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Fisheries Governance: The Search for Effective Management and the Illusion of Control

Gert van Santen[1,2a]

[1] World Bank (ret.), [2] Ocean Learning Partnership, Newfoundland

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The fish we catch are a very small part of all creatures that live in the oceans. Once put on land many fish products circulate in complex auction, processing, distribution and consumption patterns. The history of 'governance' of marine fisheries includes cases that are considered clear successes—the global effectiveness of the International Whaling Commission—and others resulting in abject failure like the cod fishery near Newfoundland; most documented cases seem to straddle somewhere in between, a fisheries purgatory.

This essay suggests that the outcome of our focus in the recent past: i.e., to privatise fishing rights in mostly advanced economies and apply theories and markets maximizing single objectives has been a mixed bag. To better address evolving energy efficiency requirements, strong demands to protect the marine environment and coastal communities, and international political developments an approach will be required in the future whereby multiple parties are given more responsibility to negotiate a politically acceptable consensus defining the—short and long-term—future of the sector and its governance.

We consume fish, just as our ancestors did. Some scientists suggest that fish consumption contributed to the amazing growth of the brain of *Homo sapiens* compared to our fellow humanoids (Crawford et al. 1999). That growth allowed us not only to react to immediate dangers—as most animals can—but also to develop abstract thought, to reason, and to find explanations for what we could observe. We learned—combining history lessons, beliefs, the recent experience of others, and our own observations—and in conflicts, we negotiated solutions. And we made mistakes, followed faulty judgments, ignored inconvenient facts, and considered simple answers for what could be highly complex situations and problems.

For many centuries, communities exploited marine and inland waters mostly as "commons," whereby social control often governed access. Members balanced current and future consumption, income, and social and cultural concerns against the perceived risks of not maintaining the wealth of local resources. When fish were plentiful, community ownership satisfied multiple social requirements. However, when external factors—population growth, intruding fishermen, new technologies, external ownership claims, ecological changes—interfered, open access increasingly replaced community ownership; ultimately, private ownership of a share of current and future catches became the preferred governance ideal to ensure better control. However, this approach largely ignored the increasingly pressing local community needs of rapidly expanding small-scale fisheries in less wealthy countries, where control appears a more distant illusion.

The fish we catch are a very small part of all creatures that live in the oceans.[1] Once on land, many fish products circulate in complex auction, processing, distribution, and consumption patterns. The history of "governance" of ma-

a https://www.linkedin.com/in/gert-van-santen-54181913
Former director, Oceans Learning Partnership, https://www.linkedin.com/in/gert-van-santen-54181913.
Correspondence: fishless4@ziggo.nl

1 Annual global marine primary production of organic compounds is estimated at 35–50 billion tons. The present catch of marine fish species totals close to 100 million tons (FAO: *The State of World Fisheries and Aquaculture,* 2000), or about 0.25 percent of all organic production.

rine fisheries[2] (Chuenpagdee and Song 2012) includes cases that are considered clear successes—the global effectiveness of the International Whaling Commission—and others resulting in abject failure, such as the cod fishery near Newfoundland; most documented cases seem to straddle somewhere in between, in a fisheries purgatory. In the past, and definitely today, we have organized the governance to manage exploitation of specific fish species in ways that too often ignore or downplay the wicked problems of satisfying the (sometimes mutually exclusive) multiple interests of all actors in the fishery (Dankel, Skagen, and Ulltang 2008). These actors interact with fish populations in the oceans, operate fishing fleets, and run supply services, product processing, and distribution under an umbrella of regulations, policies, financing, and trade restrictions[3] (De Steenhuijsen Piters 2023).

This essay suggests that the outcome of our focus in the recent past—that is, to privatize fishing rights in mostly advanced economies and apply theories and markets maximizing single objectives—has been a mixed bag. To better address evolving energy efficiency requirements, strong demands to protect the marine environment and coastal communities, and international political developments, an approach will be required in the future whereby multiple parties are given more responsibility to negotiate a politically acceptable consensus defining the (short- and long-term) future of the sector and its governance. One of the positive examples in that direction is the International Council for the Exploration of the Sea (ICES), supporting improved management of EU fisheries. In the United States, the Magnusson-Stevens Act forced the permanent consultation of many parties involved in US marine fisheries, with mostly positive results. The track record of applying the same single objective management theories in coastal zones in economically less advanced countries appears worse, reflecting the complex challenges myriad coastal communities are facing. We have, sometimes stubbornly, been applying simple theories to manage dwindling fish resources and controlling illicit fisheries with limited success. Creating employment and income outside the sector should have been given the highest priority, in the past and even more in the future.

The almost complete extinction of the North Atlantic right whale (*Eubalaena glacialis*) population during the last century and the collapse of the Atlantic cod (*Gadus morhua*) population around Newfoundland before 1992 are some of the more notorious examples of the virtual disappearance of a fish population because of excessive human fishing efforts.[4] The California sardine fishery collapse is less well known. Around the middle of the 1930s, close to 800,000 tons of Pacific sardines (*Sardinops sagax*) were caught annually and canned in 2.5 million cans and processed into fish meal and oil around Monterey Bay, California. At that time, it was one of the largest single-species fisheries in the world[5] (Rumminger 2009), providing local employment for an estimated 100,000 people. Despite measures to control catches—in retrospect quite simple and often ignored—production initially declined by half in 1947, and the sardine population collapsed completely after 1952. Fishing was formally prohibited only after 1963. Edward Flanders Robb Ricketts, biologist and philosopher, famous as the partly fictionalized "Doc" from *Cannery Row* and several other Steinbeck novels, reportedly said the sardines were "just gone." Later research (Davis 2002) indicated that high demand for canned fish, fish meal, and fish oil drove excessive vessel and shore-based investment and catches, implying the questionable effectiveness of the prevailing governance model. Changes in ocean temperatures, the natural cycle of the fish, and pollution in Monterey Bay were also to blame. Canneries tried to switch to tuna as raw material but closed one by one, the last in 1973 (Fitzgerald 1979). The cannery site currently houses the Monterey Bay Aquarium, a well-known tourism spot.

Fishing has been characterized as the second oldest profession; fishing gear and fish consumption can be traced to at least the middle Paleolithic.[6] Human efforts to "control" catching of fish—and ensure current and possibly future consumption—have been documented in some countries until the Middle Ages (Kada 1984);[7] unwritten traditions existed in many others. They developed particularly in areas where communities relied on fish as their major source of protein, such as the islands in the Pacific Ocean, and similarly in Japan[8] (Ota 2007), areas that, because of the limits of distance or technology, did not face the impact of external "agents" on their commons. Pacific Islanders orga-

2 They wrote: "… Fisheries governance has relied heavily on the creation and evolution of institutions, especially those related to property rights and access rules. Defined in its most generic form as structural constraints that provide regularities, reduce uncertainties and shape people's interactions, whereby institutions create an enabling or controlling environment for specific governing actions and decisions to take place. A growing body of literature is calling, however, for a broader notion of institutions that can deal with the social, cultural and historical aspects of fisheries, including meanings and values, trust, and norms."

3 Food systems deliver *outcomes*, are influenced by *agents*, operate through *intermediaries*, engage *value and capital chains*, and experience the impact of multiple *drivers*.

4 Major efforts during the past thirty years to enable cod stocks to rebuild have had only modest success.

5 Compared to the 7 million tons catch of the Peruvian anchoveta in 2018, the catches of Pacific sardines off California still appear modest.

6 Carved bone showing rod and line fishing, Japan, 27,000–29,000 BC.

7 Another source may be the *Taiho-Ritsuryo, a code of conduct of traditional practices*.

8 The increase of the number of fish traders providing credit during the mid-Edo period (seventeenth century) caused the difference between poor and rich fishermen to substantially increase and local fish consumption to decline.

nized not only clearly circumscribed activities for fishermen but equally the distribution and sometimes processing of the catch. The desired outcome—dependable fish consumption for everybody—was well-defined and relied on the assumption of joint community access to their coastal zone. Religious ceremonies limited the perceived risks of upsetting the natural order of the ocean, seeking approval for and justifying the rules that secured current and future fish consumption. These traditions usually dissolved once the waters around the islands were being visited regularly by external agents: foreign fishing vessels[9] (Christensen and Tull 2014). Foreign donors and local NGOs are currently trying to reintroduce practices that reflect past traditions in local fisheries.

Every fisherman, industrial or small-scale, assesses how, when, and where fish are most likely to be caught. They evaluate the experience of trusted colleagues and their own catch history when determining where to fish. Even now, with highly effective electronic fish detection equipment in virtually every wheelhouse, they always select areas they perceive as having the highest potential. Many, particularly small-scale fishermen, depend on income from fishing and have been reluctant to admit and accept a major decline of their target fish resources. Opinions of fishermen and scientists about the health of individual fish populations have a history of being at loggerheads. Scientists themselves have over time nurtured quite diverse opinions over the status of fish populations. T. H. Huxley (1825–1895), who served on three British fishing committees—and was a strong defender of Charles Darwin's theory of evolution—argued in 1883: "*The cod fishery, the herring fishery, the pilchard fishery, the mackerel fishery, and probably all the great sea fisheries, are inexhaustible: that is to say that nothing we do seriously affects the number of fish. And any attempt to regulate these fisheries seems consequently, from the nature of the case, to be useless*" (Graham 1943). Early in the twentieth century, the Danish scientist Petersen (1903) and the Russian Baranov (1926) were the first to document that regulation of fishing may be desirable as technological developments—steam power, improved net design and materials, and more effective preservation—suggested the need for some regulation. Analysis of the impact of fishing on fish resources blossomed immediately after World War II and initially focused on already heavily exploited whale populations and resources in the North Sea and on the East and West Coast of North America. Scientists still use the principles of catching "surplus growth" to optimize a single objective: the weight of the entire annual fish catch from a single fish population. R. Hannesson, a fishery economist, wrote in 2021: "*... a surplus growth will be generated if fish stocks are reduced below the upper limit set by nature. This surplus growth can sustain fishing forever without endangering the continued existence of the fish population*" (Hannesson 2021). It implies that a fishery will yield its maximum physical returns—maximum sustainable yield (MSY)—if all fish are allowed to grow to the point where the rate of increase in weight just ceases to outstrip losses due to natural mortality and predation and are then harvested; this happens when the total fish population weight is about half of the unexploited population. The focus on the weight of the catch did create multiple questions that even today have yet to be fully resolved[10] (Kolding Jeppe et al. 2012).

Economists, worried about the lack of economic considerations in the scientific analysis, linked fish population dynamics to economic principles in *bio-economic models*. Like the scientists, they aimed to achieve an "economic" optimum for a fishery: maximum economic yield (MEY). The models made it theoretically easy to calculate how to maintain the wealth of a single fish population or fishery by optimizing its "rent," the excess economic return of the fishing fleet over the "average" return on invested capital in the economy[11] (Arbuckle 2012). In theory, application of MEY principles for most fishing activities on individual species would result in a lower level of resource exploitation—and more robust fish populations—compared to the application of MSY principles.

Early on, economists[12] did argue that bio-economic analysis should not ignore other factors, such as local employment and income; social, cultural, and even moral concerns of fishing communities; and, more recently, even the role of political and macroeconomic considerations in sector governance (Van Santen 2006). In 1981 Peter H. Pearse, commissioner of the Commission of Pacific Fisheries Policy, analyzed the crisis in Canada's Pacific fisheries (Pearse 1981). He listed at least seven governance requirements that a future fisheries management system and sector policies should address: resources conservation, economic efficiency, flexibility, security, public revenues, social goals, and simplicity. He formally acknowledged the existence of multiple objectives of many stakeholder groups, and assessed how parts of a governance "process" could achieve politically acceptable solutions. Unfortunately, once bio-economic models dominated research and decision-making, the need to formally incorporate multiple stakeholder

9 The expansion of the Japanese tuna fishing fleet in the Pacific started after the Treaty of Versailles (1918) transferred former German colonies in the Pacific to Japan.

10 The study asked: What size of fish should be targeted, and, if fishing gear catches multiple species, which species should determine total catch levels, and what would be the relative importance of the protection of other species? More fundamentally: What should an ecosystem look like?

11 Arbuckle (2012) analyzed the development of the fishery "asset" over time by assessing the total (market?) value of all "quota," or the total annual rent available from the fishery divided by the discount rate.

12 Of the long list of early authors, M. Schaefer, H. S. Gordon, J. A. Crutchfield, and later B. Hersoug and A. Charles require specific mention.

ITQs: A Panacea for Some

Limiting the total catch and optimizing the value of a fishery requires the annual definition of the volume of the total allowable catch (TAC) for most commercially important individual fish populations, and the distribution of individual tradable quota (ITQ). The latter provided the right to the holder to catch a percentage of the TAC. Since the TAC is being adjusted each year, so does the allowable catch of an ITQ. Trade of ITQs on a market allows fishermen to buy or sell in line with their actual catches. ITQs were initially mostly distributed to all existing fishermen/vessel owners based on an estimate of their historic individual catches. As the size of many TACs declined to reduce the impact of excessive exploitation of specific fish populations in the past, less effective and (often) small-scale fishermen sold their ITQs. In most (developed) countries that introduced a form of market-based ITQ rights system, the role of small-scale fisheries declined, and so did sector employment. In these countries, the negative social impact of introducing ITQ-based systems has been somewhat reduced by local social security systems and targeted public support. Still, the social and cultural impact of the introduction of ITQs on traditional coastal fishing communities has often been devastating.

concerns as part of the governance process received less priority. Like their scientific colleagues, economists often avoided formally considering the economic importance of all activities that occur on land before fishing vessels depart and after the fish has been landed[13] (Gillett and Lightfoot 2001). The preferred governance model of fisheries in more advanced economies and mostly temperate waters gradually inched toward maximizing a single objective, MSY or MEY, creating market-based management systems that could function almost autonomously and improve compliance and enforcement. A bio-economic model to assess both human and natural changes resulting from modification of the marine ecology, fishing practices, fishery policies, the economy, and trade and social conditions has been available for over a decade, but its application in real life remains pending.[14]

Introduction of market-based fishery governance started in New Zealand, Iceland, and Norway during the 1980s. Start-up required several conditions to achieve sufficiently sturdy political and stakeholder support to introduce fundamental change.[15] Consensus was usually initiated by a fish resource crisis and increasing costs of traditional sector support measures,[16] notably subsidies and research.[17] Acceptance of a market-based management system also required sufficient belief in the model predicting its benefits (World Bank 2017). Negotiations to define public and/or private support measures—and money—for the initial *losers* proved critical. Each country also created or adjusted an organization to supervise administration of the system, including a market for tradable fishing quota.

After multiple start-up problems (Hersoug 2002), ITQ markets did demonstrate economic and resource improvements. Many individual fish populations recovered. The accumulated (financial) sector wealth generated by the ITQ system sometimes provided benefits to the actual fishermen, but companies, external investors, and the marketing chain benefited most. Separately, the implementation of ecolabels, like the Marine Stewardship Council (MSC) label, has had some impact on consumer selection of fish products and indirectly on management effectiveness in many more fisheries. The relatively high financial costs of introducing and inspecting labels for the industry have been drawbacks.

Who really controls parts of the system—and who benefits most from its outcomes (and who doesn't)—is often not transparent. When top predators are being overfished, species at lower trophic levels in the food web may be caught and find markets. Fishery economists have tried to reflect this complexity in their models, but translating the model theory into real-world negotiations has been a struggle.[18] Still, historic examples of reasonable control of the complexity of the sector do exist, such as the largely forgotten example of the Dutch herring fishery and the experience of the Japanese fishing sector.

Given its 280-year existence, the College van de Groote Visscherij (Authority for the Distant Fishery) (Stam 2011) may well have been one of the first effective fishery governance systems. It controlled the North Sea herring (*Clupea harengus harengus*) fishery and trade. This public-private cartel, authorized and encouraged by the Dutch govern-

13 In many national income accounts, fish processing and marketing, shipbuilding, and supplies to the sector are labeled as general industrial activities; the contribution of the fishing sector is listed separately but is limited to actual fishing activities.

14 The ECOST approach, an interdisciplinary policy-research approach developed by the University of Portsmouth.

15 Australia and to a lesser extent the United States and the European Union.

16 Often by political parties pursuing a more limited role of the public sector.

17 Sumaila et al. (2012) estimated global marine fishing sector subsidies on the order of $27 billion in 2012.

18 The introduction of an EU-wide fishery management system governed from Brussels has taken more than twenty years. It still requires major adjustments, in part forced by a growing understanding of the limits of fishery economics theory, political developments, and the impact of climate change.

ment,[19] operated successfully until 1857. At the pinnacle of its power, during the early seventeenth century, the Dutch herring fleet of over 750 specialized herring vessels (*buizen*) caught over 40,000 casks of herring annually and contributed about 9 percent to gross domestic product (GDP). Herring was also a major component of the Dutch foreign trade. The sector employed about 20,000 fishermen and 60,000 people on shore (Sicking 2009), a sizeable share of the Dutch population of about 1 million.

The long-term health of the herring fishery required development and control of (export) markets, maintaining product quality and prices. The Authority became a powerful combination of a "herring ministry" and industry organization. It rigorously enforced its policies and regulations and sometimes curtailed or expanded production depending on market absorption and the willingness of rich citizens to invest in individual fishing trips. During its existence, the Authority monitored catches but did not have the scientific tools to assess the health of the herring population; stocks fluctuated but never collapsed. During the nineteenth century, the role of the Dutch in the North Sea herring fishery and international trade declined. Vessel technology improved while market conditions, foreign competition, and trade arrangements evolved. The Authority appeared unable to adjust its policies to accommodate those changes. At present, mostly foreign fishing vessels catch herring for human consumption in the Netherlands.

Like the Dutch, the Japanese crafted their fisheries governance system over multiple centuries. Unlike the Dutch, they had to carefully manage their quite limited coastal fish resources. During 1901–2002 they transformed existing traditional practices through many legal iterations into a complex regulatory framework for community-based fisheries, offshore fisheries, and "free" fisheries (Matsuda 2005). The Fisheries Law of 1949 was of particular importance to address a crisis of overinvestment and resource depletion after World War II, and aimed at rebuilding and strengthening the role of fisheries cooperative associations (FCAs) (Ota 2007). While Japanese sector-governance policies were issued at the national and the prefectural levels, they fundamentally reflected the historic decentralization of most sector-governance responsibilities, linked to an intricate system of conflict resolution. FCAs still are not only responsible for the management of coastal fish resources and supply of fish products; they also maintain local culture and enhance environmental security as well as national security. They handle local auctions and fish processing and provide multiple services, even rental, credit, and insurance activities and education for fishermen. FCAs jointly assess the state of local fish resources and establish catch limits; they operate multiple fishing effort restrictions, protect fishing grounds from pollution, construct artificial reefs and man-made spawning and nursing grounds, and operate surveillance to prevent poaching. They also support fish culture. The Japanese governance system has quite successfully balanced multiple interests that impact the long-term health of the fishing sector as well as its daily operations. Like any complex system, Japanese fisheries are not immune to the impact of external *agents*. The system particularly suffers from a growing lack of fishermen (and women), as the average age of fishermen rises beyond retirement age.[20]

A simple comparison of the efficiency—or success—of aiming at a single objective or a multi-objective community-based approach in sector governance requires elaboration. Research suggests that at least eight factors appear to contribute most to the relative success of fishery sector governance: well-defined user rights; elaborate co-management, including compliance and enforcement; some understanding of the biology and marine environment and some luck; clear policy frameworks; understanding of stakeholder perceptions; and inclusion of multisectoral approaches (Bennett 2005). Multiple studies indicate that other factors, such as leadership qualities, also play a role. If the continued health of individual fish populations and a decent economic return are the desired single management and policy outcomes at the national level, an ITQ-based market system, *provided it is well administered*, can do the job in temperate waters. For fish stocks shared by multiple countries and exploited by different technologies, a simple market-based approach has demonstrated practical drawbacks. The long-term process of building political consensus, regulations, and multinational institutions to organize a more equitable negotiated exploitation, ongoing for Pacific and other tuna stocks and fish stocks for which the European Union is responsible, may be a better approach, but experience suggests that it can face serious political and financial hurdles. When the fair distribution of sector benefits and long-term security of coastal communities receives top priority, community-based governance, with responsibilities that also cover land-based activities, appears a potentially good option. Unfortunately, current experience suggests that introduction of such a system on a large scale faces serious local, regional, and international problems. This simplistic comparison does not do justice to the other aspects mentioned above that impact coastal fishing communities, but it appears relevant for the ongoing structural changes in global marine fisheries.

The marine and inland fish capture sector around 2010 contributed about US$270 billion to global GDP, and may have directly and indirectly employed well over 100 million people, the vast majority in developing countries (World

19 Its structure was later copied to create the Vereenigde Oostindische Compagnie (VOC), 1602–1800 (United East India Company), which operated in Indonesia.

20 The Japanese tuna longline fleet has been substantially reduced on account of lack of fishermen. The same problem currently affects coastal fisheries and aquaculture.

Bank 2012). More than 92 percent were engaged in small-scale fisheries—half of them women working mostly in processing and marketing—and they caught about half of the 85–95 million tons of global marine fish production, notably in Asia and Africa. While total global catches have been relatively stable since the early 1990s, the share of small-scale fisheries has gradually increased while industrial fisheries production declined.

Climate change—and related energy efficiency demands—and evolving national subsidy schemes, vessel access policies, and political developments are rapidly changing the structure and future of parts of the global industrial fisheries. Continuation of this adjustment process requires expansion of the coordination of national and international negotiations to seek agreements that enable growing support for politically acceptable road maps for change. Such negotiations need to cover traditional fisheries management issues, such as regulation of fishing effort and surveillance and control to maintain robust fish populations. In addition, they have to tackle economic issues to broaden international consensus on how to address the principles of coordinated investment, sector subsidies, local taxes, sector trade policies, and fisheries agreements. Ultimately, control of illicit fisheries and other security arrangements and the future role of selected coastal communities also require politically acceptable agreements. Discussion of these concerns and the structure of the required governance model has started in the Pacific, the European Union, and selected international organizations,[21] but the process of reaching agreement on a sturdy global political consensus still has a long way to go (Arias et al. 2022).[22]

Today's demands for governance of coastal and small-scale fisheries in many (sub-) tropical areas—with few exceptions—far exceed local capabilities. Sustainable small-scale fisheries require a combination of a bespoke local governance system to reach a healthy multispecies marine environment and dependable fishermen and fisherwomen employment and income, providing a secure future for coastal communities. In most developing countries—and multiple economically more advanced countries—these basic conditions no longer exist. Coastal zones are often excessively exploited and the marine environment has been partly destroyed, incomes of fishermen and fisherwomen are continuing their long decline, and the future of many communities appears bleak. Like the sardine fishery in California, modest efforts to regulate coastal—and industrial—fisheries in Asia and Africa have often been less than effective. Fundamental restructuring of the sector, notably in terms of employment and income, cannot be avoided. Creating opportunities outside the marine fishing sector, particularly for the younger generation, will be crucial. Given the modest results of projects to initiate such multitargeted change in the past, creating a governance approach that can reduce excessive fishing efforts and support employment generating economic development in thousands of communities appears a tall order. Maintaining the status quo will ultimately cause catches in many coastal waters to continue to decline, further impoverishing local communities while accelerating migration to cities and other countries.

Looking back, the history of fisheries governance suggests few long-term successes and a plethora of outcomes that proved less robust to address the impact of unexpected developments. Reasonable control of the mostly international industrial exploitation of highly complex fishery systems appears theoretically possible but will remain mostly an illusion for multiple practical and political reasons. In most small-scale fisheries, the illusion of control has never been further out of reach.

COMPETING INTERESTS

The author has no competing interests to declare.

AUTHOR BIOGRAPHY

Gert van Santen, fishery specialist at the World Bank and FAO, advised other development institutions after his retirement. He supported the growing global role of small-scale fisheries, evaluating sector strategies and designing marine fisheries and aquaculture investment activities in over thirty countries. In most the dichotomy between theory and practice of fisheries resources management in multiple mixed small-scale and industrial fisheries investment projects was apparent. At that time, political and institutional constraints and unpredictable changes in the oceanic environment became the main challenges when designing and executing marine strategy programs. He initiated what ultimately became Profish, raising World Bank, bilateral donor, and client country awareness of rapidly expanding fisheries sector needs. Translating the uncertainty inherent in complex marine and sector systems in the design and particularly the implementation of national and regional fisheries sector management activities has proved particularly challenging. He currently explores how resource management theories historically have dealt with the complexity of fisheries systems interconnecting political, institutional, trade, financial, and bio-economic factors. A founding board member of the Ocean Learning Partnership in Newfoundland, he supported introduction of an ocean-related curriculum in the province's high schools.

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Gert van Santen: *Absence of Malice* (Wageningen: Scomber

21 World Trade Organization, Food and Agriculture Organization, international development banks.

22 The recently tested results-based management approach demonstrated the advantages of high levels of participation in such negotiations.

Press, 2022)
Co-wrote *Buying Time for Climate Action, Ways around Stumbling Blocks*, edited by Jan W. Vasbinder and Jonathan Y. H. Sim (Singapore: World Scientific Publishing Company, 2022)
Gert van Santen: *The Purple Beret* (Washington, DC, 2014)
Robert Gillett and Gert van Santen: *Optimizing Fisheries Benefits in the Pacific Islands: Major Issues and Constraints* (World Bank, May 2008)

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