we will try to identify and present the main stakeholders part of the social and economic system but also establish a typology of seaweed harvesters' enterprises. Understand the interactions between the different actors beyond to the governance system will help to improve the decision making system.
Khin Maung Soe	WorldFish, Myanmar	Carrot and stick: Incentive to conserve hilsa fish in Myanmar	The objective of this research is to design a cost-effective, scientifically-researched and participatory 'incentive-based' hilsa fishery management mechanism for Myanmar. The project is using five methodological building blocks to achieve its intended outcomes: 1. Understanding the biology and ecology of hilsa fishery to determine a no-take season and zone for hilsa fishing; 2. Understanding the complex socio-economics of hilsa fishing by conducting a large-scale household questionnaire survey to map livelihood options in fisher communities affected by fishing restrictions and determine the level of incentive packages required to offset the short-term cost (opportunity cost) of abiding by fishing regulations; 3. Making a business case for investment in hilsa management in order to inform the government and the private sector as to why they should make sufficient investments to restore the fishery (including an estimate of the economic value of the hilsa fishery); 4. Developing a sustainable financing mechanism, to ensure fishers do not return to unsustainable practices (policy briefs); and 5. Transboundary learning: hilsa fish is a resource shared between Myanmar and Bangladesh, making transboundary learning and cooperation crucial with the aim of establishing a common hilsa fishery management plan between the two countries by 2020. Key words: Improved Small-Scale Hilsa Fisheries Management, Governance, ecosystem-based approach, economic value, transboundary, policy.
Kim Hunnam	Charles Darwin University & Australian National University, Australia	Possible scenarios for enhancing benefits from a small-scale fishery in Timor-Leste: How can we avoid trade-offs between food security, nutrition and coastal livelihoods?	In Timor-Leste, a country with high levels of undernutrition, small-pelagic fish such as sardines, are transported from coastal communities, including to inland areas. The existing fishery food system is under-developed and un(der-)regulated. Enhancing benefits can be conceived (through a food security perspective) by increasing the availability of fish, improving physical and economic access to fish, and encouraging households to purchase and consume more fish. But what would such future scenarios mean for the livelihoods, food security and nutrition of fishery-associated workers and their families? Drawing from lessons elsewhere, this paper will explore entry points for improvement of the sardine fisheries in Timor-Leste, and consider how these potential changes may impact both coastal ('producer') and non-producer communities.

Kumi Soejima	National Fisheries University, Japan	The change of women's participation in Japanese small-scale fisheries and gender perspective	<p>One remarkable feature of Japanese small-scale fisheries is that most is family-run management. The dramatic surge of women's participation in SSF was in 1960s. Japan was in high economic growth period and motorized fishing boats and aquacultures spread around that time. However, many sons of fishers ceased to succeed the fishery and chose to employ in other industries. Instead, wives were brought on the fishing. However, as fishing incomes begin to decline, wives began to engage in other industries. As a result, the rate of the women's participation in SSF is declining. Due to the decrease in women's participation in SSF, (1) closing their fishing businesses or downscale, (2) labor-saving by machines, (3) increasing in foreign workers are underway in fisheries and fishing communities. Under such circumstances, a white paper on fisheries had mentioned about women in the context of social well-being, not fishery worker. A white paper started to mention about women in fishery worker's section within recent years. However there are few technical and formal fisheries training programs that are targeted to or include women. Furthermore, Japanese fishery cooperatives are important organizations in Japanese fishery and fishing communities. Women are denied membership in the Fisheries Cooperative. When it becomes more difficult to maintain the cooperative due to the decrease in the number of membership, there is a tendency to try to incorporate women as membership in these days. However the purpose is to maintain a cooperative. They don't recognize the necessity of equal gender participation in fisheries governance.</p>
Kyoko Kusakabe	Asian Institute of Technology. Gender and Development Studies, Thailand	Migration in fishing communities: gender and non-farm work in fishing communities in Cambodia	<p>Fish resources both for inland fisheries and marine fisheries have been decreasing since around 2011. In Cambodia, both women and men go for fishing or at least involved quite heavily in selling and processing. Fisheries used to provide good income for the family. As the fish resources decrease, how women and men are coping differs by location. The inland fisheries have been hardest hit by the decrease in fish resources, and some are living on savings, while others send their children for labor migration to construction and industrial zones outside the villages and to Thailand. In the coastal areas, fishing still provides the highest income for the family, but at the same time, the industrialization in the area provides employment opportunities especially for young women in factories, casinos and seafood processing. The study shows how coastal areas are able to diversify their income through women's work, while in the inland fisheries area, fishers are deprived of alternative livelihood when tourism and other business opportunities are taken away by outsiders. The only way for them to survive is by sending children to Thailand, which again hit difficulty because of recent changes in Thailand's migration policy. The paper argues for the importance of creating non-farm employment for women in fishing communities, by protecting their rights to do business in the area.</p>
Kyunghoi Kim	Pukyong National University, South Korea	Development of new capping material for remediation of contaminated sediment	<p>In order to evaluate the ability of granulated coal ash (GCA), an industrial waste of coal thermal electric power stations, to remove hydrogen sulfide and phosphate from contaminated coastal sediments, a pilot study was carried out in Hiroshima bay, where sediment condition was deteriorated. Two types of GCA were capped on the contaminated sediment in Hiroshima Bay with 20 cm thickness. And control site was remained without any treatment. Concentration of phosphate in the pore water of the sediment ranged from 0.1-0.4 mg/l at the Control and Experimental A sites, while it was suppressed to 0.0-0.15 mg/l at the Experimental B site. Concentration of hydrogen sulfide in the pore water of the sediment decreased to nearly zero in both experimental sites, whereas it remained over 0.2 mg/l in the control site. Concentration of acid volatile sulfide (AVS) in the sediment also decreased significantly in both experimental sites, while remained over 0.4 mg/g in the control site. Increases were observed in both the number of benthic microalgae species and the individual number of benthic animals in the surface sediments. This may have been due to the decrease in hydrogen sulfide. From the results obtained above, we concluded that the capping of GCA on contaminated sediments is a promising method for the remediation of contaminated coastal sediments.</p>
Laia d'Armengol	Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Spain	Shared understandings for adaptive co-management in a tropical small-scale fishery in Mexico	<p>Adaptive co-management scholars argue that a shared understanding among actors about the problems of the system and how they must be addressed is key for the success of co-management. This shared understanding results from a collaborative learning process and can be graphically represented as the social mental model of the co-management system. We elicited the mental models of the actors involved in the co-management of the small-scale fishery in La Encrucijada Biosphere Reserve in Mexico and aimed to aggregate them to represent the social mental model of the system. We found that the disparity of individual mental models could only be represented in several social mental models. We then examined the congruence of individual and social mental models. The results elucidate that more than one social mental models coexist among actors. As expected, actors who more frequently interact share closer understandings of the system. But differences of mental models are also explained by the motivations that each actor has about co-management: to reduce overfishing, to increase income, to guarantee a future for children or to get government subsidies. These results suggest that, in some contexts, more than one shared understanding of the system co-exist. In developing regions with a diversity of local users and low educational levels, the existence of many shared understandings may be necessary for actors with different backgrounds and motivations to engage with co-management.</p>

Laia d'Armengol	Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Spain	Co-management for conservation and development in a tropical small-scale fishery in Mexico	<p>Co-management is a management approach claimed to be a solution to achieve ecologically and socially sustainable small-scale fisheries. The fishers and managers of La Encrucijada Biosphere Reserve in Mexico established together with other actors a co-management partnership eight years ago to enhance the livelihoods of the fishing families and to promote the conservation of the protected area. Informed by extensive on-site fieldwork, we use a multi-variable framework drawing on the social-ecological systems framework by Ostrom and adaptive co-management literature to investigate the extent to which this co-management arrangement has achieved the expected social and ecological goals. We show that co-management has increased fishers' compliance to existing rules and promoted the adoption of voluntary rules restricting fishing activity such as no-take areas and closed seasons. Illegal practices such as fishing under-sized individuals and using banned fishing gears have been reduced and fishers and their families are now more concerned about conservation. However, the goal of joint commercialization in an international market has not been achieved, due to resistances from powerful actors who would not benefit from it. These results overall suggest that co-management can be a suitable strategy to promote conservation by pursuing the social development of local communities, particularly of those living within or around protected areas, although they also call into question the ability of co-management to transform existing power asymmetries and subsequently to accomplish all expected goals.</p>
Lawrence Epstein	Environmental Defense Fund (EDF), USA	Small-scale fisheries: A pillar of Belize's sustainable development strategy	<p>Sustainable management and protection of the Belize Barrier Reef and its small-scale fisheries are essential to achieve the country's objectives for meeting the United Nations Sustainable Development Goals (SDGs). Belize has made major steps in protecting its magnificent barrier reef and in sustaining the fisheries that depend upon it. It has established itself as a global leader in small-scale fisheries management, putting in place policies that will maintain and restore the ecosystems that sustain Belize's vital fisheries and tourism industry. // Representatives from a fishing organization, government, and an environmental NGO will present on how Belize's small-scale fisheries management strategy is contributing to poverty alleviation, food security, economic growth, and social equity and cohesion. // Belize's SDG fisheries strategy rests on several core pillars: • Deploying an ecosystems-based approach that values people, resources, and biodiversity; • Passing and implementing a comprehensive, modern Fisheries Resources Act; • Empowering residents of coastal communities to participate in and lead resource management through co-management; • Protecting important places and ecological functions with a network of marine protected areas; • Preventing overfishing with a national system of fishing rights and innovative scientific approaches; • Implementing a comprehensive coastal management zone plan. // With these strategies, and additional actions proposed for the future in Belize's voluntary commitments to the United Nations, Belize will continue on its pathway for a sustainable development strategy based on healthy reefs, more fish in the water, rich biodiversity, strong communities, and thriving livelihoods that contribute to the overall health and conservation of the Mesoamerican Reef.</p>
Lena Westlund	Food and Agriculture Organization of the United Nations (FAO), Sweden	Small-scale fisheries and climate change: Exploring holistic people- and community centred approaches	<p>Small-scale fishing communities are often located in areas that are prone to climate change impacts, including extreme weather events and natural disasters, given that they live and operate at the land-water interface, which is one of the most dynamic environments on earth. The Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) promote the integration of climate change and disaster risk considerations in small-scale fisheries governance and development, including strengthening of resilience and considering the needs of both men and women and of vulnerable and marginalized groups. Still, climate change and small-scale fisheries interactions are often not considered but at the 4th International Symposium on the Effects of Climate Change on The World's Oceans (ECCWO) in Washington DC in June 2018, several sessions explicitly addressed small-scale fisheries and the need for holistic and people- and community centered approaches. This paper report on conclusions from the ECCWO symposium including (1) the need to deal with climate impacts in conjunction with other vulnerabilities and social, economic and environmental drivers, and the key role of the SSF Guidelines and the Paris Agreement in supporting this; (2) the need to engage with local communities and integrate local knowledge and perceptions in any adaptation planning processes involving small-scale fishing communities; and (3) the need for fishery policies, regulations and management to adapt accordingly, in response to climate-related changes, to protect the wellbeing and build resilience of small-scale fishers and communities.</p>

Lina M. Saavedra-Díaz	Associate Professor, Department of Biology, University of Magdalena, Santa Marta, Colombia.	Broken dreams: A study of marine small-scale fishing communities requesting regulation, while the Colombian Fishery Administration disregards them	Small-scale fishing communities in Colombia have implemented informal rules to manage fishing activity in their territories. Some of the community initiatives have been accepted by the majority of fishermen, while other rules have not had even minimal acceptance and have failed. Nonetheless, the fact that some communities have established rules resulting from their own deliberations suggests that widespread community-based fisheries management may be possible. Although all fishermen (through hearings) brought up internal weaknesses in these initiatives, most communities believed that community management was possible, if they worked hand in hand with government. In interviews for this study 51% of fishermen considered it urgent that the government establish regulations if they are to confront the majority of conflicts in the fishing sector. There is a great variety of factors involved in implementing these initiatives, which make it very difficult for these communities to implement agreed rules by themselves, without the collaboration of the Fishery Authority (FA). These results come from fieldwork conducted in the coastal states of Colombia, in nine fishing communities (one traditional community per ecoregion), during the first stage of a participatory research project (2008 – 2012). Between 2014 and 2016, the participatory research team initiated, in alliance with the FA, a second stage of the project, in order to find out what regulations each community was willing to implement in their territories. However, trust built during the participatory research projects has been lost and the dream of implementing rules selected by the fishermen. Building transparent formal fishery governance for first time in Colombia, is still waiting to become a reality.
Luis Amado Ayala Pérez	Autonomus Metropolitan Xochimilco University, Mexico	The devil fish in Mexico (Loricariidae: Pterygoplichthys), an uncontrolled and underutilized invasion	The presence in Mexico of the alien species known as devil fish has grown exponentially, which has led to environmental problems, economic and social. The devil fish has anatomical and physiological characteristics that have enabled it to adapt to different environmental conditions, which has facilitated its survival and proliferation in various bodies of water. Their presence has generated negative effects in the capture of commercial species and fishing gear and in general there is a lack of awareness of the potential for exploitation. To describe the status of the invasion in the country, joined a database with 363 records from scientific, technical reports and gray literature that report the presence of the devil fish in the country, the results highlight Tabasco with 153 records, followed by Campeche, Veracruz, Sinaloa, Michoacán, Chiapas, Tamaulipas, Morelos, Coahuila, Guerrero, Jalisco, Sonora, Colima, State of Mexico and San Luis Potosí. It is recommended to give continuity to the studies of ecology and fish biology devil especially in: Bioaccumulation of heavy metals and contaminants, taxonomy, genetics and molecular biology, parasitology, evaluation of the possibilities of fishing and the reproduction, especially to ensure that communities that have been affected using the devil fish as a fishery resource and contribute to the control of the invasion. Finally, it is proposed to give continuity to the actions of environmental education, from the realization of workshops for users of fisheries resources and to generate incentives to capture and use.
Luis Amado Ayala Pérez	Autonomus Metropolitan Xochimilco University, Mexico	Evolution of the artisanal fisheries of Octopus and Dogfish-shark in the state of Campeche, Mexico	In Campeche, Mexico, the artisanal fishing has a great social, economic and environmental significance, their catches comprise mainly finfish and shellfish, being the octopus (one specie, <i>Octopus maya</i>) and the dogfish-shark (some species) important resources for the fishermen. The fisheries production was analyzed considering 34 years (1980-2014) of official statistics. In the case of octopus during the decade of 1980 and the beginning of the 1990s were lower volumes of catch being the 1985 minor (740 ton), in 1994 the Mexican government decree veda on the octopus causing an increase in the volume of catch, taking in 2012 its highest production (9850 Ton), now in its maximum utilization. In the case of the dogfish-shark the largest catches reported occurred during the 1980s and the mid-1990s. In 1992 the production was maximum with 4577 (tons) and 2011 with lower production (434 Ton) which led to the proclamation of closed seasons for all species of shark in 2012, currently this fishery is in state of overfishing. Within the time analyzed have also changed significantly artisanal vessels (boats with paddles to fiber glass boats with engine, taking a record maximum of 5362 boats in 2009), the population dependent on fishing (maximum registration of 15284 people in 2010) and the fishing arts like jimbas longlines, and diving. In the region, with the artisanal fishing generates food and foreign exchange to meet the needs of society and is the main engine of development, especially in isolated communities.
Luiz Felipe Dumont	Federal University of Rio Grande, Brazil	Dealing with small-scale fisheries bycatch in nursery grounds: experiences from Southern Brazil shrimp fisheries	The lack of basic information on bycatch from small-scale fisheries hinders the proper assessment of these activities. Two different fisheries were assessed in terms of bycatch, one targeting the pink shrimp in Patos Lagoon Estuary (RS) and one targeting shrimps in continental shelf (SC). The former fishery only allows a passive fyke net, however, illegal trawling is also performed in the region. In this sense, the amount and composition of bycatch was assessed for both gears, but the bycatch reducing device (Fisheye) has been tested exclusively for the legal fyke nets. The ecological effects of trawling on estuarine areas was also assessed, as well as the main factors explaining bycatch. Additionally, a square mesh panel has been tested to reduce bycatch in the second fishery analyzed, the trawling for shrimps performed in the coastal shelf. The bycatch baseline indicates that the trawling for pink shrimp affects a wide number of estuarine species, all caught in very small sizes. Additionally, the salinity variation in the area is the main structuring factor to explain bycatch composition and abundance. Conversely, the bycatch from fyke nets is low. The Fisheye testing suggests that this device may reduce the catch of small juvenile fishes. Likewise, the square mesh panel, tested in trawling for shrimps in the coastal shelf, significantly reduced the capture of juvenile fishes, but with no reduction in invertebrate catch. Therefore, we strongly recommend the continuous testing and improvement of BRD's as a tool for management in artisanal fisheries.

Maarten Bavinck	University of Amsterdam, The Netherlands	Small-scale fisheries as social struggle	<p>Social scientists in the field of fisheries display a strong concern with the social engineering of environmental sustainability, but also a tendency to identify with the concerns of government. This paper, which builds on a recent co-authored publication in Marine Policy, posits that social scientists have an own responsibility in the fisheries field, and that this responsibility includes more attention to the realm of social struggle and distributional justice. Social struggles over fisheries in general, and small-scale fisheries in particular, are argued to be globally intensifying as a result of four trends: (1) the condition that inshore fisheries have now largely become a zero sum game; (2) the new sets of controls that are occurring in the fish value chain; (3) the incursion of new business interests into marine and coastal space; and (4) the increasing participation, if not interference, by governments in what used to be mainly fisher affairs. Social struggles are part of the effort to safeguard small-scale fisheries and can benefit from strategic partnerships with external actors. The paper argues that addressing distributional justice concerns may be a precondition for achieving sustainable human-nature relations.</p>
Madeleine Gustavsson	University of Exeter, UK	Exploring the changing role(s), identities and wellbeing of women in small-scale fishing families	<p>In recent years, research has studied how fishers in the global north respond to economic, policy and environmental changes by diversifying their fishing products and/or businesses to secure their economic viability - in particular in the small-scale fishing sector. However, to date, no research has explored the role(s), identities and wellbeing of women in these diversification arrangements other than noting that their contributions are important. In this presentation I will present ongoing and future research in the UK and Canada which explores how women's role(s), identities and wellbeing are unique in diversification arrangements, underpinned by historical and current gendering of fishing activities, identities and relations in the fishing context. First, the paper will explore the multifarious ways in which women participate in fishing family diversification. Second, drawing on the conceptual idea of the 'good fisher', the research will explore if and how women can develop symbolically valued capitals in the fishing field through their contributions in ensuring the future survival of small-scale fishing businesses, potentially achieving the position of the 'good fisher' and/or gender equity. I will also offer some reflections on how I will use the concept of wellbeing to understand women's position within small-scale fishing families and present some methodological approaches through which I will examine the suggested research ideas. The research uses a participatory approach and several knowledge exchange activities will be proposed – specifically focusing on women in fishing families in a post-Brexit UK.</p>
Maíra Borgonha	Universidade Federal Fluminense, Brazil	Women, squirrelfish and mangoes: Exchanges by the seashore	<p>The present study case aims to investigate the role of women participation in the fishery food chain at Caponga village, Northeast Brazil and their remarkable importance in food security, as well. The research was performed during the 2006/07 and 2014/16, gathering data about women participation in raft fishing, through an ethnoecological approach and visual ethnography. Fishing is the main economy basis at Caponga. Nowadays, with the collapse of lobster fishing, fishermen catch mostly fish in spite of being a more dangerous fishery. Over the years raft fishing techniques were improved, taught and lingered, exclusively, among men. Hence, women's role in local small-scale fisheries still remains with huge importance at present days. As observed, among informal jobs in the local food chain, it was possible to identify a veiled, but well establish, exchange system with specific functions attributed exclusively to women. Still, women have reaffirmed their participation in the fisheries context, through handicrafts and struggling for their rights through the social movements. Over time, Caponga witnessed the survival and strengthening of the female participation in fisheries, taking on the challenges caused by the economic rhythms, distinguished by times of abundance, decline and devaluation of the fishery products. Thus, this strong evidence denies the concept of female invisibility, although adequate formal recognition of their workforce continues to be absent.</p>

Maíra Borgonha	Universidade Federal Fluminense, Brazil	Side by side: fishers and researches building marine conservation together	<p>The Atlantic goliath grouper, <i>Epinephelus itajara</i> (Lichtenstein 1822), is the largest bony reef fish in the western Atlantic Ocean - can reach over 2m and weigh up to 400 kg - and is considered critically endangered throughout its range, from North Carolina to southern Brazil, including the Gulf of Mexico and the Caribbean Sea, and also along the African coast from Senegal to Congo. The species forms seasonal reproductive aggregations in shallow waters (<50 m), generally close to large estuarine areas. In Brazil, <i>E. itajara</i> are protected by a fishing moratorium set in place in 2002 and renewed for up to 2023. Illegal catches, however, continue besides pollution and habitat degradation, which hinders stock recovery and reduces our ability to understand this process. Since 2002, Meros do Brasil Project (www.merosdobrasil.org) has the goliath grouper, <i>E. itajara</i> as the focus of its research interests. Since the species is considered Critically Endangered by the IUCN, as well as, the first fish species that has a moratorium in Brazil, the Project's promotes investigation through three broad research themes: biological research and conservation of the species (monitoring of catches and gathering of biological samples, mark-recapture inside estuaries and sea, genetics, aquaculture, interaction with fisheries, conservation of associated environments, spawning aggregations and photo identification); governance (articulation with local knowledge from fisheries communities, institutional governance, public policy); communication and environmental education (insert of coastal communities in the project's activities), making goliath grouper as a conservation symbol of coastal environments. The project works through a network of institutions – government, NGOs, researchers, diver community and traditional fishery communities – being present in nine of the 17 Brazilian coastal states. The monitoring of fishery landings is an important source of information to assess the conservation status of the species. For more than a decade, the monitoring of incidental catches along the coast has been done in a partnership of researchers and artisanal fishers in several Brazilian states. Sampling of longline fisheries inside Babitonga Bay, South Brazil, tagging of juveniles inside estuarine areas of Bahia and Espírito Santo, East Brazil, and trap fisheries inside estuaries in Pernambuco and Bahia are some of the research activities that had important collaboration of local fishers along these years. Such activities provided achievements such as the implementation of public policies inside Marine Protected Areas of sustainable use, beside the national moratoria for the goliath grouper. The Project's experiences have shown that both society and academia, through fishers and researchers, can join efforts and work together for a higher goal. In this case both sectors are aiming the conservation of an important species that almost disappeared from many areas, and thus provide the possibility of sustainability of this resource for fisheries communities in a near future.</p>
Mandy Doddema	Wageningen University, The Netherlands	Tuna middleman practices: response dynamics to traceability interventions	<p>A range of voluntary and regulatory traceability interventions have been designed and implemented for small scale fisheries to overcome concerns around Illegal, Unreported and Unregulated (IUU) fishing activity. While some attention has been given to the activities of small scale fishers, less attention has been given to first tier traders or 'middlemen'. By establishing patronage relations with fishers, these middlemen play an important mediating role in controlling access to both fishery resources and markets. Understanding their role in the everyday practices of the fishing communities are therefore key for determining the success of any traceability interventions. This study employs a social practices approach to unpack the practices of middlemen and the role they play in mediating the success and failure of different traceability interventions in two remote, small-scale tuna fisheries in Indonesia. The results show that understanding middleman behaviour is essential for improving traceability interventions in seafood value chains in the future.</p>
Margaret Wilson	University of California, USA	Social-ecological impacts of an herbivore fishing ban in rural Dominican Republic	<p>Like many artisanal coral reef fisheries around the world, the rural Dominican village of Buen Hombre struggles with overfishing and ecological degradation. Intense fishing of herbivorous fish such as parrotfish has contributed to widespread shifts from coral to algal dominance on local reefs. In an effort to restore herbivory and enhance resilience of Dominican reefs, the National Environmental Protection Service imposed a two-year ban on fishing of herbivorous fish on fishing communities such as Buen Hombre, where parrotfish previously made up more than two-thirds of an average fisherman's catch. We utilize interviews, catch data, and ecological surveys both before and one year after the implementation of the herbivore fishing ban to assess 1) enforcement of and compliance with the ban, 2) shifts in catch composition, 3) shifts in fishing gear and locations, 4) socioeconomic and cultural impacts, 5) conservation attitudes, and 6) initial ecological responses. As coral reefs continue on a path of global decline, bans on fishing herbivores are frequently proposed management strategies. However, the effectiveness of these initiatives as well as the social-ecological consequences for local fishing communities have not been sufficiently assessed. The Buen Hombre case study highlights numerous interdisciplinary dynamics relevant to coral reef fisheries around the world. In order to achieve socially sustainable management that drives lasting ecological results, coral reef fisheries management must integrate both social and ecological considerations.</p>

María José Barragán-Paladines	Charles Darwin Foundation for the Galapagos Islands, Ecuador, Santa Cruz and Leibniz Centre for Tropical Marine Research (ZMT), Germany	The Meanings of 'Fish': past stories and contemporary images of small-scale fisheries in Latin America and the Caribbean	<p>The access and trade of marine resources, by human populations, has played a major role since early moments in human's history. Evidence shows, for instance, that garum, a fermented fish sauce used as a condiment in the Greek and Roman cuisine, was exported as luxurious good in 600-700 B.C. With the uprising of the Colonial powers of Spain and Portugal, after the conquest and colonization of the Americas after 1492, a new trend in the usage and appropriation of marine (i.e., fish) resources took place. During the settlement of the Spaniards and Portuguese in the so-called 'New World,' the geopolitics of the world powers heavily influenced the governance of fishing resources. . Later in history, during the late 1950s and early 1960s, the fisheries resources in the Americas—until then only used for household subsistence—were looked at as a brand new sector, where to profit from and from where fish supply to the Global North markets, could be guaranteed. This talk circulates the regimes of power/knowledge in different social areas in Latin America and the Caribbean regarding the meanings of fish and other marine resources that have dominated the policies and practices concerning fisheries in this region. This analysis is theoretically inspired by the Sociology of Knowledge Approach to Discourse (SKAD, Keller 2011), and is methodologically grounded under the Interactive Governance perspective (Kooiman et al. 2008). This analysis illustrates social actors and societal arenas of discursive disputes and images that have remained around the fisheries resources in Latin American and the Caribbean. By using a critical approach to development, this paper reflects on how governability of fisheries in general, and of small-scale fisheries, in particular, have been brought to the Global South countries as an imposed model of development by the Global North powers. Main findings explore which principles and values the policies and practices designed, implemented and carried on the fisheries sector (i.e., small-scale fisheries) in some countries in LAC, have followed; and to what extent the images associated with the development of the “small-scale fisheries sector” followed principles that enhanced equal development opportunities, and fair market initiatives. This exercise shows that, neither fishing resources, nor the social systems involved with them and their associated images are free of value and power-laden policies and practices. Furthermore, the images and meanings associated to the fisheries natural and social systems are perceived differently: the former being more attractive regarding funding and international attention, and the later, still being perceived as marginal and poor.</p>
Maria Jose Espinosa Romero	Comunidad y Biodiversidad A.C. (COBI), Mexico	Restoring Mexican SSF fisheries and marine ecosystems through effective participation, management tools, and public policies	<p>Mexico's marine ecosystems and fisheries are not an exempt from overexploitation. Populations of valuable marine resources, once the basis of vibrant economies, are a small fraction of what they used to be. Approximately 17% of Mexican fisheries are overexploited and 70% are at the maximum sustainable yield. With 41% of the Mexican population living in coastal municipalities and 11,000 coastal communities with less than 15,000 habitants highly reliant on marine resources and ecosystems, sustaining fisheries become a need for ensuring employment, income, and food security for many people. Comunidad y Biodiversidad (COBI)'s theory of change focuses on reversing marine ecosystem degradation caused by 1) weak organizations, 2) overfishing, 3) insufficient ecosystem restoration, and 4) a deficient regulatory framework, which poorly guides fisheries to sustainability, restoration, and effective participation in decision making. COBI has been testing four strategic lines in the field: 1) Capacity building of leaders and fishing organizations to create pride and co-responsibility to significantly contribute to ocean sustainability, 2) Adoption of international standards for sustainable fishing given the absence of such measures in the Mexican legal system, 3) implementation of marine reserves to restore fisheries and ecosystems, 4) Support marine policies to include sustainability aspects. This work presents the lessons learned in 19 years of working with 26 community partners in 16 sites. This reflection has helped find ways to accelerate the implementation of sustainability as well as to elevate the profile of Mexican fisheries, particularly small-scale fisheries.</p>
Maria Jose Espinosa Romero	Comunidad y Biodiversidad, A. C. (COBI), Mexico. Maastricht University	The changing role of the state in fisheries governance	<p>This work focuses on the role of the state in fisheries governance. Theories about what states are and do have changed constantly and remains an area of research for common pool resources and fisheries governance scholars. Understanding the ideal types of state's roles and the conditions under which they occur is fundamental. Especially considering the increasing evidence of unfavorable outcomes associated with state-based regimes, such as the collapse of fisheries because of the pressure from powerful interests and dominant groups or the lack of capacities. States in governance schemes are meant to play minimalistic but essential roles such as steering, regulating, coordinating, and being accountable for the maintenance of fisheries. Policies are implemented and services are provided through the involvement of sub and supra levels of governments and non-state actors. By analyzing the Mexican fisheries case, I identify the changing roles of the state by law (Fisheries Act) over time. In addition, I identify the current variation of state roles within SSF management committees, the dominant roles, as well as the conditions under which these roles occur.</p>

Maria Pena	The University of the West Indies (UWI), Barbados	Understanding working women's issues and developing practical solutions for their improved fisheries occupation and domestic life: a case study of the Central Fish Processors Association (CFPA) in Barbados	Knowledge gaps on gender in small scale fisheries contribute to the poorly understood and documented characteristics of these Social-Ecological Systems (SES) in the Caribbean. Absent is documentation of women's roles, the value of these roles to the entire fisheries value chain, strategies for livelihood diversification, and coping mechanisms in times of shock and crises; information critical to mainstreaming gender in these systems. Generally, women are well known or recognized in the postharvest segment of the value chain. Their membership in fisherfolk organizations however, is rare. In 2017, the Gender in Fisheries Team (GIFT) began action research with the only fisheries postharvest association in Barbados. The Central Fish Processors Association (CFPA) was established out of a need to address challenges small fish processors (fish vendors) were experiencing with their work area at the Bridgetown Fisheries Complex. Despite not being a legally formal organization, participation in the predominantly female CFPA and its activities is high, especially in times of crisis. Both institutionalized regular and ad hoc meetings have proven partially successful at tackling problems and developing the CFPA, but more needs to be done. Issues have been identified from CFPA meeting minutes, other documents and discussions with the membership. GIFT is continuing research to obtain a good understanding of CFPA problems and concerns, and determine what the female members envision as possible practical solutions to enhance their fisheries occupation and domestic life. This research is framed conceptually in terms of livelihood and institutional analyses and adaptive capacity – the research frameworks of GIFT.
Marta Leite	University of Manitoba, Canada	Bridging resilience and wellbeing: a transdisciplinary approach to understanding fisher behaviors in the context of change in coastal Southeastern Brazil	Understanding motivations and behaviours is fundamental to exploring the complexity of small-scale fishers' interactions with rapid social-ecological changes, which in turn is of great relevance for managing the long-term sustainability of small-scale fisheries. The objectives of this paper are to: 1) bridge concepts of resilience from diverse disciplinary fields with those of the social wellbeing approach to address small-scale fisher responses to changes, and 2) to inform possible paths to more successful local fisheries governance. The research was conducted in a community in the north coast of Sao Paulo State, Brazil, using mixed research methods. The results point to five main nodes between multi-level resilience (individual, household and community) and wellbeing (material, subjective and relational dimensions), illustrating the value of merging these transdisciplinary strands of literature in the context of fisheries governance. Furthermore, our findings lead to two main arguments. The first being that cultural values play a significant role in defining fishers' behaviours, including their engagement (or lack there-off) with changing fisheries governance. The second argument is that illegal fishing represents more than a coping mechanism, it also refers to an expression of agency and resistance among fishers as they build livelihood resilience, search for wellbeing, and react to power imbalances posed by top-down restrictive fishing policies.
Martin Purves	Southeast Asia Director, International Pole & Line Foundation, Indonesia	Bringing small scale tuna fisheries to the table for international policy reform	One-by-one (pole-and-line, handline and troll) fishing techniques for tuna are characterized as being small-scale, selective and sustainable and provide more than 10 percent of the global tuna supply. One-by-one tuna fishing is practiced by coastal communities throughout the world and is firmly rooted in local communities, traditions and values. Despite their importance, many such fishing communities continue to be marginalized, and their contribution to local and national economies, food security, nutrition, sustainable development is threatened. In many cases, the fisheries lack the resources to represent their interests at the national, regional, or international level. This is particularly problematic for tuna fisheries, as these populations are highly migratory and managed by the Regional Fisheries Management Organizations (RFMOs). In recent decades, industrial tuna operations have driven up catches and many tuna species are now overexploited. Instead of decreasing fishing pressure, industrial operators look to avoid management, or place the conservation burden on the longstanding artisanal and coastal fisheries, regardless of equity, livelihoods, or food security impacts. This happens when the small-scale fisheries (SSF) lack a voice or strong champions at the RFMOs. While the rights and interests of one-by-one tuna fisheries are recognized in international treaty texts, the fishing communities often do not have the capacity, influence, and resources to ensure these issues remain in the forefront of decision makers' minds. This is at a time when the global community has committed to the UN Sustainable Development Goals and the vision of eradicating poverty and deprivation, growing economies, protecting the environment, advancing peace and promoting good governance. Furthermore, market demand for sustainable seafood continues to grow and we are reaching a new frontier in seafood sustainability that is more holistic, incorporating social and economic dimensions, alongside the environmental dimension. Commitments from commercial company leaders who recognise the role sourcing plays in their brand reputation, combined with growing consumer awareness and NGO pressure for responsible purchasing, has led to on-going momentum in support of one-by-one caught tuna. Faced with factors such as increased pressure of tuna stocks, technological advances and high market standards, SSF need capacity strengthening and assistance in strategic engagement. This paper will examine the approach being taken by the International Pole & Line Foundation (IPNLF) and its partners to enable direct engagement between small-scale fishers with policy makers and deliver policy outcomes that protect and promote the rights of these fishing communities on the international level. It will detail the tactics used to drive greater governance over the shared tuna resources in a way that considers the wider social context in which they occur. These activities will be considered in the context of building on global momentum behind the Sustainable Development Goals.

Matt Watson	Marine Stewardship Council (MSC), UK	What is an MSC Project Pre-Assessment (PPA) and how can it support small scale fishery improvements?	<p>The Marine Stewardship Council's (MSC) program often focuses on the value of certification - market incentives driving genuine at-sea environmental improvements and increased traceability and transparency throughout supply chains. But by utilising the MSC's standard for sustainable fishing to reform and prioritise management measures at a more holistic level, we are encountering a new approach to MSC and for sustainable fisheries. Management authorities are beginning to utilise the MSC standard as an independent, credible ground truthing exercise before making wide-sweeping adjustments and efficiencies to their management framework to benefit all fisheries and not just those seeking certification. This approach is now known as a Project Pre-Assessment or PPA. This multi-stakeholder, collaborative approach has been making improvements for fisheries in the UK, the Mediterranean region, Australia and most recently, Indonesia. Through a combination of mapping and ground-truthing fishery performance at an MSC pre-assessment level, it offers governments, fishers and their communities as well as interested marine stakeholders the chance to find the most efficient route to make environmental improvements at the most appropriate scale. Inherent within a PPA is that its intended impact extends beyond the immediate project and it has the purpose of improving management especially for small scale fisheries. For those fisheries that wish to pursue certification when their performance allows, engagement through a PPA offers a streamlined, stakeholder supported approach to sustainability. For those that chose not to pursue MSC, value is gained through PPA projects with management efficiencies being made at the broadest possible level.</p>
Matthew Roscher	WorldFish, Malaysia	The big data transforming small-scale fisheries: The state of Information and communication technologies in the Asia-Pacific region	<p>Over the past decade, advances in information and communications technologies (ICTs) have transformed our ability to collect fisheries data on landings, effort and behaviour. These advances are now providing unprecedented insights into biological, ecological and socio-economic aspects of fisheries, as well as enhancing value chains and compliance through increased traceability. ICTs are revolutionizing the scope and scale of small-scale fisheries monitoring and management, allowing for much greater resolution on their global importance to livelihoods and nutrition. ICTs can encourage networking and knowledge-sharing, decrease marginalization through strengthened communication, and increase access to the governance process and political agency. ICT usage, however, has evolved in an unstructured way through a combination of market forces, the ingenuity of civil society and varyingly favourable government frameworks, and as in other disciplines, the explosion of data volume and variety has created new challenges and opportunities for information management, integration, and analysis. Given the enormous potential of ICTs, we conduct a systematic review of ICT successes and failures, the latest tools and their use in capture fisheries, and through consultation with key informants, we provide a guiding framework for governments and fisheries stakeholders in their consideration and development of ICTs. The next advance in ICTs in small-scale fisheries will be the development of a global collaborative effort to facilitate infrastructure development, data sharing and management over scales not previously possible.</p>
Mbachi Ruth Msomphora	UiT The Arctic University of Tromsø, Norway	Interactive governance of small-scale fisheries and aquaculture: Transdisciplinary challenges of community involvement	<p>Successful fisheries governance requires stakeholder's involvement from point zero. However, it is usually hard to achieve this, especially if the stakeholders have significantly different interests, knowledge and power. In this regard, authors in this field expect that a fisheries governance that entails sharing management responsibilities between the authorities and the resource users i.e. 'co-management' (Jentoft 1998) and more recently 'results-based management' (RBM) (Msomphora 2016) and that a transdisciplinary (Aguilar-Perera et. al) research approach will deliver better outcomes. The purpose of this paper is therefore to show how a theoretical framework can be established, on how, and to what extent, coastal communities, including those of small-scale fisheries people, can efficaciously be involved in the management of fisheries, including aquaculture. This question is explored using Northern Norway as a case study; with particular focus on how the increasing conflict between aquaculture and fjord-fisheries could be successfully reduced with the perspective of transdisciplinary and the interactive governance ERIN approach.</p>
Md. Emdad Hossain	WorldFish, Bangladesh	Nutrient-rich fisheries enhancement in seasonally flooded rice fields in Southern Bangladesh	<p>Natural fish production in inundated and tidal flow-influenced rice fields through migration of fish into the floodplains during monsoon are declining day by day. Generally the surrounding poor peoples of the community used to get benefit from these resources. Yet, the impact of this on fish production is not well recognized in Bangladesh. Further, opportunities to enhance fish production during the monsoon have rarely been tested. We studied the impact of microhabitats (refuge) on the abundance of migrated small indigenous species (SIS) in seasonally flooded rice fields in Southern. Three contract and two control rice fields were selected for this study. Locally available cemented rings were installed as microhabitat. Water quality (D.O., Temperature) data were collected fortnightly. Findings showed that temperature and dissolved oxygen inside the microhabitats were more suitable for fish as compared to rice fields. Fish availability in experimental areas with microhabitat increased 49.4% compared with that of control rice fields. Fortnightly collected fish consumption data revealed that 90.2% of fish captured from rings was consumed directly and rest of the fish was stocked and reared in homestead ponds – to be consumed later by the households. Ring-owner households obtained 5.2% more fish for consumption which provided 26.5% additional SIS as complement to the diet of their family annually. In sum, we found that microhabitat development substantially improved fisheries production and fish survival in rice fields, which offers a promising pathway to improve the diets of thousands people who live adjacent to and work within rice fields in Bangladesh.</p>

Md. Mahfuzar Rahman	University of Manitoba, Canada	Fisher engagements with transition in a small-scale inland fishery: long-term structural change, fisher agency, and wellbeing in Parbatipur Sub-district, Bangladesh.	Over the last five decades, the inland fishery in Bangladesh has gone through massive and multidimensional structural changes through the direct intervention of the state. The reasons for this transition are diverse, and the effects of this transition are experienced differently by different people and groups. Major effects of these structural changes to fisheries are; a significant reduction of the length of the fishing period, gradual exclusion of generational Hindu fishers and complete exclusion of women from capture fisheries, and the development of aquaculture at the expense of capture fisheries. Although these changes have also created many other alternative opportunities for fishers, in general, most of the direct benefits of these changes have been captured by the elite. Fishers creatively responded to these changes and have found multiple ways to reduce the shocks, insecurity, and the negative impact of these changes, and instead increase income and wellbeing. The overall impacts of these structural changes on fishers' wellbeing present a complex scenario. There is a noteworthy decline identified in their social and relational wellbeing, but simultaneously a notable improvement identified in material and other areas of social wellbeing. A remarkable improvement identified in fishers' overall wellbeing even after the significant decline in capture fisheries, which is surprising. The development of aquaculture significantly contributed to increase in fishers' wellbeing, but the sustainability of the capture fisheries along with aquaculture can create more opportunities and contributed more in the wellbeing of fishers and the greater community.
Md. Nahiduzzaman	WorldFish, Bangladesh	Establishing Marine Protected Area in Nijhum Dweep Seascape: A transformative ecosystem approach for Hilsa conservation	To achieve the Aichi target, Bangladesh has committed to declare 10% of its 15 000 sq km Exclusive Economic Zone as Marine Protected Areas (MPA) by 2020. The Bangladesh government is now in the process of initiating the first fisheries-based MPA which will be designed explicitly in accordance with the ecosystem approach to fisheries management (EAFM). While applying the EAFM, the MPA will be design with a focus on the Hilsa shad (a main focus of small-scale fisheries in Bangladesh) breeding and nursery grounds around Nijhum Dweep Island in the Bay of Bengal. To inform management design we conducted a qualitative and quantitative transdisciplinary study to determine and promote the likelihood of ecological, social and governance success of the Nijhum Dweep MPA. Fishers of the area were found to have low human wellbeing highlighting the need for livelihood initiatives alongside the MPA implementation. Ecosystem condition was found to be threatened by illegal fishing and siltation. The physical aspects of MPA design delineated a total of 976 sq. km; 92% water and 8% of which is land area. In our assessment of governance, we found the enforcement of existing legislation was weak, there were fragile institutional arrangements and weak participation in resource management. We identified that a new policy instrument is to be critical to declare of this fisheries-based MPA and facilitate transformation away from top-down fisheries controls towards more participatory and ecosystem-based forms of management. In this paper we discuss our consideration of research data and our relationship with government and fisher partners, to identify the best possible engagement processes, institutional structures and management strategies associated with this MPA "test-case" to optimize livelihood and ecosystem resilience.
Melisa Fabella	Division of Social Sciences, University of the Philippines, Philippines	Analysis of profits and poverty among small-scale fishers: a case for appropriate government policies in San Andres, Romblon, southern Luzon, Philippines	Despite the food and income that fishing provides, many small-scale fishers around the world, especially in third-world countries like the Philippines, still live in poverty. In line with this, even though these fishers are known to be poor, the extent of how poor they are is rarely known. With very few studies on the poverty of small-scale fishers in the country, there is an immediate call for examination and diagnosis of this reality. This research project attempts to measure the poverty among the sample size of 230 small-scale fishers in San Andres, Romblon, who were personally interviewed, covering one (1) inland and seven (7) coastal barangays. Moreover, this paper also examines the profitability of fishing using the cost-and-return analysis. The research finds that the aforesaid small-scale fishing was dominated by males (but there are also female fishers), with an average of 21 years of fishing experience. It is worth noting that, the fishing operations was profitable yet the small-scale fishers concerned were still income-poor. Respondents and household profiles showed basic needs are met, which were partly due to government programs. This study provides insights and serve as a guide for policy makers in taking actions to lower headcount poverty rate in the regions and increase fishing income without harming the fishery resources, specifically in remote and isolated areas.
Michael Fabinyi	University of Technology Sydney, Australia	A relational approach to food and water insecurity in specialised fishing communities: evidence from the Philippines.	Food insecurity remains a common problem for many small-scale fishing communities. Food insecurity is closely linked to other social conditions, and the linkages between these social conditions and their underlying drivers are less well explored in fishing contexts than they are in agricultural contexts. In this paper I draw on mixed-methods fieldwork from a community that specialises in fishing in the Western Philippines to examine the linkages between and drivers of food and water insecurity. Food insecurity is common, and characterised by a lack of funds to buy food, particularly during periods of bad weather. Water insecurity is also characterised by the need to pay for the delivery of drinking water from one of several remote sources. I argue that both food and water insecurity in communities that specialise in fishing are driven by broader forms of poverty. Understanding the relations between food and water insecurity and the wider drivers of poverty in specialised fishing community contexts should generate improved understandings of how the conditions of food and water insecurity persist, and how these conditions may be better addressed.

Miguel B. Gaspar	Instituto Português do Mar e da Atmosfera (IPMA), Portugal	The “ghost” small-scale fleet: how to make it visible?	<p>The Portuguese small-scale fleet (SSF) comprises around 6,000 vessels with an overall length lower than 9m. This fleet is spread along the entire coast and corresponds to more than 80% of the Portuguese fishing fleet. The SSF exploits a large number of resources, involving a combination of gears and target species that vary between areas and seasons throughout the year. Despite the cultural, social, economic and environmental importance of small-scale fisheries, for most of them the information available is scarce and scattered in time. Indeed, information about which fishing areas and gears are used or about the spatial and temporal distribution of the fishing effort is still lacking, which hampers the management of small-scale fisheries. Therefore, SSF is considered a “ghost fleet”! So, the main question is “How to make the SSF visible?” In the present paper, we will show how Information and Communication Technology (ICT) can play a significant role in acquiring such data, through the use of active GPS/GPRS trackers. We have used this type of devices in several small-scale fisheries and our results showed that: i) from the vessel position and speed recorded in a number of consecutive position reports, it is possible to draw conclusions about the vessel activities (steaming and gear operation); ii) the pattern of positions allows to conclude the type of gear used and its characteristics (e.g. nº of traps); and iii) the use of tracking devices has proven accurate and can be used on all small-scale vessels and in many different fisheries.</p>
Miguel Gonzalez	York University, Canada	Indigenous artisanal fisheries in Nicaragua: governance and autonomy	<p>In this paper I describe recent changes in the social and economic conditions that are relevant to the social status and development of artisanal fisheries on the Nicaraguan Caribbean autonomous regions. I examine these in relation to current governance challenges faced by Indigenous and Afro-descendant peoples, especially to those that live in coastal communities and areas adjacent to inland waters, for whom fisheries is a critical component of their livelihoods. A rapid flow and uncontrolled immigration of non-indigenous <i>campesino</i> settlers, the titling of large swaths of land under a collective property regime, and the weakening of traditional forms of authority in the light of competing governance structures, are all factors that in combination produce a scenario where conflict is frequent, while negotiation - when occurs – it often expresses historical injustice and power differences between the state, private agents, and indigenous peoples. Theoretically, my presentation seeks to contribute to transdisciplinary dialogues on governance of small-scale fisheries, indigenous tenure rights to terrestrial and sea resources and international law.</p>
Miguel R Lorenzi	Memorial University of Newfoundland, Canada	The same but different – a rapid assessment of fishing boats characteristics	<p>Most of the world fisheries rely on fishing boats of all sizes, types, and levels of mechanization for daily fishing. The small-scale fishing boats account for 80 percent of the global fishing fleet, with almost 5 million boats. The complex nature and characteristics of small-scale fisheries are also represented in the sector’s fishing boats. New building materials for nets and boats, advanced propulsions and electronic systems are being developed and integrated into small-scale fisheries, changing greatly the characteristics of small fishing boats. Failure to acknowledge this diversity, complexity, and dynamics in the fisheries systems, which are also reflected in fishing boats, may hamper fisheries governance. For instance, policies would be based on assumptions of homogeneity or outdated characteristics that do not match the reality of a complex and changing fishery. Based on a study case in Newfoundland, Canada, we propose a rapid assessment of fishing boats characteristics based on a protocol of visual identifiable features. This protocol can be used by scientists, managers and other stakeholders to rapidly and cost- effectively generate up-to-date data about a certain fishing fleet.</p>
Milena Arias Schreiber	Swedish Institute for the Marine Environment, University of Gothenburg, Sweden	Governing the governance: Small-scale fisheries in Europe with focus on the Baltic Sea	<p>“Governing the governance” refers to the overarching governance values and principles on which governing institutions are built and operate relative to small-scale fisheries. What are these values and principles, and how consistent are institutional settings with them? How effective are existing institutions for realizing these values and principles in their governing practices? These questions can be raised for any societal sector, including fisheries. Our research explores the governance system and experiences of small-scale fisheries in the Baltic Sea, particularly in the context of the EU Common Fisheries Policy. What are Baltic small-scale fisheries, and how are they being governed? How supportive are the governance system to the values, concerns and interests of small-scale fisheries? Thus, what is the scope for the governability of small-scale fisheries in this area? We focus on the consequences of a missing link between small-scale coastal fisheries’ interests and concerns and the EU overarching fisheries governance and fishers’ representation in regional fora like the Baltic Sea Advisory Council. We evaluate how this missing linkage shifts under current transitions towards increased support for small-scale fisheries in Europe, and what governability and transdisciplinary challenges this shift may entail.</p>

Minerva Arce-Ibarra	El Colegio de la Frontera Sur, Mexico	Progress and perspectives on the implementation of the SSF Guidelines and the SDGs in Mexico's artisanal fisheries	<p>As an UN member, Mexico has signed several UN international agreements, including the SSF Guidelines. This study aims at presenting a review of the progress and perspectives on the implementation of the SSF Guidelines and the SDGs in Mexico's artisanal fisheries. One of the top challenges in Mexican fishery policy is that there is a lack of a long-term plan for fisheries management and fisheries governance. Other problems include that the social aspects of SSF fisheries are poorly researched and that deterioration of fish stocks has been gradually increasing. The SSF Guidelines were introduced to the Mexican Senate on August 2017, and currently, we found no evidence of any implementation program whatsoever. To move forward toward the implementation of SSF Guidelines and SDGs within a human rights-based approach in Mexico's SS fishing sector, this study proposes a TD approach that includes several scales, from global to local. Globally, Mexico and other Latin American countries would need support from the World Bank and other international institutions in devising structural policies –sensible to countries' realities, targeted at poverty eradication and food security. At national level, the Mexican government needs to work on participatory approaches in fisheries policy implementation including a call to SS fishers as well as other stakeholders (academia, NGOs, SCOs, and private sector) to introduce a diagnosis of the fisheries sector, and to propose a scenario of solutions sensitive to regional and local contexts of SSF.</p>
Misael Sosa Avila	Instituto EPOMEX/Universidad Autonoma de Campeche, Mexico	Characterization of artisanal fishing in Carmen Island, Campeche	<p>For several years the artisanal fleet of Carmen Island in the south Gulf of Mexico has increased, developed as an alternative as consequence of the decline of industrial fishing and the oil crisis. The increase of the fishing activity generated problems such as decreasing catches, sociopolitical conflicts and challenge in the application of the fisheries regulations, especially related to the illegal fishing. Due to the high biologic-socio-economic importance of this activity, the objective of this study was to characterize the artisanal fisheries. Direct and indirect information sources were used in this work. In 2015, the artisanal fishing production of Carmen Island reached 2,721.8 tons, which corresponded to 4.9% of the total production of the state of Campeche; with a profit of 8,268,094 pesos. The artisanal fleet of Carmen Island consists of 697 boats, corresponding to 140 fishing permits. The 84% of the boats are dedicated to the catch of seabob shrimp, 13.0% to fin-fish, 2.0% to the sharks and 1.0% to the oyster. The most important species by volume are: the snook (<i>Centropomus undecimalis</i>), the seabob shrimp (<i>Xiphopenaeus kroyeri</i>), the yellow sea chub (<i>Kyphosus incisor</i>), the croakers (<i>Cynoscion</i> spp) and the crabs (<i>Callinectes sapidus</i>, <i>C. boucourti</i>). The most used fishing gears are bottom trawl net (seabob shrimp), gillnets (snook, sharks, yellow sea chub, etc.), and trap (crabs). Despite the substantial number of fishermen and boats, the catches describe a general decreasing tendency, in this context it would be important to redesign management measures, based on a new classification of fisheries covering factors as social, economic and environmental; further, to integrate all sectors and concerned stakeholders of fisheries.</p>
Moenieba Isaacs	University of Western Cape, South Africa	Can international instruments like the SSF guidelines and SDGs prioritise women's interests, rights and access to land and marine resources- a case study of Buffeljagsbaai, South Africa?	<p>Women in Buffeljagsbaai on a daily basis are faced with difficult choices between feeding their families and/or garnering quick cash from poachers and risk imprisonment. Many women in the community have husbands, sons, partners, and brothers who are engaged in illegal abalone poaching and they are entrapped in traditional gender roles to supporting these poaching activities by preparing food, cleaning wetsuits, storing catch bags in their freezers and allowing boats to park on their premises. A transdisciplinary approach through the use of documentary evidence, district land office, local land committee, and in-depth one-one interviews to get a deeper understanding of the challenges facing women to eke out a livelihood of the marine resources and on the land. The tenure insecurity of ancestral land challenge due to blue growth initiatives in large-scale abalone aquaculture. The women of Buffeljagsbaai use food and the production of food they sourced from the seascapes (land and sea) to resist the threats from authorities to their livelihoods, land and food security. The women of Buffeljagsbaai face an ongoing struggle to have their voices heard and their needs met against a backdrop of one of the most divisive and politically sensitive issues facing vulnerable coastal communities in South Africa. How can we overcome centuries of discriminatory tenure systems? How can land and fishing rights be redistributed in an equitable way? Can international instruments like the SSF guidelines and SDGs play a role in women's prioritise women's rights, access and interests?</p>

Moh Ardiansyah	Diponegoro University, Indonesia	Co-Management Model for Karimunjawa Water: A Choice between Economic and Environment for Sustainable Development	<p>Indonesia is a maritime country with about 17,500 islands and Karimunjawa is a small part of those islands. It lies in the east-northern of Semarang as the capital city for Central Java province. Karimunjawa is formed of 22 islands and has an area of 111 625 ha with population of over 8,800 inhabitants who depend on fisheries resources. It has a national marine park with huge of wonderful coral reef as recreational object. Utilisation of Karimunjawa among others are for fisheries resource, National Park of marine protected area (MPA) for certain cluster, recreatioanal object and resorts. A part of Karimun is about 111 625 ha has been converted into a national park with the name of Karimunjawa National Park. The National Park designated as a Marine Nature Reserve through the Minister of Forestry Decree 123 / Kpts-II / 1986 and in 1999 through Decree 78 Menhutbun / Kpts-II / 1999 Karimun Nature Reserve and surrounding waters. This is under the management of Board of Taman Nasional Karimunjawa. While the fisheries resource of Karimunjawa and it surrounding area is managed by under the Central Java Government. The main problem encountered in the field is the non-compliance behaviour among the fisheries users, the dilemma option is between economic motive versus ecology or environment motive are taken placed. Although within a tolerance condition, several exploitation fisheries resource and its ecosystems are detected in Karimunjawa. Improper waters and land used for privatisation property or estate by the business parties is one of the worriness as perceived by public. The economic development in this region is significantly growing with the present of economic activities. But the academicians and people who concerned with environment prefer to manage Karimunjawa resources toward renewable in ecosystem. Thereafter, it is urgently need to set the strategy to manage Karimunjawa sustainable. Perhaps Co-Management with the affirmation of Tripatriate model of Academician/ University-Government-Community/ Business will save the Karimunjawa for our future generation.</p>
Mohammad Mahmudul Islam	Sylhet Agricultural University, Bangladesh	The impacts of transdisciplinary threats and stressors on the mangrove fisheries in the Bangladesh Sundarbans	<p>The Sundarbans is the largest mangrove ecosystem in the world that represents one of the productive fisheries of Bangladesh. The mangrove fisheries of the Sundarbans provide benefits to the local and wider populations directly or indirectly for their livelihoods, income and wellbeing. However, like many other mangrove ecosystems of the tropics, the small-scale fisheries of the Sundarbans are at risk from a number of threats and stressors of which many are external but greatly affect their sustainability. Research focusing on the effect of these transdisciplinary originated threats and stressors are scant in Bangladesh. Based on literature review and qualitative fieldwork, this study aimed to identify transdisciplinary originated threats and stressors that affect the fisheries ecosystem of the Sundarbans, Bangladesh. The findings suggest that a number of transdisciplinary originated threats and stressors including natural (e.g. climate change impacts, cyclones and other extreme events) and anthropogenic (e.g. reduction of freshwater flow due to upstream barrage, land use change through shrimp farming, coastal and industrial pollution, structural development activities, ports and navigation activities, irresponsible tourism etc.) affect the flow and the quality of the fisheries ecosystem services (through loss of habitat, destruction of biodiversity etc.) in the Sundarbans, thus put strains on the community livelihoods. The existing governance structure has proven largely ineffective in recognizing the importance of the transdisciplinary process for mangrove governance that has had negative implications for managing mangrove fisheries resources. This calls for an immediate need for transformation. By providing a critical reflection on dimensions of the effects of transdisciplinary drivers on mangrove fishery, this study also offers suggestions for transformation in governance mechanism of the Sundarbans mangrove ecosystem.</p>
Mohammad Mozumder	University of Helsinki, Finland	Climate change: Social, economic, and ecological adaptation strategies for Hilsa (<i>Tenualosa ilisha</i>) fishers in Bagladesh	<p>Climate change and extreme weather pose significant and long-term risks to fisheries in many tropical developing countries including Bangladesh, like disruption of fishing operations and fish production. Coastal fishing communities lack the economic, social, and political power to improve their resilience to these stressors. Hilsa (<i>Tenualosa ilisha</i>) is Bangladesh's most valuable fish species - nutritionally, economically, and culturally. Adoption of coping strategies to the impacts of climate change is crucial for the Hilsa fishery, and the fishing communities depend on it. This research focuses on the liable determinants and dimension of Hilsa fishing community beliefs of, and adaptation to, climate change and recommends policies for adaptation. The present study applies vulnerability, adaptation, and resilience thinking theories to shape the research and related interpretation. Two coastal fishing villages in Patuakhali district (substantial risk zone for disasters) were selected. A mixed method research approach was used to investigate fundamental dimensions of community perception of climate change and adaptation, drawing on multiple sources of evidence: participant observation, in-depth individual interviews (n=60), focus group discussions (n=2), and secondary sources. Respondents had clear perceptions about climate change as a form of changes in rainfall, seasonal patterns, increased temperatures, and salinity. Such changes threaten biodiversity and could lead to changes in migration patterns of fish, declining fish stocks. Hilsa fishers believed that adaptation to climate change needs measures that simultaneously reduce poverty, protect, or restore biodiversity and ecosystem services, by getting more fishing inputs and modern equipment, awareness and information, weather observation and alternative business. It is hoped that this research will serve as a food for thought how fisher's preferences and adaptation practices including fisher's traditional knowledge can be incorporated into formal adaptation policies.</p>

Mohammad Mozumder	Faculty of Biological and Environmental Science, University of Helsinki, Finland	Facing governance challenge of small-scale Hilsa (<i>Tenualosa ilisha</i>) fishery in Bangladesh: A social-ecological approach	Hilsa (<i>Tenualosa ilisha</i>) is Bangladesh's most valuable species of fish- nutritionally, economically, and culturally. However, the existing fisheries governance mechanisms (top down and exclude informal institutions) have not been supportive to manage the fisheries rather overlook the potential of local communities and institutions to manage their resources. Hence, an alternative and proper management approach is necessary. This research aims to explore the effectiveness of a co-management approach in Hilsa fisheries to enhance the resilience of fishing communities. The present study applied SES (Social-ecological systems), resilience thinking and co-management theories to shape the research and related interpretation. Empirical data are collected through in-depth individual interviews and focus group discussions on understanding the reasons behind the Hilsa stock depletion, the strengths, and weaknesses of the current Hilsa conservation and management policies and the strategies to enhance the resilience of the fishing communities. Use of illegal nets, harvesting of juveniles and brood-stocks, improper fishing regulations, and climate change impacts are the major threats to Hilsa stock depletion. Socio-economic conditions of the fishers and other stakeholders are affected by the imposed ban period and inadequate allocation of incentives by the government, unequal distribution of power practiced at distinct levels of the value chains. As a solution, fishers urged to use of local ecological knowledge in the management plan, provide them alternative income-generating activities during the fishing bans and other crisis periods, and sharing responsibilities to manage the Hilsa fishery as a form of co-management, which may eventually enhance the resilience of the fishing communities.
Monica Engel	Memorial University of Newfoundland, Canada	Small-scale fisheries people: The importance of individual cognition to promote fisheries sustainability	Small-scale fishing communities are highly reliant on the ocean for food, income, and cultural traditions. These people are individuals who hold a specific set of values, beliefs, and attitudes in relation to fishing practices and management decisions. At the same time, fisheries communities are the most impacted by the changes in the oceans, and the decisions related to marine management. Hence, men and women who represent the life above water in resource-dependent communities are fundamental to any effort in promoting transformation towards sustainable fisheries. Listening to fisheries people is of crucial importance in implementing Goal 14 of the United Nations Sustainable Development Goals. At the root of any decision from the individual to the governmental level, values, worldviews, and moral beliefs are at the foundations of a specific set of attitudes, behaviors, agreements, and policies. Assessing individual's values, beliefs and attitudes aid to the understanding of people's predisposition to engage in sustainable behavior, practices, and support or oppose to various managerial strategies. Sound knowledge is critical to making fisheries sustainable, both socially and ecologically. Cognitive research can guide the understanding of individual and social values, beliefs, and behaviors, and thus enlighten the successful implementation of SGD14. It is by understanding the drivers of behavior that we will transform the future of small-scale fisheries and engage people in sustainability.
Mr. Bobby	Network Activities Group, Myanmar	Sub-national fishery legislation experiences	The constitution of Myanmar (2008) allowed the first time in the history for State and Region to formulate their own freshwater fishery law. In 2012, the first Freshwater Fishery Law was enacted by Ayeyarwaddy Region, other Coastal States and Regions enacted in the later year based on experiences of Ayeyarwaddy Region. The Fisher Development Associations and Networks has been successfully exercised their rights in influencing Freshwater fishery law through public hearing, consultations and feedback. Myanmar Freshwater Fishery Law (1991) restricted its focus on revenue collection. Current Freshwater Fishery Laws at the States and Regions recognize small scale fisher access to fishing rights, their livelihood, right to organize fishery group/association, promote co-management of fishery resources, and sustainability. Although it is early to see the outcomes of new regulatory frameworks; fishery landscape are changing, initial success are observed and new challenges and opportunities emerged.
Mtui Sallem Rose	Poverty, Land and Agrarian Studies (PLAAS); University of Western Cape – South Africa	Investments in small-scale fishing communities: A transformation of coastal fishing communities' livelihoods?	The discovery of gas in the Tanzanian southern region of Mtwara brought high expectations for development, economic growth and hope for a bright future especially among the local populations. However, this hope turned into a fear and led into a conflict when the government decided to relocate these people to pave way for exploration. Why did such a fear arise? And what has been the outcome of it? This study examines this fear and on how communities perceive their natural environment in the context of their political environment, economic pressure, and government policy. The study discusses the effect of investment activities on coastal fishing communities. It examines impacts of investment activities on small-scale fishing community livelihoods based on indicators identified in Tanzania Development Vision (TDV) 2025 and National Five Year Development Plan (NFYDP) 2016/17–2020/21. Both qualitative and quantitative methods comprising individual questionnaires, interviews were administered to sampled community members, investors, Government officers from ministries, project and programs officials. Quantitative data were analyzed using SPSS software version 21 and Ms Excel software version 11. Findings indicate that apart from investment in Oil and gas, Tourist/Guest Hotels, Cement manufacturing, Seaweed farming, Salt mining, Waste Facility and Logistics, Port expansion, Fertilizer manufacturing and Conservation (Marine Park (MBREMP)), there are other investment in the form of corporate social responsibilities (CSR) and/or Social Investment (SI) which are meant to transform community livelihoods. Despite these efforts, local communities are not convinced that their livelihoods have improved. To them, investments have not brought tangible positive changes in their predominant rural livelihoods.

Nachiket Kelkar	Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, India	Riverine ecology and institutional interplay: Treacherous regimes and precarious fisheries in the Ganga River, Bihar, India	Fluid boundaries of dynamic floodplain rivers often mismatch with the hard boundaries of institutions invested with managing common-property fishery resources. In such ‘riverscapes’, conflicts over rights and access to mobile and unpredictable fishing areas can result in adverse impacts on ecological sustainability and social justice, impairing institutional relevance to management. Interactions between different institutions at multiple spatial, temporal, and organizational scales can further complicate fishery conflicts. Studying complexities of institutional “interplay” can help make predictions about the adaptive capacities and resilience of different institutional regimes. We analyzed the implications of 1) overlaps between river channel changes and jurisdictional boundaries, and 2) interactions between state-based and non-state institutions, and different fisher groups, for resource conflicts in the open-access river fisheries of the Ganga River (Bihar, India). We conducted hydrological studies, GIS analyses, participatory mapping, and detailed semi-structured interviews with institutional representatives and fisher group members. Our study focused on the state fisheries department and mafia-gangs as the main “institutions” influencing gear conflicts; with gillnet-using fisher groups alleging that mosquito-net use by other fishers (backed by the gangs) were destroying fisheries. Analyses revealed the 1) abandonment of fisheries management interventions by state institutions due to confusions about jurisdictional and legal boundaries, institutional interactions, and river channel movements, 2) increasing illegal practices by mafia-gangs and evolving alliances between fisher groups and gangs, and 3) the failure of local community-based institutions and collective action to overcome the impacts of fishery conflicts.
Natali Piccolo	Rare, Mexico	Quality of life and living conditions in small-scale fisheries in Southeastern coast, Brazil	New contributions to fisheries management have been discussed through innovative approaches as well-being and quality of life. In south Brazil, quality of life (QOL) and quality of living conditions (QLC) were evaluated in rural and aquaculture producers, and results showed the possibility of this method to contribute as a tool to the fisheries science as an alternative and transdisciplinary assessment. This study aimed to know the distance between looks about the fishing activity from fishers and technicians in municipalities of central to south coast of São Paulo State, Southern east Brazil, assessed in four dimensions: social, environmental, economics and governance through a qualitative approach. Was possible to evaluate the quality of life from socio-environmental indicators, such as the Index of the Quality of Life (IQOL) and the Index of the Quality of Living Conditions (IQLC). These indicators use social, environmental, cultural and economic conditions, with an inseparable character, but distinguishable from the relevant conditions in human social organization, to achieve the purpose of satisfaction in living. The governance dimension was the most critical and unsatisfactory, resulting in lower quality of life (IQOL) and living conditions (IQLC) indicators, emphasizing the discussion of the need for further studies on the institutional processes interfere with the welfare of fishing community in the region.
Natali Piccolo	Rare, Mexico	Sustainable fishing in Mexico: Where are we and what do we need to improve?	Fishing is an essential activity for coastal communities, particularly in developing countries where it represents an important source of protein, income and employment. In these areas, resource overexploitation can have serious ecological, social and economic consequences. In 2014, FAO reported that 28.8% of the world’s fisheries were overexploited, and 61.3% at the maximum sustainable yield, showing a notable reduction in landings since 1974. Mexico reflects this situation, with 15% of its fisheries overfished or collapsed. Resource deterioration has been due to both direct and indirect impacts in fisheries that do not have robust characteristics of sustainability. For more than 18 years, organizations have been working in Mexico to help fisheries meet international sustainability criteria. We review reviews the different paths that have been taken to promote sustainability in Mexico’s fisheries using diverse internationally recognized standards, with the aim of providing successful examples, inspiration and assuring healthy fisheries for this and future generations.
Natasha Stacey	Research Institute for the Environment and Livelihoods, Charles Darwin University, Australia	Enhancing coastal livelihoods in Indonesia: An evaluation of recent initiatives	We report on the results of a collaborative research activity to examine findings from 20 small-scale fisheries and aquaculture development enhancement programs and projects implemented in Indonesia over the last two decades. Through collaboration between Australian and Indonesian researchers, we assessed the effectiveness of initiatives, their contributions to livelihoods and lessons learned. Measures of success (immediate and longer term and livelihood outcomes) loosely followed the Sustainable Livelihoods Approach Conceptual Framework and gender approaches. This synthesis of initiatives was used to identify common factors for enhancing livelihoods, as a basis for more applied, action-driven research in Indonesia.
Natasha Stacey	Research Institute for the Environment and Livelihoods, Charles Darwin University, Australia	An action research agenda for improving the visibility of SSF and their contributions	This presentation will summarise findings from a recent review on approaches to SSF livelihood enhancement and diversification, including best practices, successes, failures, constraints and opportunities. We suggest despite limited successful examples, there is general consensus on best practice approaches, in ranging from methodologies, to improved project planning, implementation, and evaluation. Multidisciplinary feasibility assessments are also important but rarely conducted. We provide recommendations for further research, capacity building and livelihood development including building on innovations in other agricultural, gender health research relevant to SSF.

Nelly de Paz Campos	Áreas Costeras y Recursos Marinos (ACOREMA), Pisco. Peru	Encouraging fishermen as a strategy to ensure sustainability of small scale fisheries in southern Peru.	<p>In Peru, gillnets from small scale fisheries (SSF) are a major threat for the survival of endangered species such as sea turtles, cetaceans, and sea birds. To quantify and characterize this interaction, we began a bycatch assessment through surveys of fish landings, non-structured interviews and later, on-board monitoring. Since sea turtles are landed alive for illegal trade, we started an awareness campaign directed to the community. All this process was launched 18 years ago, with some time gaps due to lack of funds. Through this experience, we learned how important was including economics and social aspects, especially understanding how fishermen perceive and use endangered species, to learn about the complexity of SSF. Thanks to our long lasting presence in the fishing community of San Andres, southern Peru, a relationship of trust has been built with fishermen. This has been the cornerstone of our work, making possible sea turtle's releases from fishing nets where historically were retained and used for food and trade. Considering that capture levels are not sustainable for both the target and bycaught species, which could lead to strong regulations and even fishery closure, different strategies and approaches were identified for monitoring and reducing bycatch. These include: 1. Fishermen training for fishery data record and handling, and releasing of bycatch, including economic and market aspects. 2. Evaluating gear changes. 3. Promote small incentives for net losses and damages 4. Searching for new markets for target species for a just and sustainable trade. 5. Recognize fishermen efforts to ensure SSF sustainability.</p>
Nicolas Gutierrez	Food and Agriculture Organization of the United Nations (FAO), Italy	Assessment and management of small-scale fisheries under data and capacity limitations: are we in the right track?	<p>Sustainable harvesting of fish stocks is achieved through management that relies on some kind of assessment of their exploitation status and/or production capacity. Such assessments often require estimation of the fishing mortality and stock biomass and a comparison of these estimates with established reference points. Nevertheless, many fisheries lack the necessary data or technical expertise to perform a formal quantitative assessment, highlighting the need for alternative and reliable assessment approaches that inform management in such situations. Fortunately, the field of data-limited assessments is now evolving rapidly, with new methods and tools being developed and implemented across a wide spectrum of fisheries around the world. Yet we need to acknowledge that for these approaches to be effective at the global level they must be: (1) rigorous enough to provide legitimacy to fishers, managers and industries; (2) simple and intuitive enough to be applicable to fisheries or areas where technical capacity is limited; (3) suitable for a wide range of data and information availability, from experts' judgement to long time-series of fishery data; and (4) conceived as a basis for implementing data collection and monitoring systems aimed at more data-intensive assessment and management approaches. Here, I will present where we are and where we should go in order to upscale current and future assessment and management approaches to move small-scale fisheries towards sustainable development.</p>
Nicolas Rovegno	WWF, Peru	Catalyzing initiatives for improvements in a Fishery Improvement Project: Case study of the jumbo squid small scale fishery in Peru	<p>Jumbo squid sustains the second largest fishery in Peru, with annual catches above 500 thousand tons, and the first worldwide with over 50% of global catches. Likewise, it is an artisanal activity with a great social impact due to the amounts of jobs it generates and its contribution to food security. Being a short life cycle species regular assessment of its abundance, population structure and recruitment are essential, as well as constant monitoring of the fishing activity. However, it is a fishery that is considered underexploited due to the significant difference between biomass and catches. Given its importance to the country, it is important to contribute to the development of an integral and ecosystem-based management of this fishery, in agreement with the FAO Code of Conduct for Responsible Fisheries. In that regard the status of the fishery was assessed against the Fisheries Standard from the Marine Stewardship Council, considering the degree of compliance of Principle 1: The fishery has proven to be sustainable over time, despite this has not been due to the management system; and Principle 2: The fishery has a low impact towards the ecosystem, nevertheless, small amounts of information are available to score this matter. With all this in mind, the present work presents the analysis, scenarios and proposals for improvements in the management of this important fishery that however works with high degrees of informality.</p>

Nicolas Rovegno	WWF, Peru	Collaborative Fisheries research approach: small scale Fisheries case study for mahi mahi and jumbo squid in Peru	<p>Small scale fisheries have an important role in Peru, supporting livelihoods of over 40 thousand fishermen along several coastal communities, sourcing for fish for local consumption which is the highest among Latin America and for exports which represent over 500 million dollars in revenue for the country. Despite their importance SSF have grown under supervised and in an unorganized manner, which has led to a lack of management capacity and a deficient state of governance. In the recent years, the government has turned their looks at SSF fisheries and realized their importance, given that mahi mahi and jumbo squid fisheries represent around 400 million dollars in exports and are solely fished by SSF. In that regard, the government is fostering an associative pilot plan for SSF through fishing cooperatives in which they promote the inclusion of SSF along the value chain while improving fisheries traceability. On the other hand, the government has been characterized for seeking SSF improvements but through a top-down approach, and having sporadic and small involvement capacities. Reviewing work done by non-governmental organizations, the success of their efforts relies on the close relationship they have developed with artisanal fishermen from certain coastal communities and in the constancy of their work. These trust-based relationships with fishermen aid in aligning conservation goals with their own goals. Horizontal approaches have been important for improved communications with SSF and achieving multiple goals. WWF has been involved for over 5 years with fishermen from La Isilla and La Tortuga cove, which target seasonally mahi mahi and jumbo squid. Permanent presence in both communities have allowed for strong bonds to be formed. Long-lasting projects have empowered fishermen providing them with information on their fishing activity and highlighting their knowledge so that they can engage with other fishermen, businessmen and government officials. Both communities have decided to take part in the government's associative pilot plan and WWF has supported them with their organizational strengthening which has resulted in them having a strategic plan and roadmap. Additionally, traceability requirements are in place, for which a mobile app has being prepared for them to register their catches and tested with community members with success. Likewise, community goals have been supported and aligned with conservation goals, in projects which have been prepared and presented seeking for funding. Mixing different approaches from multiple points of view have allowed for a holistic view during interventions. Having a permanent communication with fishermen and balancing technical work has been important to reach a balance. This has enabled our work with both communities to have strong relationships which have fostered collaborations from fishermen when required. They have been highly involved with the projects which have had a horizontal approach. Key results include obtaining a functional mobile app to register catches, preparing a strategic plan and long-term goals for both fishing cooperatives and creating strong bonds with them which aid in this and other conservation projects.</p>
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Nigel Martinez	Director of The Belize Federation of Fishers, Belize	The Belizean Fisher Experience	<p>All over the world small scale fishers have been faced with a series of issues from multiple fronts, be it political, economic, or legal. In Belize, these very issues have alienated and marginalized the fishers who have such a direct influence on the country's economy. For years, the fishers have had to deal with increased fisheries regulations on what they can and cannot catch, as well as on the fishing areas that were once accessible due to the establishment of new and larger marine protected areas (MPAs) for conservation purposes. While these measures should help the fishers in the long term, the short term has seen many having to leave the industry they love and that they were born into. These persons usually have to leave their coastal fishing community to find work elsewhere. The once flourishing fishing communities have thus been neglected without the usual economic activity that flowed through that area. This paper's discussion/ focus is twofold: a) a discussion on the work of the Belize Federation of Fishers (BFF) and b) further discussion on innovative programs that may benefit fisher folk in other regions. The BFF is the umbrella group for fisher associations around the country. The BFF has recognized the fact that any transformation of the fishing industry has to start with the fishers and have focused all their energy towards transforming the fishers of Belize. The BFF has organized these fisher associations into legal entities, registered under the laws of Belize. These entities are now flourishing businesses that take the transdisciplinary approach to re-brand themselves, transforming every fisher and their family through innovative programs and training sessions building capacity and preparing them to take on the challenges facing them. The BFF is now a leader in the fishing industry. Its collective numbers within their associations have created a strong voice with the law makers, ensuring that the regulations that are enacted have to take their concerns into consideration at every step of the process. Most of all, the work of the BFF has transformed the dying coastal fishing communities into thriving fishing tourism destinations that allow the fishers to work within their own community.</p>
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Nilam Amalia (co-presenting with Irna Sari)	Sustainable Fishery Advisor USAID-SEA PROJECT, Indonesia	USAID-SEA Project is taking the Indonesian small-scale fisheries to the next level of management	Indonesia is the second largest capture fishery producing nations which is mostly dominated by small-scale fisheries. Indonesian fishery statistics recorded around 650,000 of fishing units that fall under this category with more than two million fishers. This contributes to a significant degree of fishery resources extraction and pressure. However, small-scale fishing effort and access is not monitored and controlled, and sufficient management for this scale is lacking. Since 2016, a five-year USAID funded project, Sustainable Ecosystems Advanced, is supporting the Indonesian government to strengthen and to establish management tools for small-scale fisheries. The initiative includes monitoring of fish landing, strengthening an integrated small-scale fishing vessel database, establishing a fishing logbook system, and building the capacities of national- and provincial-level government. A co-management approach is being applied for implementing this initiative engaging government agencies, private sectors, non-government organizations, and communities. This presentation shares the innovative approach used in establishing the partnership across the parties, and to date lessons learned. It highlights that horizontal and vertical integration is a critical approach. A function of a development project should not only be focusing on activity implementation, but should act as a catalyst and facilitator for the integration that depends on strong leadership and promotes active and direct engagement of the stakeholder parties. This is not only to ensure internalization of the initiative but also a pathway of capacity building of the related agencies for sustainable long-term impact of the transforming initiative and project investment together with the Government of Indonesia.
Nireka Weeratunge	International Centre for Ethnic Studies, Sri Lanka	To migrate or not: social wellbeing and gendered household decision-making in fishing communities in Sri Lanka	Households in fishing communities on the west and east coasts of Sri Lanka engage in internal (coast-to-coast, along the same coast) migration to pursue small-scale fishing and fisheries-related livelihoods. Based on quantitative and qualitative data from two fishing communities each in Puttalam district on the west coast and Trincomalee district on the east coast respectively, we look at decision-making within households, especially the gendered material, relational and subjective factors that underlie these decisions, using a social wellbeing approach. Gendered patterns, enabling and disabling factors, and the costs and benefits of migration processes on the wellbeing of household members are assessed. The role of social relations and networks, as both enabling and disabling factors for migration, is emphasized. The paper argues for the relative importance placed on material, relational and subjective wellbeing dimensions among individuals, households and communities to make sense of household decision-making related to migration, as well as its consequences.
Nitya Rao	University of East Anglia, School of International Development, UK	Moving in and out: Capitalisation, migration and the masculinisation of small scale fisheries in coastal Tamil Nadu	This article explores the gendered vulnerabilities and wellbeing impacts of migration in the context of wider transformations in fisheries and coastal landscapes. Increase in competition for limited, open access resources, has pushed a trend towards greater capitalization of fisheries, with those able to invest reaping benefits and others reduced to a laboring class. In order to retain their status as fishers rather than laborers, and in the absence of adequate financing from banks, several young men from fishing communities migrate to raise capital for investment in boats and allied technologies. Unable to invest on their own, new forms of organization are emerging to facilitate collective ownership of boats in order to not just survive, but maintain their status, and be able to participate in appropriate consumption activities. Dowry has emerged as both a source of capital and status, as have the celebration of festivals and religious events. At the same time, greater capitalization creates a further demand for labor, met by migrant labor, both from the agricultural hinterland and more distant and less developed parts of North India. While there is some diffusion in the control of capital locally, this is restricted to the fisher castes, with laboring groups not allowed a share. At the same time, in terms of gender relations, while a few opportunities have opened up for women in auctioning fish catches, for the majority, their active role particularly in post-harvest fisheries has been marginalized through processes of both capitalization and the recruitment of male migrant labor for subsidiary tasks. The article is based on data collected from a survey of 200 households and in-depth interviews with about 20 households in Cuddalore district of Tamil Nadu, and specifically explores how the changes in fishing practices are contributing to a renegotiation of both class and gender relations.
Ollin Gonzalez Cuellar	Sociedad de Historia Natural Niparajá, A.C., Mexico	How to systemize and complement local knowledge with scientific knowledge for decision making in small-scale fisheries: A case study of the Gulf of California, Mexico	Most small-scale fisheries (SSF) worldwide are data poor or lack of data. This can restrict the comprehension of the state of fishing resources and lead to inappropriate management decisions. For SSF local knowledge is very valuable and a basis for scientific analysis because it can provide data, understanding of the fishery dynamics, help interpretation and give feedback of results. To incorporate fishing community's local knowledge into data analysis and decision making, as a starting point it is important to find mechanisms to systemize the information. As an example, in the San Cosme to Punta Coyote Marine Corridor (SCPCC) in the Gulf of California (Mexico), two monitoring programs were developed, where community members participate to gather information about a multi-species fin fishery and a Fisheries Refugia (FR) network. The Fishery Monitoring Program collects data of size, length and weight of important species, fishing sites, fishing gear and catch in a monthly basis. On the other hand, the Underwater Marine Monitoring Program, gathers data of the fish community, commercial species and the habitat. The design of both programs incorporates local knowledge and scientific approaches. Fisherman provided important information such as the identification of the main commercial species of the fishery and helped define relevant monitoring sites for the assessment of the FR. On the other side, scientific expertise provided the methods to systematize data gathering. This transdisciplinary effort has generated basis for decision making of the FR network and pretends to help in the design of the management strategies in the (SCPCC).

Oluyemisi Oloruntuyi	Marine Stewardship Council, UK	Fisheries certification standards as a tool to implement the Sustainable Development Goals and FAO's Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries: A case study	Environmental stewardship and social development are key components of two internationally agreed instruments of key significance to Small Scale Fisheries (SSFs) - the FAO's Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (VGSSSF) and the Sustainable Development Goals (SDGs). Governments, businesses, NGOs, and civil society have accordingly made commitments to work to achieve the SDGs which relate to fisheries, and to the implementation of the VGSSSF. The multi-faceted attributes of fishery certification initiatives - which are inclusive of measurable standards, independent evaluation, multi-stakeholder engagement, continuous improvement, transparency and value chain gains - suggest that certification could provide a mechanism to achieve and demonstrate compliance with internationally-endorsed goals. A case study review of the Marine Stewardship Council (MSC) programme (one of the more prominent fishery certification programmes) illustrates how fishery certification standards contribute to the SDGs and the VGSSSF. Qualitative review of several small-scale fisheries engaging with or working towards MSC certification highlights how certification operates in practice to achieve environmental sustainability components such as resource management, increased scientific knowledge, and monitoring control and surveillance. In addition, several social outcomes integral to these two global instruments - including market benefits, participatory approaches to decision making, and improved governance - are amongst the direct and indirect ways in which standards operationalise and catalyse a pathway to global targets.
Patrícia Amorim	University of Azores / MARE / SFP, Portugal	Snapper and grouper fisheries worldwide: knowledge and status under data limitations	Evaluating fisheries sustainability based on the best available data is of primary importance for management and conservation. However, effective fisheries management is often challenged and limited by the quantity and quality of the information available, particularly in multispecies small-scale fisheries in tropical and subtropical areas with high species diversity. This is the case of snapper and grouper, important fishery resources with high commercial value in international markets that also play an important role in the livelihoods and food security of many local communities. The state of knowledge about global snapper and grouper fisheries was assessed applying a Generic Knowledge Indicator (GKI) that focuses on three main components: biological/ecological information, fishery data, and stock assessment. For the evaluation of sustainability status, the following approaches were explored: determination of the snapper and grouper fisheries status based on FAO assessment criteria and analysis of trends of landings time-series. We found that the status of many snapper and grouper fisheries is currently unknown, particularly for small-scale fisheries in developing countries where the reporting system is absent or insufficient. For the fisheries with some information, the results suggested that the majority of these resources are overexploited or in transition between fully exploited and overexploited status. These results provide a tangible pathway for developing snapper and grouper fishery improvement actions. The methodology presented in this work can be easily applied to other data-limited fisheries.
Patrick McConney	University of the West Indies, Barbados	Influencing Caribbean regional small-scale fisheries policy by protocol	Small-scale fisheries are prominent features of the 17 small island developing states that comprise the Caribbean Regional Fisheries Mechanism. The Caribbean Community Common Fisheries Policy (CCCFP) is a binding treaty approved in 2014 for implementation in the CRFM region. The Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) were endorsed in 2014 by the 31st Session of the Food and Agriculture Organization's Committee on Fisheries for global implementation. Drafting the CCCFP concluded in 2011, well before the SSF Guidelines were adopted in 2014. The principles of the SSF Guidelines were not explicitly incorporated into the CCCFP. This case study was conceived to formulate a protocol to incorporate the SSF Guidelines into the CCCFP through an exemplary participatory process led by a partnership of Caribbean fisheries stakeholders, prominently featuring the regional fisherfolk network. Several methods were used within a conceptual framework for policy influence to which was added a participatory approach and capacity development. The influence exerted on CRFM's policy advisers and policy makers was a good practice. It achieved the desired outcome of technical and political endorsement for developing a SSF Guidelines protocol to the CCCFP through a participatory process. Implementation of the participatory approach itself was less successful, and drafting the protocol is delayed. Despite these limitations, the collaborative policy influencing process for creating the protocol was seen as a promising practice that could stimulate learning, adaptation and replication to implement the SSF Guidelines in other regions.
Paul O. Onyango	University of Dar es Salaam, Tanzania	FISHMOB Technology: Digitalizing the fishing sector to uplift small-scale fisheries	Small-scale fishers (SSF) are seen as low-key players in a global industry, overlooked, underestimated and often ignored. This is despite the fact they constitute a very large portion of the rural population that is too big to ignore. In Tanzania approximately all fishers are small-scale. However, the picture always given about small-scale fishers is that they are often found in overcrowded living conditions, have inadequate health services, low levels of education, politically disempowered and vulnerable. This incidence of poverty among the small-scale fishers has to do with the distribution of the wealth generated from the fisheries. The poverty among SSFs reflects a general lack of economic, political and institutional development that affects rural areas in which fishing communities live. As a consequence of this state, the Department of Aquatic Sciences and Fisheries (DASFT) of the University of Dar es Salaam, together with University of Western Cape in South Africa jointly implemented a project, which has developed a mobile technology called FISHMOB. This is a data management and marketing information system in which fisheries statistics such as landings prices, fish species, gears used and landing site infrastructure are collected and sent by use of mobile phones and the information is processed and accessed by users using mobile phones. This paper discusses this technology and present how it operates and its importance for small-scale fishers and industrial development.

Paula Satizábal	University of Melbourne, Australia	Opportunities, threats and challenges: exploring emerging blue economy discourses and practices in the coastal Philippines	Blue economy (BE) initiatives have emerged along marine and coastal areas, seeking to bring the green economy into the 'blue world'. Often defined as a global policy agenda reconciling economic growth with protecting the ocean's ostensive natural capital, the BE supposedly aims to link poverty reduction, social equality and marine biodiversity conservation. While global and national policies have spent decades supporting the coastal livelihoods and fishing practices of the poor, nascent critical analysis suggests that BE discourses and practices might be promoting something different. New market-oriented programs and packages aim to tap the imputed financial value of the ocean's 'blue capital' (e.g., blue carbon, value added production), fostering income generation and sustainable solutions for conservation finance. But how different are these BE practices from previous interventions? Indeed, there is limited consensus about what the "blue economy" actually entails, what it seeks to pursue, and the implications it has for small-scale fishing communities. Drawing on critical discourse analysis from a transdisciplinary review of relevant literature, we examine the meanings, motives and practices of the so-called BE in the Philippines, focusing on potential projects and practices in Palawan Province. Across scale, we examine how policy makers, multilateral institutions, bilateral organisations, NGOs, indigenous organisations, academics across disciplines, and other key stakeholders in the country represent and frame the BE. Our analysis engages with what is included and excluded from emergent policy initiatives and practices, focusing on the implications this has for the Philippines' transition towards more socially equitable and sustainable small-scale fisheries governance.
Paulo Vasconcelos	Instituto Português do Mar e da Atmosfera (IPMA), Portugal	Comprehensive and multidisciplinary studies for sustainably managing a data-poor small-scale fishery targeting gastropods in southern Portugal	The small-scale fishery targeting muricid gastropods (banded murex - <i>Hexaplex trunculus</i> and purple dye murex - <i>Bolinus brandaris</i>) constitutes a locally important socio-economic activity in the Ria Formosa lagoon (southern Portugal). However, despite its relevance for local communities, until recently the knowledge on this artisanal fishing activity and on the target species biology and ecology were quite scarce. For this reason, an integrated project was developed to gather relevant and detailed information for proposing management measures aiming for the long-term sustainable exploitation of this fishing resource. The project involved diverse and multidisciplinary tasks, such as enquiries to local fishermen, monitoring fishing surveys, laboratory sampling and analyses. Overall, was obtained data on the fishing operations and fishing gear, as well on the species age and growth, reproductive biology (gonadal development, maturation and ripening) and spawning behaviour. To achieve these objectives, multidisciplinary techniques and varied methodologies were employed, such as the technical characterisation of the fishing gear, mark-release-recapture operations, rearing experiments in aquaculture facilities, histological analyses and development of condition indices for following the species reproductive cycle. The overall information gathered in these studies allowed proposing management measures for this small-scale fishery, including a closed season in the fishing activity and minimum landing sizes for the target species, which were duly implemented in the official regulations currently in force. The collaborative research, together with the comprehensive and multidisciplinary approach adopted in the present project, can be successfully transposed and replicated in other data-poor small-scale fisheries targeting gastropods.
Philile Mbatha	University of Cape Town, South Africa	Fisher livelihoods at odds with an expanding conservation estate? The case of South Africa's Small-Scale Fisheries sector	Thousands of marginalized, small-scale fishing communities living along the South African coast have a long history of fishing. However, over a hundred years of Colonial and then apartheid rule resulted in dispossession, restricted access and alienation of people from traditional lands and waters. At the end of the apartheid era in 1994, the democratic government of South Africa sought to provide redress to past imbalances in the fisheries sector. The promulgation of the Marine Living Resources Act (MLRA) in 1998 which included objectives to transform the sector and reincorporate historically excluded fishers signaled a new approach to the fisheries sector. However, increasing dissatisfaction amongst small-scale fishers due to ongoing prioritization of the industrial fisheries sector, led to protests and finally legal action to force the government to address their rights and concerns. Eventually, in 2012, after a seven-year consultative policy formulation process, the Small-scale Fisheries Policy (SSF Policy) was promulgated. There were great expectations that rights to historical fishing grounds would be restored, communities would be involved in management and customary systems of marine governance would be respected. However, by the end of 2017, rights of coastal fishers to marine resources had not yet been allocated. Implementation of the policy has been hindered by various political, economic, environmental and governance issues. One of the key blockages to transformation has been the failure to clarify how rights of small-scale fishers living in or adjacent to conservation areas will be addressed. South Africa's commitment to expanding the conservation estate and meeting international conservation targets are clearly at odds with allocating fishing rights to local communities in these conservation areas. This paper draws on four case studies along the South African coast and highlights how transformation efforts in the small-scale fisheries sector are being thwarted by international conservation agendas which are strongly supported by marine scientists and the conservation community in South Africa. It explores the tensions between these two paradigms and governance approaches and reflects on cases where these tensions have led to further alienation and conflict amongst fishers and conservation agencies. It highlights how state -driven conservation governance often operates in parallel with customary and local fishery governance systems. This results in confusion and conflict emanating from asymmetries between the transformative Small-scale Fisheries Policy and staunch conservation regulations along the coast.

Philip A. Loring	University of Saskatchewan, Canada	Staying or leaving during times of stress: how imperiled fishing communities are responding to the cumulative effects of change in arctic Alaska	This research is concerned with understanding the adaptation strategies individuals and households employ when fishery resources decline, specifically in rural Northern places. Focusing on a case study from Northwest Alaska, this research explores the drivers behind individuals' choices following natural resource disruption and declining opportunities to harvest resources, and, intends to better describe behavioral patterns such as outmigration that are not well understood but represented in statistical data for the region. Our research focuses on Norton Sound, on the Northwest coast of Alaska, with community members from the predominantly Native village of Unalakleet. We conducted semi-structured interviews with household members to investigate the various short and long-term strategies that people employed following the 2001 fishery collapse, and more generally in response to ongoing impacts of climate change; Unalakleet is one of several communities in coastal Alaska that is expected to have to relocate because of climate-driven erosion. We discuss the range of adaptive strategies that people have employed at the household and community level, and discuss short- and long-term cumulative impacts of the collapse in light of other issues such as, other fisheries' statuses, food and fuel costs, increased environmental risk, etc. Throughout, we build on a framework for understanding adaptive strategies such as migration that emphasizes three factors that influence how people ultimately respond: buffers, attachment, and alternatives.
Philippa Cohen	WorldFish, Australia	Securing a just space for small-scale fisheries amidst ocean governance transformation	A critical challenge for ocean governance for the 21st century is to balance competing interests in economic potential while avoiding irreversible ecological change. Simultaneously, ocean governance transformations must ensure human rights of those who work at sea are respected, benefits of growth are equitably distributed and human well-being of coastal and marine-resource dependent people is maintained or enhanced. The 'Blue Economy' has attracted the attention of governments, private enterprises, philanthropic organizations and international conservation organizations. These groups dominate high profile dialogue and policy decisions on ocean futures largely informed by economic and ecological research and ideology. A substantial body of social science has been less visible, and concern for food security, livelihoods and social justice has gained little meaningful traction in the dominant policy discourse on transforming ocean governance. We argue that one of the largest groups of ocean-users – people who service, fish and trade from small-scale fisheries – has been marginalized from this dialogue. New governance initiatives increasingly imply alignment with social objectives and small-scale fisheries concerns, yet deeper analysis reveals that fundamental differences in ideologies and approaches persist. We argue that small-scale fisheries are being subtly and overtly squeezed for geographic, political and economic space, jeopardizing the substantial benefits they provide to millions of fishers and in the developing world over a billion low-income consumers. Here we bring insights from social science to explore a way forward for ocean governance that ensures social dimensions of fisheries are accounted for.
Pia Harkness	Research Institute for the Environment and Livelihoods, Charles Darwin University, Australia	Assessing the impact of coastal livelihood development programs in Savu-Raijua, eastern Indonesia	Livelihood diversity and adaptability are key strategies employed by low-income coastal communities in Southeast Asia. However, programs aimed at strengthening or introducing livelihood activities typically focus on one activity, rather than working holistically across livelihood systems. This paper examines government coastal livelihood programs in Savu-Raijua, and considers how they enable or constrain existing household livelihood systems. Program outcomes have varied, with problems relating to corruption, unequal distribution of benefits, and conflict. The paper identifies how these issues may have been avoided by developing programs based on an improved understanding of livelihood systems, and social and political dynamics.
Prasant Mohanty	NIRMAN - A Sustainable Development NGO, India	Building resilient coastal communities by reducing vulnerability to climate change in the Bay of Bengal Coast of Odisha, India.	The goal of the paper is to discuss the need for an active community-based and community-led initiative to tackle coastal climate change related vulnerabilities and building resilience in small-scale fishery communities through collaborative, participatory and partnership-based approaches in the Bay of Bengal coast of Odisha, India. It focuses on the historical and ongoing climate injustices in the region and examines creative ways to address them. Based on a decade long experience of implementing the “The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act,2006”, I propose to use a human rights-based approach to build capacity in the Bay of Bengal coastal communities enabling them to respond to climate injustices. Commonly known as the Forest Rights Act, the 2006 legislation facilitates the transfer of tenure rights to forest dwelling tribal communities. The Act intends to correct the historical injustices experienced by the tribal communities and help achieve food and livelihood security, decision-making power and cultural identity. NIRMAN has since successfully mobilized forest dwelling communities of Western Odisha to assert their customary rights over traditionally used community forest areas and has facilitated settlement of such rights in 69 Tribal villages under this legislation. Using the success of implementing forest rights act, the paper analytically explores if the small-scale fishing communities of Bay of Bengal coast can benefit from the formulation and implementation of a policy similar to the Forest Rights Act. It outlines some of the key strategies to work with the state government to develop such a policy.

Priyadarshi Patnaik	Indian Institute of Technology Kharagpur, India	Understanding cultural transformation among fishing communities in Chilika Lagoon, Odisha: Towards a multi-modal methodological framework	A culture is better understood by its visuals, literary texts and oral traditions. In a different way, culture is manifested through rituals, religious beliefs, cultural praxis as well as everyday aesthetics. Each of these modes of communication gets linked with other modes either directly or indirectly to make a distinctive identity of a community. In order to develop insights into the history and practices of a cultural community, a case study has been conducted on the fishing community around Chilika Lagoon of Odisha by focusing on various literary texts, socio-cultural practices, festivals, visuals and performative practices of the people. These sources are reflexive of perspectives and perceptions of fishers, and in a way, an organic reflection of actualities. The minute task of the researcher pursuing multi-modal approach is to analyze and interpret granular textual properties from these wide array of sources. This multi-modal methodological framework is a significant tool to capture short-term changes as well as long-term transformations that take place in such communities across different historical epochs. It is effective towards detailed identification and portrayal of ecological, occupational and life-style changes among fishing communities across transforming times, bringing out the cyclical dialectics between nature and society in a constantly changing ecological hotspot.
Ragnhild Lund	Norwegian University of Science and Technology, Department of Geography, Norway	Introduction to study of well-being in contexts of vulnerability and precariousness.	Ragnhild Lund will give an overview of the research project ‘Migration and collectives/networks as pathways out of poverty: Gendered vulnerabilities and capabilities amongst poor fishing communities in Asia’ by way of presenting research partners, project objectives, analytical approach, study sites, and methodology.
Ragnhild Lund	Norwegian University of Science and Technology, Department of Geography, Norway	Well-being and mobility of female heads of households in vulnerable and precarious situations: The case of a fishing village in South India	This paper focuses on how Female Heads of Households (FHHs) in a village in Cuddalore District, in the state of Tamil Nadu, India, have tried to achieve their various well-being targets and overcome their vulnerabilities through engaging in fish trading and auctioning that in turn involves moving within and outside their village. The study is based on fieldwork undertaken in April and May 2017, including multiple methods, such as observations, village walks, informal discussions, focus group discussions, and in-depth interviews. We address how FHHs’ well-being is reduced due to old vulnerabilities that are an inherent part of their fishing culture (caste, class and gender) and new vulnerabilities created due to precarities related to modernization and post-tsunami development.
Raju Mullick	Research Scholar, Advanced Technology Development Centre, Indian Institute of Technology Kharagpur, India	Creating a multimodal database for capturing cultural data on small-scale fisheries	Detailed documentation of different aspects surrounding fishing communities including knowledge of fishing, fish preservation and storage, coping mechanisms, etc. is the need of the hour. Fishing communities living around Chilika Lagoon are rich in native culture. However, in the wake of modernity, cultural erosion is underway. Modern technologies are rapidly replacing traditional fishing techniques. Native culture is also being reshaped by modern culture. Migration and occupational change are important contemporary trends among Chilika fishers, especially those involved in small-scale fishing. A detailed database through documentation and compilation of transformation trends can provide significant insights for policy formulation and design suitable and sustainable interventions. This paper reflects on the methodological and technical details of designing and operationalizing a database that captures transformations in small-scale fisheries of Chilika Lagoon. However, database creation for capturing multimodal data has its own unique properties and difficulties. Certain fundamental issues relating to classification, search properties, ease of retrieval and appropriate input for meaningful use of the database requires attention. The paper will focus on the key features and attributes of the database: enabling remote access, speed optimization and data retrieval based on key words from title as well as web content, and using Grover’s algorithm; archiving field work, cultural world, textual and visual narratives; and so on. Finally, it will discuss and demonstrate a prototype of such a database that can be rigorously worked upon and implemented across spatial scales. Development of a multimodal database to capture cultural data holds much promise for the future of small-scale fisheries.

Ramani Gunatilaka	International Center for Ethnic Studies (ICES), Sri Lanka	Migration, mobility and the distribution of consumption in fishing communities In Cambodia, India and Sri Lanka.	<p>The economics literature on fishing communities in developing countries is mainly concerned with their poverty and access to resources. Even though fishers are not always the poorest, poverty can be both a cause as well as a consequence of resource degradation. Technological modernization and demographic growth can make some fishers rich and others poor. This study adds to this literature by using survey-based data from inland and coastal fishing communities in Cambodia, India and Sri Lanka to study the impact of external and internal migration and movement in multiday boats on the entire distribution of fishing households' consumption expenditure. The study finds that migration in Cambodian fishing households may be driven by poverty and that migration may also be a pathway out of poverty, but found little evidence that migration enables fishing households to move into the middle classes. In contrast, in the fishing villages of Kanyakumari and Cuddalore in Tamil Nadu, households moving to fish in across the maritime border in multiday boats are concentrated along higher segments of the range of consumption, more so in Kanyakumari than in Cuddalore. This appears to be true of Sri Lanka's fishing communities in Puttalam as well, where proportionately more households migrating seasonally from Sri Lanka's west coast to the east coast are concentrated in the middle segments of the range of consumption. Econometric analysis using semi-parametric decomposition methods revealed that multiday fishing has helped households in Kanyakumari move up along the distribution of consumption into higher segments. Migrant households in Puttalam also appear to have moved up along the distribution, but the causal impact has been very slight. No such positive impact on the distribution of consumption of multiday households can be discerned in Cuddalore, but households which engaged in multiday fishing experienced an increase in average consumption as a result of this movement.</p>
Raquel de La Cruz Modino	University of La Laguna, Spain	Marine Reserves & resilience in difficult times: Transdisciplinary research and governance as successful strategies to cope with the global threats	<p>This team paper verses about the project entitled "Strengthening of the adaptation and recovery capability in the population of La Restinga (El Hierro-Islas Canarias)". The project focuses on the processes of change introduced by the recent volcanism in the coast of El Hierro (Canary Islands, Spain) and its Marine Reserve (MR), during 2011. Our main goal is to improve the recovery strategies already at play and to suggest new ones by means of (a) a socioecological study of the interaction between the human population and its environment as well as its reactions to the environmental changes due to the volcanic activity; (b) the design of buffering politics adapted to the local framework; and (c) the development of tools to prevent conflicts and threats that may arise for the local small-scale (SS) fishers community. The MR of El Hierro is named Punta de La Restinga-Sea of Calm. It was created in 1996 on a part of the "Sea of Calms", with the local fishermen's support and it has traditionally focused on fisheries government. The Sea of Calms constitutes a major portion of the La Restina coast, where the good weather conditions allows SS fishing and marine tourism activities taking place during the entire year. During the fall of 2011, the explosion of a submarine volcano in the Sea of Calms preceded by several seismic crises, affected the coastal waters and the entire insular economy. The disaster, along with the Spanish economic recession, prompted a severe decline of the island's economy. Although the small-scale fishing sector showed a better recovery than others, including (or specially) the touristic sector. After more than a lustrum has passed, it is necessary to assess the level of recovery of the island in socioecologic terms, by analyzing the local and insular resilience of the system overall, and understanding which mechanisms have played a major role in the Small-Scale fisheries recovery. In this regard, our project pays special attention to the role of the MR, since we believe that it could facilitate the recovery of the marine ecosystem as well as the governance of the small-scale fisheries at the population of La Restinga overall. We will use such knowledge to try to prevent future situations of vulnerability for the fishing families, as those resulting, for instance, from the loss of marine-tourism resources; and to provide better responses to face future random scenarios. Another case studies included in the project are the Islas Atlánticas National Park in Galicia (Spain) and the Solomon Islands. We hope that the results of the project will help shaping the strategies of the local and national government to strengthen the economy of the island using the MR as a leverage. The recent initiative to create a Marine National Park across the entire Sea of Calms is one of such strategies currently under debate, which is expected to become a reality soon with the support of the local fisheries. The authors acknowledge the financial support of the Cajacanarias-La Caixa Foundation under grant [2017REC23].</p>
Rashmi Ranjan Behera	Indian Institute of Technology Kharagpur, India	Relational well-being and transformation: Case studies from Chilika Lagoon	<p>Well-being at an individual level very often encompasses well-being of near and dear ones. It is realized in collective terms, and not as the property of individuals but something that belongs to and emerges through relationships with others. The idea of relational wellbeing emerges through the interplay of personal, societal, and environmental processes, interacting at a range of scales, in ways that are both reinforcing and remain in tension. This paper, taking Chilika fishing communities as a case study, addresses how fundamental decisions about change in life-styles and occupation, from tradition to modern and from conventional to contemporary, are driven by relationships, comparisons and perceived threats and benefits. When there are rapid ecological as well as policy changes, communities undergo rapid transformations, and these are driven by comparisons, band-wagon effect and present bias. However, an underlying motivation of all these factors is the search for well-being. In Chilika, migration for work, changes in value system, abandonment of traditions because of comparative perception of wellbeing, and changes in dynamics of social relationship and support system are functions of 'relationship' with community members who undergo extensive transformations. Using case studies and interviews, a mixed methodology of both qualitative and quantitative approaches, the paper addresses how perception of certain relational criteria and the notion of well-being drive such behavior and decisions, and gives a new direction in assessing wellbeing of fishing communities in relation to the complex socio-economic, political and ecological settings and formulating policies having far-reaching implications for actual community well-being.</p>

Rattana Tiaye	Southeast Asian Fisheries Development Center (SEAFDEC), Thailand	Nam Oon Fisheries Co-management Model, Sakon Nakhon Province, Thailand	Co-management in inland small-fisheries with a balance between ecological and human well-being under good governance among the fishers and government could sustain the fisheries resources and fishers' livelihood. In 2014-2018, the Department of Fisheries (DOF) of Thailand and Southeast Asian Fisheries Development Center (SEAFDEC) implemented a fisheries co-management project in Nam Oon Reservoir in Sakon Nakhon Province, Thailand, to encourage the local people especially the fishers to work together with the government in planning, implementing, and monitoring the fishery resources in the reservoir. This research discussed the approaches used to increase the participation of fishers in fisheries co-management that focused "the Sufficiency Economy Philosophy (SEP)" and "the Monitoring, control, and surveillance (MCS)" which were implemented step by step. After the establishment of thirty-two (32) committees in sixteen (16) villages along the Nam Oon Reservoir, the members of which have agreed, implemented, and monitored the work plan as well as promoted the livelihood activities. The experiences and lessons learned from implementation of these approaches could be adapted in other areas to serve as model for inland fisheries co-management.
Raymond Ayilu	University of Ghana, Ghana	Informal Artisanal Fish Trade in West Africa: Improving Cross-Border Trade	In West Africa, fishing and trading in fish and fishery products has been practiced for centuries and makes a significant contribution to per capita GDP. Data were collected with structured and validated questionnaire. The study used a survey data from 263 randomly selected fish traders in selected markets. Using a Logit model, the study found that traders with primary or basic education were more likely to participate in cross-border fish trade compared to their uneducated counterparts. The distance (km) travelled between purchase points and the destination of fish positively and significantly influences cross-border trading; that is, long distances will reduce the probability of fish traders engaging in informal cross-border trade. It was apparent that traders who belong to a fish traders' association were more likely to participate in cross-border fish trade compared to those who do not belong to any association. Availability of good road infrastructure had a positive and significant influence on informal cross-border fish trade participation choices. While residing close to a border town also affects fish traders' decisions to participate in cross-border trade because it is easier to access the neighboring country's markets. The study concluded that government intervenes by providing the necessary infrastructure that will help to reduce transaction costs and improved transportation. The paper argued for the provision of adequate and timely information on fish products markets. It is further proposed that fish traders be supported and encouraged to form marketing cooperatives.
Rebecca Borges	Leibniz-Centre for Tropical Marine Research (ZMT), Germany	Spatial dynamics of crab fisheries on the Amazon coast: Integrated management of adjacent protected areas to maintain resource sustainability	In coastal-marine environments, such as mangroves, fish populations provide food and revenue for millions of low-income households. Because of their importance to local populations' livelihoods, large extensions of Brazilian mangroves are legally protected under the 'extractive reserve' model. The crab fisheries, the main economic activity in these reserves, have been considered sustainable for the past decades. Expanding fishing territories could cause conflicts among villagers from different protected areas, while posing a threat to the so-far sustainable crab fisheries in the region. In this study, expanding fishing territories and possible conflicts among users are explored by investigating fishing practices and management in two adjacent protected areas in Bragança and Tracuateua, north Brazil. Based on stakeholders' perceptions, we constructed maps with the fishing grounds of the mangrove crab. We also identified the spatial mobility of fishers, showing where from and where to these fishers go to catch the crab. The protected areas are strongly interconnected in terms of fisheries, with fishers moving between these two protected areas in the search for more abundant and larger resources. Based on these spatial dynamics, we present how local knowledge on mobility can be systematically applied to support integrated, ecosystem-based management. Although adjacent protected areas in North Brazil belong to a same management category, local regulations vary among the different reserves. We propose applicable, integrated regulation measures which could help tackle the changing fisheries scenario in these sustainable-use mangrove reserves.

Rebecca Borges	Leibniz Centre for Tropical Marine Research (ZMT), Germany	Ecological core indicators for assessing sustainability of data-deficient small-scale fisheries	<p>Basic indicators for sustainable resource management are well developed for large-scale fisheries on global to national levels, but are not suitable to assess local small-scale fisheries (SSF). Due to the absence of adequate information, quantitative modelling in the development of management strategies is hardly possible. Therefore, the implementation of an Ecosystem Approach to Fisheries (EAF) in data-limited fisheries systems requires a shift from solely model-based to qualitative data- and knowledge-based indicators corresponding to management objectives. The purpose of this work is to understand the current sustainability status of artisanal SSF by describing the socio-ecological characteristics with a mixed-methods and interdisciplinary approach. In order to depict the complex and adaptive nature of coastal marine social-ecological systems (CM-SESS) and to contribute to the development of efficient responsive monitoring systems, we propose a core set of already available indicators to assess the resource status and the human and environmental forces that act upon it. The selection encompasses biodiversity and conservation-based indicators which complement ecological indicators of fishing pressure and all are based on and can be derived from landings or from survey data. Indicators were compiled based on criteria for judging objectives and responses in decision-making processes, namely the DPSIR framework and SMART criteria. To address the issue of generality and the applicability of the variables to other CM-SESSs, this study provides indicators and their working definitions for precautionary policy planning and management of marine resources by applying international standards and methodologies and referring to the United Nations 2030 Agenda for Sustainable Development. Selected indicators refer to ecological variables that describe the focal system, i.a. size of resource system, fish stock abundance, species composition, predictability of system dynamics, and also to socio-economic variables such as the economic value of the resource unit, human-constructed facilities and fishing effort. To evaluate the set of indicators we apply it to case studies of SSF in Costa Rica, Colombia, Brazil, Peru and Kenya.</p>
Richard Nyiawung A.	Memorial University of Newfoundland, Canada	Examining new environmental governance initiatives for developing country small-scale fisheries: Fishery Improvement Projects (FIPs) in the African context	<p>Although the eco-certification movement has gained significant momentum in developing country fisheries, few fisheries in the African context have received eco-certification. To date, no small-scale African fishery has attained certification to standards set by the Marine Stewardship Council (MSC), the most prominent voluntary third-party certifier for wild-captured fisheries. In response, proponents of eco-certification through the Conservation Alliance for Seafood Solutions initiated and developed multi-stakeholder Fishery Improvement Projects (FIPs) beginning in the 2010s to help fisheries improve their practices and to move fisheries closer to eco-certification standards. Few researchers have examined FIPs within an African context, however, and we know little about how FIPs have been implemented in the African context. Drawing on literature review and key informant interviews with stakeholders involved in FIPs in Africa, this paper examines the motivation and roles of different actors and organizations involved in FIPs and interactions among these actors and organizations. The findings suggest that international actors play a central role in different FIPs and provide significant efforts to support capacity building while the role of governments are relatively limited. Small-scale fishers are generally not well integrated into formal FIP processes, suggesting challenges to processes of FIP governance. The paper uses a political economy framework to explain the complex and challenging opportunities for and barriers to inclusion and participation in FIPs and a general ambiguity of social development questions for small-scale fishers in FIPs.</p>
Rick Gregory	Pyoe Pin Institute & Network Activities Group, Myanmar	Ten years of freshwater fisheries governance reform in Ayeyarwaddy Region, Myanmar	<p>In May 2008, Cyclone Nargis devastated Myanmar's Ayeyarwaddy Delta, killing 140,000 people, destroying countless livelihoods and causing enormous infrastructure damage. Fishing communities were hit particularly hard by the disaster. In response, a tri-partite collaboration between the Myanmar Government, United Nations & ASEAN, coordinated a successful recovery effort that rebuilt communities and livelihoods throughout the Delta. Through this collaboration, relations between the Myanmar Government and donor countries improved steadily leading to the eventual lifting of international sanctions and subsequent democratic reforms. Civil society organisations and NGOs proliferated during this transition period. At the same time, Myanmar's increased exposure to international fisheries norms has ushered in a number of fisheries policy changes. Following decentralisation of freshwater fisheries governance in 2008, Ayeyarwaddy Region passed a fishery law that recognized some rights of small-scale fishers, who had been largely overlooked in previous national fisheries legislation. After several years of lobbying by local and international organisations and courageous leadership by senior Regional Government officers, Ayeyarwaddy Region implemented pro small-scale fisher policies and on 4 th April 2018 enacted a new Freshwater Fishery Law, creating a legal basis for community fisheries organisations, supporting a policy change that allocates lower value leasehold fisheries to community organisations. The ten-year period since the Nargis Cyclone disaster provides insight into how fisheries policies can be influenced by significant natural and political events and how NGOs can play a significant role in ensuring that new government legislation protects and enhances the livelihoods of small-scale fishers.</p>

Rizkyana Dipananda	Wageningen University, The Netherlands	Drawing invisible lines: The process of boundary making in marine space - A case study of governing FADs in Labuhan Lombok	<p>A Fish Aggregating Device (FAD) is a modified floating object that is intentionally placed into the sea to aggregate the fish. Since the natural and highly dynamic topology of the sea cannot be ignored, the deployment of the FAD establishes two irreconcilable spatial ontologies in ocean spaces. This research focuses more on the boundary making process in FADs arrangement as main components in establishing territory. In order to better understand the context, this research takes a case study from Labuhan Lombok, Indonesia. From the field work, it is found that the first spatial form is the Jurisdictional Spaces where the State dominates the boundary work process by enforcing the Cartesian way of understanding the sea. The government topographical understanding of the ocean has resulted in ineffective state-based regulation related to FADs. Whereas, the second spatial form is the Relational Spaces in which fishers have their own understanding of looking at the sea. In the fisher's relational network, the FAD's boundary making is highly influenced by the informal authorities performed, such as the supplier or other powerful fishers. Since previous research on FADs is extremely limited in the context of boundary making, this research used data collected in the field as the primary data resource. The methodology in obtaining the data is participant observation and semi-structured interview. Moreover, through closer examination of four variables (Object, Subject, Expertise and Space) adapted from Vandergeest et al. (2015), this research argues that these two spatial ontologies function separately. Therefore, from the two-conflicting types of spaces, this thesis followed the emerging research on exploring the relational practice of geographical maritime worlds and applied it to the maritime policy setting. With the support of network and flows thinking, it is concluded that to better govern the FADs, the State needs to re-invent new ways of understanding the ocean territory by incorporating the fishers' relational network as a vital instrument in FAD's collaborative management.</p>
Rodelio Subade	Division of Social Sciences, University of the Philippines Visayas, Philippines	Valuing coastal areas loss towards transformation of coastal communities of fishers: A case in Miagao, Iloilo, Philippines	<p>Miagao coastal communities particularly the small scale fishers face a range of coastline that are rich in marine resources in which most Miagawanons are dependent to, because of the employment opportunities, abundance in goods and services, and the aesthetic value of the coasts. However, in recent years, there have been observed cases of coastal area loss (MGB, 2017) that have been a major problem to the people living in the said areas. While coastal area loss might have been due to few possible causes, this study characterizes and estimates the value of those losses through the value to the loss of land, buildings and structures, trees, economic activities and docking area by using market price. The paper also attempts to characterize and measure psychological impacts due to these losses by using scales that show how attached they are to those losses. It also aims to provide possible solutions to coastal area loss since there is little funding and adaptation strategies existing; the willingness-to-pay of the people will be measured to know how important these adaptation strategies are to them. Since there are a lot of people, particularly small scale fishers residing in the coastal areas of Miagao, aforementioned losses could be a major threat to their lives. The paper suggests that both coastal communities and government should work together to address the existing problems in the coastal areas by creating adaptation strategies that can reduce risk and potential damages.</p>
Rodelio Subade	University of the Philippines Visayas, Philippines	Value chain analysis of windowpane oysters (<i>Placuna placenta</i>) in Oton, Iloilo	<p>The windowpane oyster industry is important to the local economy of Oton, Iloilo. It has contributed to the local economy in terms of revenue, food security, and livelihood to small-scale fishers. Hence, the study is conducted to determine what needs to be upgraded in each stages of the windowpane oyster value chain through the value chain analysis. The different activities within the value chain of windowpane oysters are described and analyzed to understand where, and how, value is added at each stage. Activities and the prices achieved at each stage of the chain, from harvesting windowpane oysters to its eventual end-users, are examined. Data on the socio-economic characteristics, harvesting, processing and marketing practices, expenditures and earnings, and problems of the actors in the value chain are gathered through personal interview. A purposive snowball sampling is used to determine the participants of the study. The conclusion from the study is yet to be made. However, the result from past studies showed that the value is added when products pass different stages and move from one intermediary to another. It also showed that the price of the product increases as it is transferred from one consumer to another. Producers usually benefit the least in the whole value chain. Common constraints faced by the value chain actors include lack of infrastructure, lack of government assistance, inadequate off-season livelihood opportunities, and the depletion of the resources due to increased entry and destructive methods of harvesting.</p>
Rodrigo López-Salazar	LMSZC, UMDI-Sisal, Facultad de Ciencias, UNAM, Mexico	Differences of fishing operations from two small-scale fleets targeting octopus: Understanding fleets' interactions.	<p>Technical attributes of fishing vessels are related to the fishing effort exerted on target species such as vessel size, fishing gear, engine, and technology on-board, but it also depends on fishing time, time spent searching, crew, among others. Usually, fisheries management use to establish fishing regulations to control fishing effort. The assumption in this approach is that vessels are homogeneous, i.e., a decrease on number of vessels will reduce fishing effort exerted. However, this assumption is not true, and on the contrary, fishing vessels are highly diverse, such as in small-scale fisheries. Therefore, there is a need to better understand how fishing effort is exerted given fleets' interactions. In this work we assessed which factors determined the catch rates of two small-scale fleets targeting octopus through a generalized linear model performed to each fleet. The main attributes differences between these fleets are the size of vessels and the number of days-at-sea. Our results showed that smaller vessels obtained high catch rates during October while larger vessels were on November. The distance to port affected smaller vessels while depth of fishing was related to catch rates from larger vessels. Our findings highlight the relevance of assess the factors related to catch rates, we discuss the implications of each attribute on management.</p>

Rodrigo Pereira Medeiros	PPGTE - Federal University of Technology – Paraná, Brazil	Addressing small-scale trawl fisheries bycatch issues in a Marine Protected Area	The Environmental Protected Area of Anhatomirim (EPAA) is located in a very important region for the Atlantic seabob shrimp (<i>Xiphopenaeus kroyeri</i>) trawl fishing at the South-Southeast Brazilian coast. Research and outreach have been supporting fisheries management in EPAA since 2011 through tests and demonstration of net modifications with bycatch reduction devices (BRD). Socio-economic information on fishing and dependency on bycatch have been surveyed through SocMon Methodology. The EPPA management plan was released in 2013 formally addresses bycatch problems, for the first time in Brazil. The REBYC II LAC Project - Sustainable Management of Bycatch in Latin America and Caribbean Trawl Fishery (FAO/GEF) supported the realization of scientific experiments in order to design a portfolio of BRDs in three levels of bycatch reduction: i) low-level (squared-mesh); ii) medium-level (30 mm space bar Nördmore Grid) and; iii) high-level (17 mm space bar Nördmore Grid). Managers evaluated positively in terms of the opportunity to generate a dataset in support of decision-making, the participatory approach and the close interaction with fishers. Otherwise, the need for more dialogue with fishers in institutional conflicts were treated as constraints. Fishers positively evaluated the methodology, perceived as respecting fishers' knowledge, transparent in dialogue and the practical, also, the possibility to have different net combinations according to bycatch rate. Fishers' engagement in the activities was considered low. Disagreement appeared in relation to the use of BRDs that reduce byproduct, such as valuable fishes and the white shrimp (<i>Litopenaeus schimitti</i>). Effective implementation requires the development of incentives as well as fishers and management engagement in implementing responsible fishing.
Rodrigo Pereira Medeiros	PPGTE - Federal University of Technology – Paraná, Brazil	The interpretations of human dimensions in three Brazilian marine protected areas and small-scale fisheries management	Human dimensions (HDs) in marine protected areas (MPAs) are expected to play a significant role in the support of SSFs. We aimed to describe the progress of the incorporation of HDs into legal frameworks and resource management mechanisms adopted in Brazil. Firstly, an analysis of the state-of-the-art of the term HD in publications have been prepared. A total of 35 components were categorized into five HDs: governance, economic, cultural, political and social. Next, we focused on the governance and management arrangements of three MPAs: (1) Guaraqueçaba Environmental Protected Area; (2) Marine National Park Currais Island and (3) Anhatomirim Environmental Protected Area. Both MPAs have a multi-stakeholder decision-making body for resource management. We note that these initiatives can be monitored from HDs components, such as policies and laws (legal rules systems) and institutional arrangements (informal norms, rules in use). In the case 1, the Technical Chamber of Traditional Peoples was created, in which researchers and fishermen have been trying to discuss the right to the consultation provided for in ILO Convention 169. In the case 2, workshops were made in order to reconcile traditional fishing uses with the conservation objectives and a commitment term was drawn. At the case 3, was established a marine zoning by use of bycatch reduction devices as a management tool. Besides, we argue that the existing levels of trust among the stakeholders currently define the progress of these cases. To improve this expectation, a better understanding of these governance arrangements is necessary.
Romain Langeard	WorldFish, Myanmar	Characterizing and monitoring outcomes of inland fisheries governance in Myanmar	The project 'Improving fishery management in support of better governance of Myanmar's inland and delta fisheries' funded by ACIAR is carrying out research to support inland small-scale fisheries (SSF) and their transition under the decentralization of natural resource management. Implemented by WorldFish in partnership with the Department of Fisheries (DoF), the project is pioneering a unique research framework involving local NGOs and universities to document and support the policy reform process. The research aims at offering in-depth characterization of existing management systems, with a particular emphasis on recent community-based arrangements. Further, the research puts forward a comprehensive monitoring system with the intention to evaluate the impacts of different management in terms of social equity, economic productivity and environmental sustainability. Building on these two components, the research supports a critical reflection on the reform process and the possible improvements in the governance of Myanmar's freshwater fisheries. The presentation will revisit the collaborative research work to date in order to finally outline some of the risks and opportunities lying ahead of the reform.
Roquelito Mancao	Rare, Philippines	Beyond Marine Protected Areas: Leveraging Pride into Managed Access as a Strategy for Sustainable Coastal Fisheries in the Philippines	For over 35 years, Rare has trained local conservation leaders to run social marketing campaigns, which have helped inspire community support for sustainable behaviors Beginning with the recovery of the endangered St. Lucia parrot in the Caribbean, to the rebound of the Philippine cockatoo population in Narra, Palawan in the Philippines, more than 300 Pride campaigns worldwide have reduced threats toward species and habitats. In the Philippines, Rare's work has been focused on coastal fisheries management. Combining governance, community support and behavior change approaches, Rare's partners have improved the effectiveness of over 50 MPAs in the country – achieving desired social and ecological goals. In addition, they have harnessed the participation of fishers and community leaders to establish over 30 legally-declared Managed Access Areas combined with no-take zones, which grant exclusive fishing rights to certain groups of fishers provided they agree to more stringent fishing regulations. These managed access areas are proving to be a strong incentive for compliance with sustainable fishing practices, a means for getting fishers organized and making decisions, and are showing great promise as an important long-term strategy to address overfishing.

Ruby Grantham	ARC Centre James Cook University, Australia	Using seasonal calendars to understand expectations and livelihood structures	<p>A majority of the world’s population practice diversified livelihood strategies. However, the tendency of research and statistics to focus on primary occupation has led to an oversimplified perspective of livelihoods. The resilience and vulnerability literature stress the need for a more complex understanding of livelihoods and the mechanisms through which individuals and households maximise returns and spread risk. In this research we examine how activities are temporally arranged within diversified livelihood strategies and the potential to use seasonal calendars to assess livelihood structures. The research was carried out in two coastal communities on the Island of Atauro, Timor-Leste. Seasonal calendars were used to collect information on the temporal relationship between livelihood activities and weather and environmental conditions. In both communities, livelihoods were predominantly dependent on a combination of small-scale fishing and farming, but localised seasons created different livelihood structures and associated variability in food and income. We discuss the potential benefits of accounting for livelihood structures to conservation and development. We also highlight that seasonal calendars rely on resource user expectations underpinned by local ecological knowledge. We therefore argue that, in the context of a changing climate, seasonal calendars should be implemented and interpreted with caution but if framed correctly, understanding resource user expectations could contribute vulnerability and resilience research.</p>
Ruby P. Napata	University of the Philippines Visayas, Philippines	Managing small-scale fisheries in the Philippines: The blue swimming crab (<i>Portunus pelagicus</i>) Story	<p>Small-scale fisheries (SSF) play a vital role in providing livelihood, income, food and nutrition to many of the worlds’ population. In the Philippines alone, there are about 1,371,676 million people engaged in SSF, which is 85% of the total fishers in the country. Management of SSF is challenging because these fisheries typically employ multi-gear, multi-species approaches, and are strongly influenced by the cultural norms of their particular society. The blue swimming crab (<i>Portunus pelagicus</i>) is one of the most important aquatic invertebrates in the Philippines which contributes significantly to the fish food supply and livelihood of different stakeholders that belong to small-scale fisheries. It is one of the top export fisheries commodities of the country. With increasing demand for crabs, different stakeholders are faced with limited supply due to unsustainable fishing and management practices. The study was conducted to assess the performance of the blue crab industry, how benefits are distributed along the supply chain and to identify issues and gaps. A total of 1335 respondents (fishers, traders, processors) were interviewed using a pre-tested questionnaire. Results of the study revealed that each sector of the chain have unique issues and problems to be addressed and among these problems, illegal fishing activities are the most pressing issue. Post-harvest losses and a more environmental friendly and efficient gear should be put into management priorities. Lastly, government policies that govern the industry should be revisited to enhance the industry performance.</p>
Ruth Brennan	Trinity Centre for Environmental Humanities, Trinity College Dublin, Ireland	Working with small scale fishing communities in Ireland to co-design and test inclusive governance approaches	<p>The reformed Common Fisheries Policy recognises that “[s]mall offshore islands which are dependent on fishing should...be especially recognised and supported in order to enable them to survive and prosper.” The Island Fisheries (Heritage Licence) Bill 2017 envisages issuing “heritage licences” to rural coastal and island communities to allow for traditional and seasonal fishing practices on offshore islands. As an island nation, fishing has always been economically and socially important to Ireland. Key questions are whether, and how, the small-scale fishing industry can develop low-impact, sustainable fishing models through innovations that promote good governance, foster marine stewardship, meet the environmental objectives of the Marine Strategy Framework Directive and contribute to climate change goals while meeting the need of fisheries-dependent coastal communities to flourish and thrive. The Irish Islands Marine Resources Organisation (IIMRO) is a national organisation made up of Irish islanders fighting to bring to the attention of decision makers the needs of island communities across the country on marine related matters. This talk will introduce new research to co-design and test innovative governance approaches with a strong community, heritage and sustainability focus that address the needs of fisheries-dependent island communities while meeting national and European marine planning and conservation objectives. This research builds on the author’s previous participatory and ethnographic research that examined how the articulation of culturally-embedded relationships between people and place can facilitate engagement with the related policy environment by challenging the dominant narrative of conservation through the visual articulation of competing realities.</p>

Salvador Rodriguez-Van Dyck	Sociedad de Historia Natural Niparáj, A.C., Mexico	Commitments that transform: The establishment and renewal process of the first Fisheries Refugia network in Mexico	<p>A Fishing Refugia Network was officially established in 2012 in the marine-coastal Corridor San Cosme-Punta Coyote in Baja California Sur, Mexico. Among the criteria that local fishers used to design and select areas for the refugias, was the commitment to respect the zones once they were established. In organizational culture, commitments are considered as an essential element of management. In fisheries management is not otherwise. After five years, fishers and coastal communities have observed the positive effects of the fishing refugia network particularly with the increase of biomass and size of the commercial species. A proposal to continue the protection of the critical zones was signed by 80% of the resident fishers. On November 15th, 2017, the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), renewed the network for five more years. The establishment of the refugia taught us some lessons that were taken into account during the renewal phase. For example, a community realized that a new and high-level commitment should be made to change the status quo of their resources. Other communities decided to keep the area of their refugia as they were. Reinforcing commitments are comfortable, however, commitments that transform are anything but easy. This paper summarizes information about the key elements of the processes that make possible the creation of the refugia network. We also identified how personal and group commitments were able to transform the results and how they strengthened the use of this fishery management tool for the first time in Mexico.</p>
Sarah Appiah	University of Ghana, Ghana	Livelihood vulnerabilities among women in small scale fisheries: Evidence from the Gomoa West District of Ghana	<p>Women’s immense contribution in the fisheries sector, particularly in post-harvest fisheries cannot be underestimated. However, several factors inhibit the wellbeing of women activities in the sector which makes them vulnerable to livelihood insecurity. While some interventions have been made in the sector to address the livelihood vulnerabilities of fisher folks, these policy interventions still miss their target in creating a sustainable livelihood for the more vulnerable group in the sector, who are mostly women. This paper investigates the livelihood vulnerabilities of women in small scale fisheries in the Gomoa West District of Ghana by constructing a multidimensional livelihood vulnerability index for women fish processors and traders. The Alkire- Foster multidimensional measure is used to quantify their livelihood vulnerability based on the capital assets of the Sustainable Livelihood Framework. The results show that 70% of women surveyed are multidimensionally vulnerable to livelihood insecurity and were deprived in 80% of the weighted indicators. The estimates of the probit regression also shows that differences in multidimensional vulnerability was explained by differences in certain socio-economic factors such as widowhood, gender of household head, access to remittances, post-harvest losses (fish spoilage) and experience in business. The paper provides valuable insights on the capacity building needs of women in the fisheries and concludes that, to sustain and enhance the livelihoods of women in the sector, policy interventions should be focused on improving their access to livelihood resources particularly social capital indicators as well as building human and institutional capacity.</p>
Sarah Harper	Institute for Oceans and Fisheries, University of British Columbia, Canada	The role of Indigenous women in transforming fisheries governance	<p>While the agency of individuals has been identified as a key factor in triggering governance transformations in social-ecological systems, little research has investigated the role of gender in these processes, particularly with respect to Indigenous fisheries governance challenges. For millennia, coastal Indigenous communities along the northwest coast of North America have depended on fishing as a way of life and Pacific herring (<i>Clupea pallasii</i>) has been an integral part of their economies and cultures. However, maintaining access to this essential resource for food, social, and ceremonial use and local livelihoods, has become increasingly challenged by centralized governance regimes, fishing pressure and climate change. In 2015, on the Pacific coast of Canada, conflict between the Heiltsuk First Nation and Canada’s federal fisheries agency over the conservation of Pacific herring sparked a flashpoint. We focus on the role of Heiltsuk women during this crisis to better understand broader processes of change within a linked fish-human system. Through semidirected interviews we identified important contributions by Indigenous women to the herring-related economy through participation in the herring spawn-on-kelp fishery, and its governance. We found that in recent efforts to reclaim Indigenous fishing practices and rights, Heiltsuk women took on key leadership roles, increasing social cohesion, facilitating the flow of information, and negotiating among those holding power and conflicting objectives. Viewed through the framework of transformative change in social-ecological systems, Heiltsuk women demonstrated strategic agency in challenging colonial governance regimes and catalyzing change in small-scale fisheries policy and management.</p>

Sarah Lawless	ARC Centre of Excellence for Coral Reef Studies, James Cook University, Australia	Opportunities to realize social transformations in small-scale fisheries	<p>Increased attention given to addressing social issues in small-scale fisheries has led to an emergence of ‘social meta-norms’ promoting the best ways of governing for social and environmental outcomes. Social meta-norms predominately refer to human rights, gender equality, equity, and justice. Collective efforts have been effective in establishing and promoting these meta-norms at the global scale (e.g. the Sustainable Development Goals). In small-scale fisheries, these norms have manifested as guiding principles, for example, within the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries and are increasingly prioritized in regional and national fisheries policy. Despite these written commitments, few efforts have led to transformational change at regional, national and local scales. Using small-scale fisheries as a case, I discuss how social meta-norms travel, and why in many cases they are unsuccessful in catalysing favourable change. Drawing lessons from diverse disciplines including political science, international relations, sociology, international development, institutional studies and international law, I identify the drivers influencing the spread of meta-norms. I combine these results with empirical data exploring the interpretation of social meta-norms by small-scale fisheries actors at regional, national and local scales. I find in many cases social meta-norms are resisted, contested or rhetorically adopted by small-scale fisheries actors. Actor responses to norms are shaped by certain drivers, including how norms are framed, and their perceived cultural suitability. Through understanding both actor responses and the drivers shaping the spread of meta-norms, this research offers insights into the conditions that may lead to the transformation of social-meta norms into small-scale fisheries practice.</p>
Sebastian Tapia-Lewin	University of California, USA	Interplay between different dimensions of adaptive capacity affect fisher’s adaptations to Climate Change	<p>Coastal fishing communities are expected to be affected by climate change effects on marine resources distributions. However, research assessing what shapes small-scale fishers’ adaptations to these effects are scarce. Here, we operationalize a recently published Adaptive Capacity (AC) framework and test how 5 different dimensions of AC are related to fishers’ adaptations to decline in catch scenarios. We conducted surveys along the coast of Chile, where we interviewed 635 fishers and fisher organization leaders. Binary logistic regressions show that the learning, social organization, agency and flexibility dimensions of AC are related to some form of adaptation while assets are related with the coping response. Understanding AC indicators that make certain adaptations more likely to occur is critical for designing sound policies that consider the long-term sustainability of small-scale fisheries in a changing environment.</p>
Sebastian Tapia-Lewin	University of California, USA	Distal impacts of aquarium trade: Exploring the emerging sandhopper (<i>Orchestoidea tuberculata</i>) artisanal shore gathering fishery in Chile	<p>Artisanal fishery activities support the livelihoods of millions of people worldwide, particularly in developing countries. Within these fisheries, distal global drivers can promote switching between alternative target resources. These drivers can promote the rapid development of new, unregulated and previously unexploited fisheries that pose a threat to the sustainability of ecosystems. In this paper, we describe a new artisanal shore gathering activity that targets a previously unexploited resource: the sandhopper (<i>Orchestoidea tuberculata</i>). The activity is driven by aquarium trade demand for food. We used mixed methods to describe the activity, assessed basic socio-economic incentives, and estimated Catches per Unit Effort. Results show that the sandhopper plays an important role for the livelihoods of shore gatherers engaged in the activity. Gatherers have adapted and developed two main extraction methods with different degrees of investment and extraction rates. Furthermore, gatherers have developed local knowledge regarding the ecology and management of the resource. Results show that economic incentives can motivate a rapid expansion of this unregulated activity. Future research gaps and management options to address the development of this fishery are discussed in light of these findings.</p>
Seishiro Sakita	Department of Geography, Graduate School of Environmental Studies, Nagoya University, Japan	Building on the tradition: the development of the community-based management of clam fishery in Tōgō lake, Japan	<p>Small-scale fisheries management in Japan is considered to be one of the most successful community-based management system. Local communities have long managed their own fishing activities based on their conventional rules and official fishery rights. However, due to the various changes in fisheries situations for several decades, contemporary management practices in some local areas are no longer accordant with the aforementioned consideration. This study demonstrates the management system of Japanese basket clam (<i>Corbicula japonica</i>) fishery in Tōgō lake, as a case of the recent dynamics of local small-scale fisheries in Japan. Tōgō lake is a brackish lake which has an area of 4.05 km² with a mean depth of 2 m approximately. Until 1970's, clams in the Tōgō lake have been collected for local subsistence and were distributed within a very limited area as they had less economic value. Clams fishery in the lake rapidly expanded in 1980's induced by external market. In response to the commercialization, fishermen started building a management system of clam fishery. It was based on their traditional rules and was directed by the local fishery cooperative, which was typical of Japanese small-scale fisheries management. At the same time, however, they were split into some marketing groups as they failed to agree to employ collective sale system. Consequently, current management system of clam fishery is supported by fisherman's unanimous cooperation while small groups are operating the clam sale competitively. Commercialization also brought about biophysical monitoring by research institute and about intensive cooperation with government agencies.</p>

Serena Lomonico	The Nature Conservancy, USA	Overcoming management inefficiencies in Peru's artisanal fisheries: A collaborative learning experience between the benthic fishers of Ancon and The Nature Conservancy in Peru	<p>Artisanal and small-scale fisheries are an important economic engine for coastal communities. In Peru, they account for close to 10% of the Peruvian wild fish catch, which represent almost 80% of the seafood consumed in the country. More than 45,000 fishers are directly employed in this sector. Despite its importance, very little is known on condition of stocks, levels of fishing effort, or performance of the fisheries. These obstacles combined with weak governance and limited market access, have led, in many instances, to overharvesting stocks and destructive fishing practices. The town of Ancon, located just north of Lima and home to approximately 500 fishers, exemplifies the need for management reform of near-shore artisanal fisheries in Peru. Since 2010, the Ancon fishers implemented self-imposed management measures for benthic and finfish species in their fishing grounds to overcome the declining trend that many of their stocks were facing, including: fishing effort controls, seasonal closures, size limits, and spatial closures. Since January 2015, the Nature Conservancy started working closely with the association of benthic fishers of Ancon to help them evaluate the efficacy of the "bottom-up" management initiatives they have adopted throughout their traditional fishing grounds. Building upon their community-based effort, the Conservancy joint efforts with the fishing community of Ancon in a pilot project that explores new approaches for small-scale fisheries management in the country, including: 1) assessing the effect of providing access rights to local fishing grounds; 2) increasing the capacity to carry out monitoring and data-poor stock assessments for setting harvest control rules; 3) strengthening the organizational capacity of the Ancon fisher association; 4) increasing access to seafood markets; and 5) fostering partnerships to support national policy reform. Together with fishers, TNC has designed and implemented a monitoring program to gather information and assess the effects that the community based management arrangements had on recovering and sustaining their main fishing stocks. Results show that providing fishers access to science-based monitoring and evaluation techniques allow them to be more confident in the outcomes of the pre-agreed harvest control rules and make management decisions based on empirical measurements. We are seeing empowered fishers with a commitment to sustainable use of their resource. By increasing the fishers' capacity to access markets for sustainable products, we can improve the economic performance of their fishing activities, securing a long-term viability of their fishing practices. This approach is transforming the way small-scale fishing communities do business in Ancon and is serving as a model to follow in other fishing communities setting the ground for a comprehensive reform of the Peruvian artisanal fishing sector. More specifically, it is currently serving as one of few pilot sites recognized by the Peruvian Government to test co-management schemes and rights-based management systems for small-scale benthic fisheries in Peru.</p>
Serena Lomonico	The Nature Conservancy, USA	Envisioning learning platforms for transforming sustainable small-scale fisheries: informing policy innovation from the bottom.	<p>Voluntary bottom-up fishery self-governance arrangements can provide key insights for improving the governability of small-scale fisheries (SSF). There is much that can be learnt from fishers' efforts, from the design of stock monitoring and control rules to the incentives that promote group compliance to achieve common goals. In 2016, 18 fishing communities along the coast of Peru were visited to i) identify the existence of self-governance arrangements in different social-ecological systems; ii) document the characteristics and diversity of such fishery management agreements, and; iii) understand the factors behind the success or failure of fishers' self-governance efforts. Like in many countries, self-governance efforts in SSF were unknown or underestimated in Peru before this study. We found fishers' local arrangements and a diverse set of control rules to regulate fishing effort and catch. We also reaffirmed what the literature suggests for the success of such efforts, like exclusive access to fishing grounds or specific fishing resources, leadership, social cohesion, and market incentives, and described how they are expressed in the Peruvian context. We discuss the policy implications of our findings in improving the governability and management effectiveness of small-scale fisheries in Peru. A set of recommendations is proposed to create transdisciplinary learning platforms and move towards co-management schemes that values traditional knowledge, built upon fishers' efforts, and promote adaptive learning for fisheries management. The ultimate aim is to improve the status of the stocks, fisher's well-being and the overall performance of SSF management sector in Peru.</p>
Sérgio Mattos	Ministry of Planning, Brazil	A decline of the profession of artisanal fishers in Rio Formoso (PE): A historic contextualization in Brazil	<p>From 2012 to 2013 fishers' profession at Rio Formoso fishing community, located in Pernambuco/Brazil were analysed, through semi-structural fishers' interview aiming at analyzing historical agents responsible for socioeconomic changes in fishers' occupation, including ethnobiological information. Brazilian fishing policy faced great changes during the 20th Century, from the navy intervention in coastal and fishing communities, when "fishers associations" were created, and fishing expansion strategies policies established towards a co-management process held by public institutions and fishers themselves in more recent years. Nevertheless, during the 60s and 70s industrial fishing policies were supported, generating an unfair competition with traditional fishing activities. This, together with the decline in fish stocks caused by predatory fishing, increasing tourism activities, mangrove degradation and input of pollutants, induced an evasion from the sector. While old fishers shifted to work as house-keepers and tourist guides, the young generation migrated seeking education upgrading and job opportunities. At Rio Formoso fishing community there still complaints about the lack of policies seeking to integrate tourism with traditional activities. In addition, environmental laws were launched without proper information, pushing fishers to fish illegally. These two factors generated sudden drops in fishers' income from traditional fishery, which needing to adapt to this new scenario. Despite these obstacles, fishers are currently combining tourism and fishing on an alternated seasonal basis. Thus not only tourism and traditional fisheries can walk together, but is worth reinforcing that small-scale fishery still an economically viable, desirable, and ecologically adequate activity in Rio Formoso.</p>

Since the adoption of the “SSF Guidelines” by FAO members in June/2014, the Brazilian small-scale fishing sector is promoting dialogues aiming at disclosing and discussing lessons learned about values, norms and principles contained therein, supporting its implementation. Which requires the stimulus of spaces for capacity formation and experience exchange to disseminate local knowledge, through a broad and participative process of dialogue among all stakeholders. Challenge, unmistakably, are on how to take the SSF Guidelines to remote communities, to facilitate this process of appropriation and which strategies of internalization are needed in Brazil. Therefore, we depart from the principle that SSF Guidelines can provide political coherence in the national scenario, becoming an instrument of reforms in the context of the existing legal and institutional framework, and compatible with others international agreements Brazil has signed. Such actions must be strengthened due to the current political context of social and economic rights losses and attacks in the field of environmental policies. We are facing threats to natural ecosystems and the maintenance of population levels of main fishing stocks, which support dynamic and sustainable fisheries. Therefore, this special session aims at promoting discussion among Brazilian stakeholders on the following themes, towards actions for full implementation of the SSF Guidelines. **1.** Traditional fishing communities territorial rights: Defending the beach from a cultural-base perspective, discussing proposals on how to develop community tools for fishing territories delimitations, self-identification and self-management, building a major axis of debate, linking with fishers health, environmental impacts and fishing rights issues. **2.** Monitoring, control and surveillance: Inconsistent policies for fisheries management and the impacts on fishing resources and fishers’ livelihood show the setback Brazil are experiencing in fisheries management, once all fishery monitoring and control mechanisms stopped, which need an urgent action. **3.** Social and environmental conflicts: Mapping of socio-environmental conflicts to improve community self-management. Strengthen the implementation of techniques, methods and tools that can be used to support fishing communities to be self-sufficient in solving conflicts. **4.** Occupational health: Multiple tasks, e.g. restrictions on access to fishing territories, intolerance, and violence against women, can strongly affect these populations, generating disorders and high level of anxiety and stress, which need the insertion of tools and strategies of action. Mental, physical and spiritual health are common problems, and one cannot rule out the issue of spirituality often very connected to aquatic environments. **5.** Fishers’ organizations: To promote debates from local to global, their historical dilemmas and perspectives from a political point of view - the invisibility of small-scale fisheries. **6.** Evolution & Transformation: No longer possible to untie one thing from the other, under the risk of weakening small-scale fisheries. There is a need for greater involvement of people and entities, as fishing territories and rights can go hand in hand with evolution and modernization of small-scale fisheries. SSF representatives cannot stay forever pleading for improvements in public policies, seeking evolution and transformation to strengthening self-esteem, through self-monitoring and control, working by applying methodologies and technologies for a sustainable fishery.

VITAL FISHERIES:
Setting pathways for
the implementation of
International
Guidelines for Small-
Scale Fisheries in Brazil

Market demands are big incentives for resource exploitation worldwide, different approaches have been follow to deal with this problem, from regulation to market certification or to ban products of threatened species. If viable and sustainable fisheries are aimed, under these contexts, it is necessary to understand fisheries contexts and comprehend market trends, drivers of change, and agents’ participation in the value chain. We present tow case studies of fisheries in Mexico to analyze their value chain, map destination of products, and identify the structure of the chain. We used official statistics, catch data, and interviews in fishing communities to analyze the value chain. In the case of octopus, international markets offer an opportunity for producers, but they have to comply with regulations difficult to achieve in artisanal fisheries. Diversification of international demand in market trends have been influencing octopus’ exploitation patterns. In the case of sharks’ fisheries based exclusively in artisanal fisheries, generate few product presentations consumed by local and national retailers (principally fillet) and fins go to Asian markets, there is however a problem of mislabel and traceability, that gets lost at an early stage of the value chain. In both cases the benefits of the trade concentrate in few agents. In moving towards the improvement in fisheries’ viability and sustainability, it is necessary an understanding of fisheries trade trends and interactions among agents.

Value chain structure
of the shark and
octopus’ fisheries:
between conservation
and market
certification

Impact of fisheries over population has been assess through the analysis of changes in catch composition of incidental and target especies. Temporal turnover monitoring of fishing especie is important to detect variations in community structure and composition of especie. In this study we used a multivariate approach to estimate temporal turnover of species targeted by the artisanal fleet of Yucatan, Mexico and to identify species that have the greatest contribution to such changes. We used official records of monthly catches that include total weight (kg) by species and fishing ports. The turnover was measured as dissimilarities between years and expressed as a percentage. An algorithm was used for weighted the dispersion on the database, used to build a Bray-Curtis (dissimilarities) matrice, evaluatedd using multivariate approach of the analyzes: PERMANOVA (Pair wise) PERMDISP, distance among centroids, PCO and SIMPER. The species turnover presented a temporal structure (Pseup-F = 6.81, Pperm = 0.001, gl = 14,159) of 5 periods: 2000 to 2001, 2002 to 2004, 2005, 2006 to 2011, and 2012 to 2014. The greatest dissimilarity observed was between 2000 and 2014 (40%; t = 3.3965, Ppermu = 0.001). Results showed low turnover between periods because the species composition captures, were similar from one year to the next, only with variations in total weight. However, there were important changes in 2005, registering new species, as *Ocyurus chrysurus*, which increased in volume towards 2014; other species like *Callinectes* spp species showed a gradual decrease. Temporal turnover suggested a low replacement of species targeted.

Temporal turnover in
the composition of
artisanal fishing
species in Yucatan: A
multivariate approach

Simon Bush	Wageningen University, The Netherlands	Emerging trends in aquaculture value chain research	<p>This paper presents an overview of a recently published special issue in the journal Aquaculture that brought together the largest collection of research on aquaculture value chains compiled to date, comprising 19 individual papers. In doing so five key themes of value chain research emerge, namely: multi-polarity, diversity and scale, dynamics of transformation, performance and equity, and technical and institutional innovation. Contrary to much research to date, this state-of-the-art review shows how the expansion of aquaculture has resulted highly diverse configurations of production for consumption in the global South. Two conclusions emerge. First, there is a clear need for research on neglected value chain segments and categories of actor, modes of production, regulation, and innovation, and access to both market and non-market benefits. Second, there is a need for more rigorous and diverse research on value chains to better understand the diversity and impact of aquaculture in order to contribute to the sustainable expansion of the sector as a fundamental component of the global food system. Based on these conclusions an agenda for the future of aquaculture value chain research is set out for discussion.</p>
Simon Funge-Smith	Food and Agriculture Organization of the United Nations (FAO), Italy	An ecosystem approach to promote the integration and coexistence of fisheries within irrigation systems	<p>In recognition of the increasingly diverse and extended demands for water from irrigation systems there is a need to introduce ideas on holistic landscapes and multiple-user types, to conventional thinking on irrigation management. The integration of fish production, (capture fisheries & aquaculture) into irrigation systems has yet to be fully realised and in many cases, opportunities that could significantly increase local economies, food security, household incomes and livelihood diversity are being ignored. To examine the potential of fisheries in irrigation systems, the concept of the Extended Command Area (ECA) is used. Many elements of an irrigation system, from upstream dam storage to downstream drainage areas, offer opportunities for increasing fish production. Many of these opportunities may be realized at no or little additional cost to the main irrigated crops. A key concept for sustaining inland capture fisheries is ‘connectivity’ and Improving this within an ECA can restore elements of ecological services that may have been compromised or degraded through irrigation structures, water management or infrastructure development, such as roads. Within a broader application of the ECA concept, aquaculture productivity, whilst not dependent upon connectivity to the same degree as capture fisheries, can be integrated best through treating fish as a crop requiring irrigation services, much as any field crop does. A proposed integration process for integration fish into irrigation systems, links the development of the EAF management planning process for fisheries, with irrigation system management & operation, and is given the acronym EAFm-i. Key parts of this linkage is the assessment of water resources in the ECA for fisheries potential, and the quantification of water service delivery for fisheries.</p>
Steve Box	Rare, USA	Connecting essential information to community-based management: The data we need to succeed	<p>Rare’s work in coastal fisheries across the developing tropics puts fishers and communities at the helm, recognizing they are the most impacted by and invested in the future of their local resources. Through Fish Forever, a community rights-based management approach that combines managed access with marine reserves, Rare is employing social marketing and behavior adoption techniques that inspire communities to work through local management bodies and recover their fisheries. Rare assessed data from five years of design and implementation of Fish Forever in 260 communities across Brazil, Indonesia, and the Philippines and found that the approach is working. Thousands of in-water surveys, individual and household surveys, and records of fishing trips show that fish biomass is recovering both inside as well as outside marine reserves, participation in fisheries management is improving, and social cohesion and resilience in communities is growing. To sustain effective fisheries management, decisions must be informed by available data, and fishers and communities need to have and understand the analysis. Rare is addressing traditional data and capacity limitations in coastal fisheries by creating simple data collection systems for fisher registration and catch recording (through the OurFish App), critical habitat mapping, and fish/stock monitoring. This is complemented by trainings for local partners from government institutions, fisher associations, NGOs, and CSOs who can support collection and interpretation of data, and go further to build financial literacy and transparent organizational management capacity. Working in concert these efforts will enable and incentivize fishing communities to maximize the socio-economic benefits their local coastal resources and ecosystems provide.</p>

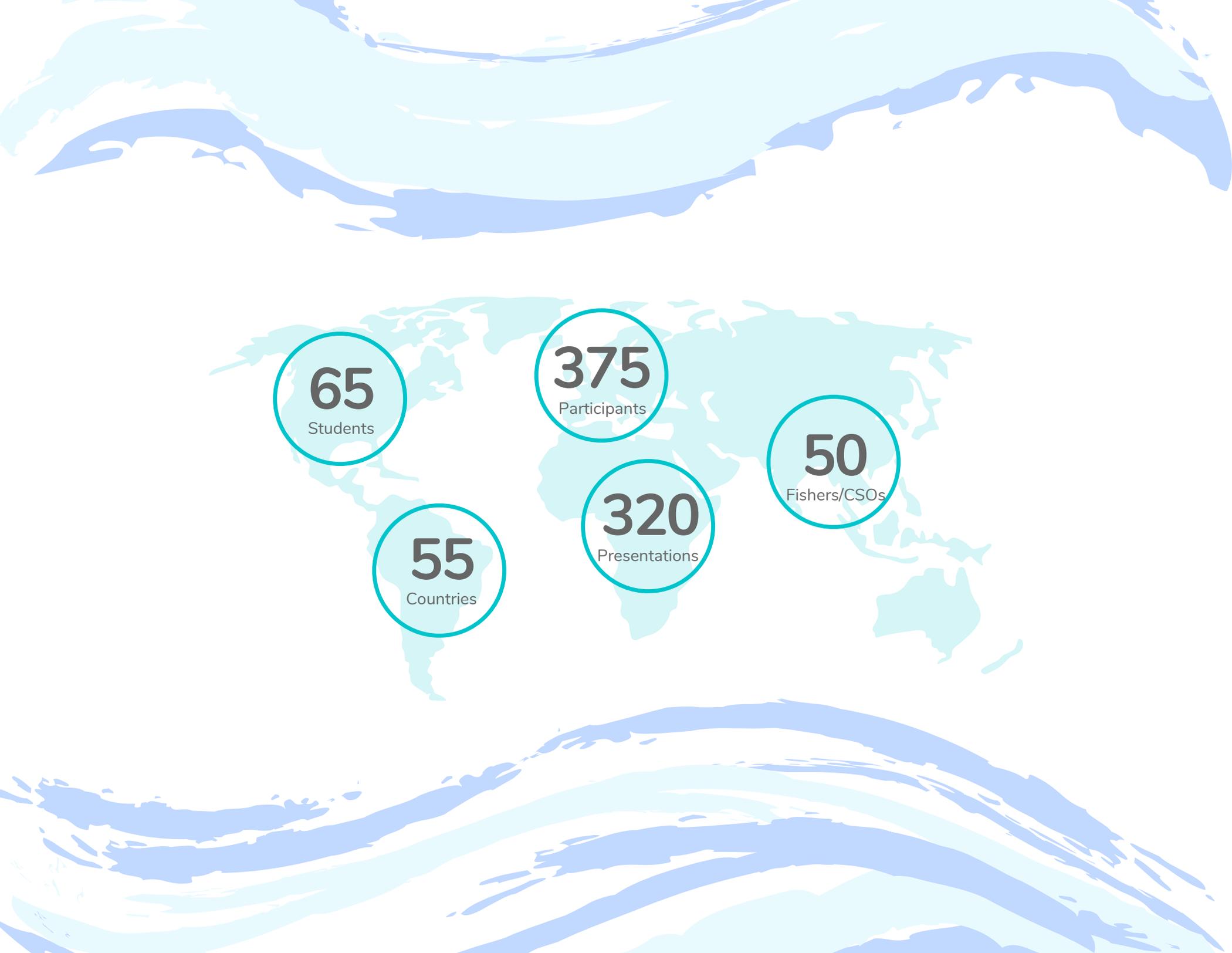
Suchitra Pramanik	Research Scholar, Department of Humanities and Social Sciences, Indian Institute of Technology Kharagpur, India	Fish stories, local, global, past and present: understanding change through narratives	<p>The power of stories is well documented in social science scholarship. In the past, stories were created to transmit wisdom and knowledge from one generation to the other. Analyzing such stories is a unique empirical tool that provides insights into history and culture of communities, their values and belief systems, their struggles and challenges, and their potentials and resilience. Oral narratives also capture contemporary multifaceted realities of a community. A combination of both enables to encapsulate a holistic and integrated picture of a community across temporal trajectories, shedding light on processes of transformation and suggesting best possible actions towards sustainable future. India is a country replete with numerous exciting stories surrounding fishing and fisher communities. We propose to conduct an in-depth analysis of selected place-based stories from Chilika Lagoon, Bay of Bengal, India to develop an initial methodological framework that can help capture processes of transformation involving fishing culture, society, economy and environment. Our focus will be on examining how stories and oral narratives can be used as a powerful tool to understand transformations in the context of small-scale fishery systems. We will include specific attention to examining transformation as it relates to community wellbeing (i.e., material, relational and subjective). This paper is based on archival work and qualitative field research, particularly focusing on stories and oral narratives of the fishing communities in Chilika Lagoon.</p>
Susanne Auerbach	Japanese Studies, Freie Universität Berlin, Germany	“Back to the community” – Current trends in fisheries policy in Japan	<p>Japan has had a long history as a fishing country with it’s heyday in the 1970s as the fisheries nation number one. But due to the development of UNCLOS Japan’s high seas fisheries lost their profitable fishing grounds and consequently experienced a deep decline. To uphold the national production in fisheries products the focus turned back to Japan’s own coastal waters. Here mainly small-scale fisheries operate, organized through fisheries cooperative associations (FCA). But these fisheries have also been struggling with resource depletion, a sinking demand and an ageing population of fishermen among others. Policy makers and fishermen alike have tried to find solutions for those diverse issues. Fisheries policies subsequently changed and now embrace a holistic approach, comprised of technical measures for resource management as well as strategies to include other stakeholders and to revitalize rural areas. In my paper I examine the role of fisheries communities, proposed as an important means to solve the above-mentioned challenges (Jentoft 2000, Pinkerton et al. 1995). Drawing on governmental publications, such as white books and policy records, publications by fisheries organizations as well as material collected during fieldwork, I will, in a first step, define the meaning of “fisheries community” (jp. gyoson) and then proceed to discuss their role in current fisheries policies, focusing on two programs, the “Revitalization plan for coasts” and the “Revitalization of fisheries communities”. I argue that the challenge for small-scale fisheries in Japan lies in the creation of functioning communities to achieve a sustainable use of fisheries resources.</p>
Suvaluck Satumanatpan	Mahidol University, Thailand	Resilience of small-scale fishers in the Gulf of Thailand	<p>Findings indicate that small-scale fishers’ responses to the fishery’s decline are associated with four components of resilience derived from a principal component analysis of 12 resilience items: ability 1) to get work elsewhere; 2) to compete and survive and adapt better; 3) to increase confidence by planning for financial security and learning new skills; and 4) to cope when there is a change. The study indicated that resilience of fishers depends on a combination of several factors. Fishing communities in the developed urban areas have high levels of employment options, as well as competitiveness, survivability and adaptability. Similar to fishers in developed urban areas, those in industrialized, pollution producing areas share the high level of competitiveness, survivability and adaptability, while having low capacity to cope when there is change. In addition, fishers’ age, household income from fishing, education, years of fishing, boat ownership and fishing group membership have varying effects on their perceptions of resilience. Surprisingly, awareness of climate change had no impact on the resilience variables. It is notable that, even though fishery resources have been declining, most fishers continue to fish and do not want to pursue another occupation. The findings from this study can aid in design of fishery improvement and governance programs appropriate to the attitudes, beliefs and values of fishers; hence, increasing the likelihood of their relative success.</p>
Takafumi Yokoyama	Rissho University, Japan	Restoration process and adaptive capacity of fishing communities after 2011 tsunami in Japan: Focus on the role of local fishers restarting local rural economies	<p>Seven years after the 2011 tsunami, coastal fishing communities in northeastern Japan and their fishing activities recover to the pre-earthquake level. On the other hand, restoration processes are not a uniform state, are variable reflecting condition of local fishery and social capital in several fisheries communities. This study clarifies the restoration process of fishing communities in Oshika peninsula, Miyagi prefecture, Japan, focus on the role of local fishers in restarting local rural economies. It then, discusses the adaptive capacity of fishing communities against a tsunami hazards. The Oshika peninsula, where oyster, seaweed farming and fishing are the main economic activities, suffered extensive damages from the tsunami. The Oshika peninsula is located within the Miyagi prefecture, one of the 47 prefecture of Japan, and has an extension of about 20 km coastline, comprised of small bays dominated by rocky or sandy bottom environments. Communities are generally isolated from one another, and local festivals and other events are considered important opportunities for the creation and reaffirmation of community social ties in the region. In Makinohama case, the tsunami also forced fishers to modify the way they harvested and marketed their oysters for the fresh de-shelled market. Without appropriate facilities to de-shell and package fresh oysters, they had lost access to that market. Therefore one of the fishermen in Makinohama, decided to contact the FCA in Hokkaido. After collective discussions, Makinohama fishers decided in May 2012 to ship their oysters live, before reaching market size, to farms in Hokkaido.</p>

Tamano Namikawa	The Japanese Institute of Fisheries Infrastructure and Communities, Japan	The value of small scale fisheries in urban areas	<p>Japan's fishing communities are located every 5.6 km along the coast, including remote islands and peninsulas that are considered disadvantaged areas. Most of fishing communities are small and engaged in coastal fishing. Although the revenue from fisheries is generally low, fisheries and related industries constitute an important industry for the remote islands and peninsulas on which they are based. Fisheries constitute more than 70% of the primary industry in remote islands in Japan. In other words, the importance of fisheries to the local economies of remote islands and peninsulas is verifiable. Conversely, there are also fishing communities that conduct coastal fishing in areas that are undergoing urbanization. In these urbanized areas, fisheries have little impact on the local economy. Nevertheless, it can be inferred that the reason fisheries have persisted in Tokyo Bay, the suburbs of Tokyo, and other urban areas is that small-scale fisheries have social value instead of acting as a primary industry. This paper aims to clarify the social value of urban small-scale fisheries, via the development process of suburban fishing community, Hiratsuka. As seen in this case, when coastal fisheries exist in an urban area, it is significant that community needs are accurately understood and responded to Suburban fisheries have answered the social needs of city residents in response to urbanization and have grown from a primary industry for the production of foodstuff to a tertiary industry providing recreation and food. Thus, they will continue to exist, now and in the future.</p>
Tanya King	Deakin University, Australia	Industry responses to perpetual transformation: Mental health and the Australian fishing industry	<p>Commercial fishers in Australia experience frequent changes to management. These transformations vary in type, degree of impact, and industry response. A 2017 survey suggests that both the changes themselves as well as the anticipation of further changes are a source of significant anxiety in the community, with fishers reporting levels of 'high' and 'very high' 'psychological distress' (using a K10 test) at rates almost double that of the general population. These results merely confirm what has been a well-known feature of the industry for some time. The public naming of the issue, in the mainstream and social media, as well as the recognition of the issue by key government bodies, including the Fisheries Research Development Corporation, and the departments responsible for fisheries, and for health, has prompted action on behalf of industry to address the issue. This paper will consider two of the key industry-driven responses to the crisis of poor mental health in the Australian fishing industry. First, I will describe the mobilisation of the Tasmanian (state) fishing community around the issue, including their fund-raising efforts and their partnering with an existing wellbeing provider. The second will present a national strategy driven by Australia's fishing women's organisation, that draws on the candid reflections of several fisherman 'ambassadors' to highlight the impact of suicide in the community. The goal of the national campaign is to advocate for the mental health of seafood communities to be taken into account when designing future management transformations.</p>
Tara Sayuri Whitty	IUCN, Myanmar	Transformations in managing Myanmar's small-scale fisheries: An overview	<p>It truly is a dynamic time for fisheries governance in Myanmar, with recent and ongoing changes to national policies, newly developed state and regional laws, and the formation of Union and State/Region-level Coastal Resource Management Committees. While these changes signal great opportunity for co-management of local small-scale fisheries, it is also necessary to establish processes and capacity for co-management in the Myanmar context. The various groups linked to the Myanmar Fisheries Partnership (MFP) are working toward this goal through diverse projects. Wildlife Conservation Society (WCS), Pyoe Pin Institute (PPI), and Rakhine Coastal Region Conservation Association are implementing an inshore fisheries co-management pilot project in Rakhine State. Network Activities Group (NAG) and PPI have been active in Rakhine State and Ayeyarwaddy Region, organizing fishers, using SSF Guidelines as a policy advocacy tool, and developing state/regional policies and fishery partnerships. WorldFish works with Department of Fisheries (DoF) on inland fisheries in the Dry Zone and Ayeyarwady Delta area. Danish International Development Agency works with a focus on capacity- building of DoF staff for sustained management effectiveness. FFI's work with the DoF, regional government, and local communities in the Myeik Archipelago resulted in the endorsement of Myanmar's first Locally Management Marine Areas in 2017. In Mon State and Bago Region, the Swiss Agency for Development and Cooperation's Gulf of Mottama Project is a cross-sectoral project on fisheries co-management and livelihoods improvement, implemented by Helvetas, NAG, IUCN, and Biodiversity and Nature Conservation Association. These projects represent efforts to take advantage of emerging opportunities to shift Myanmar's SSF toward greater equity, representativeness, and sustainability.</p>

Thamasak Yeemin	Ramkhamhaeng University, Thailand	Impacts of marine shellfish collection on coral reefs in Thailand	<p>Top shell (<i>Tectus niloticus</i>, family Tegulidae) and spiny oyster (<i>Spondylus cf. versicolor</i>, family Spondylidae) are economic shellfish found in tropical coral reefs with shallow waters. Because of its high economic value, the shellfish were usually harvested by small-scale fishers. In this study, we analyse the possible impacts of the shellfish collection on coral communities using Ko Si Chang Group as a case study. Ecological surveys were done during 2008 – 2016 to observe the long-term change in abundance of the top shell and spiny oyster while in-depth interview with the fishers were also conducted. Based on the survey, the population density of the top shell drastically declined from 65 ind.100 m⁻² in 2008 to 5 ind.100 m⁻² in 2016 while the density of spiny oyster slightly reduced from 143 ind.100 m⁻² in 2008 to 121 ind.100 m⁻² in 2016. Currently, only 3 – 4 small-scale fishers in Ko Si Chang Groups collect those shellfish by free-diving. Yet, as much as 50 – 60 kg of the shellfish per fisher per day were harvested. The average selling prices ranged from 5 – 6.5 USD per kg. In terms of ecological impacts, greatly reduced abundance of the top shell may alter the balance of algal dynamics since the shell is one of important grazers in reef systems. Overgrowth of algae may also affect coral growth and recruitment. The spiky oyster generally attaches on coral colonies so physical damage on the corals can be occurred because digging tools are usually used to harvest the shellfish. This research provides baseline information for future research and policy formulation to support ecological and fisheries sustainability.</p>
Thaung Htut	Wildlife Conservation Society (WCS), Yangon, Myanmar	Piloting inshore fisheries co-management in southern Rakhine State, Myanmar	<p>In support of ongoing fisheries reform efforts in Myanmar, WCS and local partners have been developing an inshore fisheries co-management demonstration project involving 10 coastal communities centered around Kyeintali in Gwa Township, southern Rakhine State. With funding from the UK's Darwin Initiative, WCS is working with the Rakhine Coastal Resource Conservation Association (RCA) and other partners (Pyoe Pin, University of Exeter) to understand the communities' socioeconomic situation and analyze their current and historic fishing practices. We have mapped fishing grounds and compiled information on preferred gear types, targeted fish species, and seasonal fishing activities. We also installed vessel monitoring systems to track fishing boats – which confirmed the data gathered from participatory mapping and helped further define the community's fishing grounds. These activities aided us in identifying a co-management area and establishing a new fisheries association – the Kyeintali Inshore Fisheries Co-management Association (KIFCA) – comprised of 20 representatives from each of the participating villages (one man and one woman) to collaboratively oversee the area. Within the 280-square mile co-management area, specific zones – such as no take zones, seasonally-closed areas, and gear-restricted areas – have been delineated by the communities themselves and a co-management plan drafted to guide implementation. On August 8 Myanmar's Department of Fisheries formally designated the Kyeintali co-management area, one of the first such arrangements in the country. This is just the beginning of the process and additional efforts will be needed to continue supporting co-management implementation and strengthening of KIFCA in order to present a successful model that can be replicated across Myanmar. This presentation will provide an overview of the co-management demonstration process in Kyeintali, lessons learned to date, and implications for further replication in the Myanmar context.</p>
Thierry Frédou	Universidade Federal Rural de Pernambuco (UFRPE), Brazil	Ichthyofauna bycatch of the artisanal fishery of penaeid shrimps in of Pernambuco, Northeast of Brazil	<p>The shrimp trawl fisheries are highly efficient at catching the target species. It is also an unselective gear that commonly catches unwanted organisms. The present study aims to describe the composition of ichthyofauna caught by the shrimp trawling in Pernambuco. Sampling was carried out monthly between August 2011 and July 2012. The composition of the fish community was described using relative abundance, in number (%N) and weight (%W), diversity indices and nMDS ordination. The monthly fish catch rate was evaluated by the Capture-Per-Unit-of-Area (CPUA) and compared to the shrimp rate. A total of 9,723 fish were captured, distributed in 17 families, 38 genera and 51 species. Shrimps dominated the catch all year round while sciaenids dominated the bycatch. The proportion target species: bycatch in weight was of 1:0.39. Although univariate community indicators (S, D, H') remained stable along the year, multivariate analysis unveiled a seasonal succession of species dominance following the rainfall annual cycle. The high overlap of the catches rates between shrimp and sciaenids is mainly because shrimps are important prey items for sciaenids feeding. The bycatch observed in Pernambuco was lower than in other regions around the world and in Brazil. Sirinhaém bycatch is often used by the local community as additional source of food and income. Nevertheless, incidental catch may change drastically the ecosystem functioning by removing key species mainly juveniles. A recent international initiative coordinated by the FAO was set up in Brazil to reduce bycatch in the artisanal trawling activities by using bycatch reduction devices (BRD).</p>

Timothy B. Werner	Anderson Cabot Center for Ocean Life, USA	Report from a FAO workshop on reducing marine mammal bycatch in fishing and aquaculture operations	<p>In 2018, the Food and Agriculture Organization of the United Nations (FAO) held a workshop to review means and methods for reducing marine mammal mortality in fishing and aquaculture operations. A key objective of this review was to provide guidance to the fishing industry and governments about techniques for reducing marine mammal bycatch. Among the topics covered were acoustic deterrents, physical modifications to fishing gear and how it is deployed, and the prospect of switching gear types that maintain commercially viable catches while reducing bycatch. There have been a number of initiatives at national, regional and international levels to address the issue of marine mammal bycatch, including the FAO's International Guidelines on Bycatch Management and Reduction of Discards, which address the broader issues of bycatch. The FAO's Committee on Fisheries (COFI) constitutes the only global inter-governmental forum where major international fisheries and aquaculture problems and issues are examined and recommendations addressed periodically to governments, regional fishery bodies, NGOs, fish workers, FAO and the international community. COFI is also a forum in which global agreements and non-binding instruments are negotiated. These factors make FAO well placed to provide guidance and assistance to Member States on marine mammal mortality related to capture and culture of marine species. The results and outputs from this workshop will be presented and include reference to means and methods which may specifically impact small-scale fisheries.</p>
Timothy B. Werner	Anderson Cabot Center for Ocean Life, USA	The implications of multi-disciplinary research in a small-scale Argentine gillnet fishery for reducing bycatch of threatened species	<p>Small-scale fisheries around the world contribute to unsustainable bycatch of threatened marine mammals and other species. Artisanal gillnet fisheries in northern Argentina kill Franciscana dolphins (<i>Pontoporia blainvillei</i>) at numbers that are not sustainable this coastal dolphin, the most endangered marine cetacean in the southwest Atlantic. For over a decade, local and international researchers have established a collaborative program with fishermen to evaluate several techniques for reducing Franciscana bycatch while maintaining a commercially viable fishery. The focus has included testing different acoustic deterrents, changing gillnet mesh size, evaluating both acoustically reflective and physically stiffer gillnets, and comparing the catch and bycatch between traditional gillnets with both experimental handlines and fish pots. These studies have included economic assessments of using different types of fishing gear. The results of these trials challenge the assumption that some relatively high cost methods for reducing bycatch (pingers) are not appropriate for small-scale gillnet fisheries, and highlight the economic and bycatch reduction benefits from switching out gillnets for different types of fishing gear. Government fisheries managers have used this research as the basis for promoting bycatch-safe fishing methods through new regulatory instruments and securing international funding to support their implementation. This long-term project demonstrates how a multi-disciplinary strategy combining marine mammal science, fisheries engineering, economics, and policy can achieve the goals of bycatch reduction and maintaining the livelihoods of local fishing communities. The lessons can inform other small-scale fisheries that face what seem to be overwhelming challenges in reducing bycatch while meeting basic subsistence and commercial needs.</p>
Wichin Suebpala	Ramkhamhaeng University, Thailand	Management of wedge clam resource in Thailand	<p>Due to the great demand of wedge clam, <i>Donax scortum</i> (Linnaeus, 1758), heavy exploitation of it has been occurred affecting their abundance. However, the knowledge on this is generally limited making it difficult to achieve sustainability of the wedge clam resources. In response to this, we apply a transdisciplinary approach to support the effective management of the wedge clam resource in Thailand by conducting ecological and socioeconomic surveys at Pak Meng Beach, Trang Province, during November 2016 to March 2017. This study aims to illustrate the importance of clam fishery and to analyze the current state of the fishery based on the fishers' point of view. In-depth interviews were conducted in 2016 with fishers who involved in the wedge clam fisheries in Hat Pakmeng Beach, Sikao District, Trang Province. Based on the interviews, all fishers agreed that the wedge clam fishery is important for their livelihoods in terms of food source and household additional income. High proportion of female fishers (>80%) reflected the high level of women participation in this fishery. Most of the fishers pointed out that the declines in abundance and individual size of clam are currently observed. These could be mainly resulted from the growing number of fishers collecting the clam. To conserve this clam, the respondents recommended to establishing some no-take areas and appropriate size of the clam for harvesting to increase the clam abundance along with enhancing the fishers' awareness. This information serves as a basis for further policy formulation and decision-making on the conservation of wedge clam.</p>

Wilson Mhlanga	Institute for Poverty, Lands and Agrarian Studies. University of the Western (UWC), Cape Town, South Africa	Transnational Governance of the Kapenta (<i>Limnothrissa miodon</i>) fishery on Lake Kariba, Zambia/Zimbabwe: Towards transdisciplinarity in fisheries management	The Kapenta fishery on Lake Kariba, a man-made lake, is based on the freshwater sardine <i>Limnothrissa miodon</i> that was introduced from Lake Tanganyika. Sustainable (Optimum) harvesting levels (fishing pressure) have been determined using information from biological and economic assessments. Despite efforts to control fishing effort at levels that would give optimum yield levels, annual fish landings and catch per unit of effort continued to decline. In an effort to improve fisheries management, co-management was introduced in both countries. However, there was no uniformity in the implementation of co-management on either side of the lake. After the adoption of co-management, while there was improved participation of resource users in resource management, some management challenges remained unresolved. Although the co-management approaches created mechanisms for fisheries managers to consult with resource users, allocation of access rights (in both Zambia and Zimbabwe), and law enforcement, the arresting powers (in Zimbabwe) remained a preserve of government. The legislative reforms in Zambia and the formulation of a draft Fisheries and Aquaculture Policy in Zimbabwe, provide an opportunity to transform the management of the fishery in order to achieve more effective governance. We propose that in order to address the current management challenges, a transdisciplinary approach to fisheries management needs to be adopted. This requires collaboration among a wider range of stakeholders. The collaboration would entail transforming the management tools so that they incorporate input from all stakeholders.
Xavier Tezzo	WorldFish, Myanmar & Wageningen University, The Netherlands	Re-assessing Fisheries and Aquaculture Development Policies in Asia: Adopting a Fish Food System Perspective on the Aquaculture Transition	This study analyses contemporary governance tensions in the domestic spaces of the aquaculture transition. Starting from the realization that there is a perceptible degree of fragmentation in associated development policies, the study proposes to investigate the framing of development issues by major transnational fisheries research policy organizations advocating in these spaces. To that end, the fish food system is advanced as a framework articulating domestic practices of production, system of provision, and consumption, enabling greater consideration for fish as food and dynamics at play in the domestic spaces of the aquaculture transition. By systematically ascertaining the logics of dominant fisheries and aquaculture development policies through the lens of the fish food system, we provide a critical reflection on development policy coherence and the conjectured role of the sector towards the central imperative of (fish) food security.
Yiming Luo	China Blue Sustainability Institute, China	Scoping of small scale fishing in Hainan, China	Hainan Island, the second largest island of China, is our southernmost province with rich and varied culture in separated indigenous fishing villages. There exists 68 natural harbors along the coast of Hainan island and 830,000km2 of fishing grounds. Whereas, most of the vessels are equipped with traditional fishing gears that can only be utilized in limited near shore areas. It is reported that in recent years overfishing and other anthro pic activities have contributed to a decrease in average age and size of the harvest. In this study, we have carried out a survey in miniature harbors along the coast of Hainan Island, identifying the main harvest species, the number and type of gear and vessels, cultures, traditional ecological knowledge, and economy of indigenous fishers. By understanding how the small-scale fisheries are running and the fishers are organized, we are trying to develop a collaborative mechanism to facilitate pro-sustainability transformation of small-scale fishery among all involved stakeholders including government, research institutions, fishmongers etc. On the other hand, Hainan attracts millions of tourists every year with scenery and seafood. Recreational fishing, as alternative livelihood for fishers, will be scoped for its feasibility and potential impacts during the study. With analysis on local economy and community, we can offer fishers and local government scientific advices and provide guidance for fishery management and future study on transformation of small-scale fishery in China.
Yinji Li	Tokai University, Japan	A new role for fishermen's side in Japan: Fisheries to Umigyo, fisheries governance to coastal governance	In regard to the international movement of coastal governance, awareness on the concept of coastal governance has increased rapidly in Japan, and there are various initiatives and efforts about coastal governance among government and private sectors are seen these days. However, the legal framework with practicability has not been prepared, and it's the current state that a unified view especially about the governance body, namely, who should undertake the role of the governance isn't obtained. For instance, there are arguments saying that the fishermen's side who possess the high priority with fishery rights in coastal use, plays a leading role in fishery resource governance should perform the key role in coastal governance. On the other hand, while the negative factors regarding fisheries, such as the decrease of fishermen, slumps in operation of fisheries cooperatives, lowering regional vitalities etc., became more serious with the background of industrial reduction in Japanese fishery, there are also people arguing that fishery is the one often disturbs harmonized coastal use due to its strong right, and questioning fishermen's ability on coastal governance. With the circumstances of restructuring of coastal industries is taking place, and the fishery is being transformed into a new industry, Umigyo (Various economic activities led by fishermen, utilizing various local resources) today in Japan, this study aims at analyzing the terms and conditions for transformation of fishermen's role from fisheries governance to coastal governance, as well as verifying the possibility of the new role for fishermen's side.

A stylized world map in shades of blue and teal, with abstract brushstroke-like waves at the top and bottom. Five circular callouts are overlaid on the map, each containing a large number and a smaller label below it. The callouts are positioned over North America, South America, Europe, Africa, and Asia.

65
Students

375
Participants

50
Fishers/CSOs

55
Countries

320
Presentations