



**LEAVES, A Newsletter of the
INTERNATIONAL
ENVIRONMENT FORUM
Volume 19, Number 10 15 October 2017**



International Environment Forum A Baha'i inspired organization addressing
the environment and sustainable development

Website www.iefworld.org
Article submission newsletter@iefworld.org
Secretariat Email ief@iefworld.org
President Email ief@iefworld.org
Postal address 12B Chemin de Maisonneuve, CH-1219 Chatelaine, Geneva, Switzerland

Article Deadline next issue 13 November 2017

General Secretary Emily Firth
Arthur Lyon Dahl Ph.D.

From the Editor, Request for information for upcoming newsletters

This newsletter is an opportunity for IEF members to share their experiences, activities, and initiatives that are taking place at the community level on environment, climate change and sustainability. All members are welcome to contribute information about related activities, upcoming conferences, news from like-minded organizations, recommended websites, book reviews, etc. Please send information to newsletter@ief.org

Please share the *Leaves* newsletter and IEF membership information with family, friends, and associates and encourage interested persons to consider becoming a member of the IEF.

The Bicentenary of Bahá'u'lláh - 1817-2017

The International Environment Forum (IEF) has always described itself as a Bahá'í-inspired professional organization for the environment and sustainability, and its membership is largely composed of scientists, academics, experts and educators working in relevant fields. What then does it mean to be Bahá'í-inspired? The IEF draws on the ethical and spiritual principles of the world's religions, in particular the Bahá'í Faith, as a complement to scientific knowledge in addressing the challenges of environmental management and sustainable development. A scientific understanding, by itself, is usually not sufficient to change human behaviour. Motivating change, either in individual lifestyles and consumption patterns, or collectively in communities, enterprises and government, requires a commitment to moral principles or values and some vision of social improvement that science, by itself, does not provide. It is this interface between ethics and science that the IEF addresses.

The principles of the oneness of humankind; unity in diversity; moderation; the fundamental reality of increasing levels of cooperation, complexity, and reciprocity throughout the planet; and the vital importance of ecological balance; that are at the heart of IEF, come from the teachings of **Bahá'u'lláh** (1817-1892) the bicentenary of whose birth is being celebrated this year on 22 October 2017. Bahá'u'lláh (a title meaning the Glory of God) was born in Teheran, Persia, in 1817, and died a prisoner in Akka, Palestine, in 1892. He not only renewed the moral principles that are the foundation of all religions, but provided the social teachings necessary for building a world civilization whose coming He anticipated, hence His relevance to the environment and sustainability.

Bahá'u'lláh loved nature. He said that **"The country is the world of the soul, the city is the world of bodies."**

He taught the harmony of science and religion as complementary domains of knowledge and experience. **“Great indeed is the claim of scientists and craftsmen on the peoples of the world.... In truth, knowledge is a veritable treasure for man.”** Long before the 2030 Agenda and the Sustainable Development Goals, He called for an integrated approach drawing on both science and religion, which need to be in balance for society to advance: **“Regard ye the world as a man's body, which is afflicted with divers ailments, and the recovery of which dependeth upon the harmonizing of all its component elements.”**

He warned of the dangers of the excesses of material civilization: **“If carried to excess, civilization will prove as prolific a source of evil as it had been of goodness when kept within the restraints of moderation.”** He called for simplicity in lifestyle: **“Take from this world only to the measure of your needs, and forego that which exceedeth them. Observe equity in all your judgements, and transgress not the bounds of justice, nor be of them that stray from its path.”**

He emphasized justice as the central principle of social organization: **“The best beloved of all things in My sight is Justice.... By its aid thou shalt see with thy own eyes and not through the eyes of others, and shalt know of thine own knowledge and not through the knowledge of thy neighbour.”**

While he did not propose a specific economic system, He said that everyone should have an occupation, so society must give everyone the opportunity to work for both its material and spiritual benefits. **“It is incumbent upon each one of you to engage in some occupation - such as a craft, a trade or the like.... Waste not your hours in idleness and sloth, but occupy yourselves with what will profit you and others.”** Extremes of wealth and poverty should be eliminated. **“Man's merit lieth in service and virtue and not in the pageantry of wealth and riches.”** Following these teachings, it is clear that now is the time to abandon outworn ideologies and economic systems that no longer meet the needs of society, and to experiment with new approaches, starting at the community level.

Bahá'u'lláh can be seen as a precursor of the environmental movement and an early exponent of sustainability. The lessons being learned in Baha'i communities as they try to put His teachings into practice can also serve as examples for possible ways forward towards sustainability. For more information on Bahá'u'lláh and the Baha'i Faith, resources and links are provided [here](#) and at <http://www.bahai.org>. For more about the bicentenary celebration, go to <http://bicentenary.bahai.org>.

(Statement prepared by the Governing Board of the International Environment Forum)

IEF participation in IPBES meeting in New Zealand

Dr. Austin Bowden-Kirby from Fiji was nominated by IEF as one of the NGO experts participating in an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) workshop on visioning futures for biodiversity and ecosystem services, which took place in Auckland, New Zealand, on 4-8 September 2017. The focus of the workshop was to define future desirable scenarios and models for our relationship with nature. One group of mostly indigenous people from around the world chose to base their vision work on the theme spiritual and cultural values. Austin in another group made a strong contribution based on his work on coral gardens restoring damaged coral reefs, and working with village women and island communities.

Austin has pioneered replanting corals on damaged reefs, and still focuses on coral gardening for climate change adaptation. However in recent years he has worked more on the connection between human societies, poverty, and environmental destruction on both land and sea, and the ability of rural and traditional societies to take better charge of their own futures - by better understanding the destructive processes they are driving, establishing nature reserves using local resources and traditional decision making processes, and re-focusing on sustainable livelihoods and the better use of resources that can be enhanced and developed in order to shift pressure off of the natural systems, allowing them to recover. He has projects in a number of countries.

PERL Think tank at UNESCO in Paris

As part of its longstanding collaboration with the Partnership for Education and Research about Responsible Living (PERL) and its UNITWIN network, IEF was an active contributor to the PERL Think Tank meeting on Collaborative Learning for Sustainable Lifestyles at UNESCO headquarters in Paris on 25-26 September 2017. IEF board member Victoria Thoresen helped to organize the meeting, and IEF President Arthur Dahl was one of the 20 invited experts.

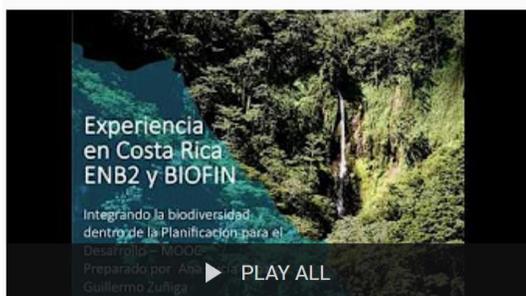
The meeting focused on the individual and social dimensions within sustainable development and gave special attention to the educational and learning perspectives relevant to achieving sustainable lifestyles. It explored both conceptual and practical approaches for accelerating sustainability transformations. Some of the key questions addressed were:

- How do we conceptualise “sustainable lifestyles”, and what are the overlooked or neglected issues?
- What factors hinder individuals in playing significant roles in achieving sustainability transformations?
- How can we better engage individuals and communities in active modes of learning about sustainable development and empower them as informed, responsible actors?
- Paradigmatically, what are the foremost challenges for achieving sustainability transformations in the near future?
- How can the results of these discussions be incorporated into the development of: 1) concepts, 2) research, and 3) learning approaches?

Some of the issues raised included the fear of the future in most young people today and their need for hope; the consumer society and the outmoded growth paradigm as driving forces for unsustainability and the difficulty of changing associated values and habits; and the democratic model that is no longer working. We are not changing fast enough to avoid dangerous tipping points, and need more than incremental change. It will take more than government action to implement the UN 2030 Agenda. Suggestions for ways forward included grassroots participation and social innovation to create just and sustainable communities, showing examples of successful communities and individuals. We need to build trust and empathy, increasing interdependence and embracing diversity. The focus of education should be on active learning, systems thinking, more ethical training, and learning to manage change. Participants suggested the renovation of traditional life skills, a dialogue with religious leaders, and reflection on our individual and collective purpose in life. We need to go from a focus on crises to imagining positive visions of the future.

The outcomes will contribute to the development of future strategies and work plans for the new Center for Collaborative Learning for Sustainable Development at the Inland Norway University of Applied Sciences, and for the PERL/UNITWIN network, both directed by Victoria Thoresen.

MOOC on greening consumption and production



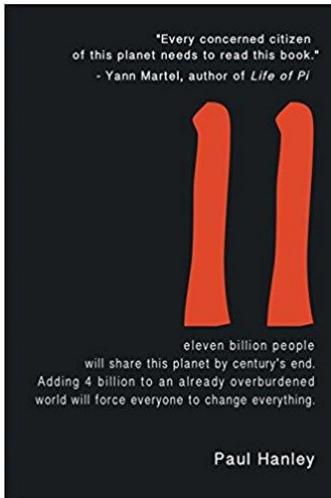
Greening Consumption & Production MOOC Playlist

22 videos • 1,932 views • Last updated on Jul 11, 2017

In June and July, IEF board member Laurent Mesbah in Sarajevo was facilitator of a Massive Open Online Course (MOOC) on greening consumption and production. The course was set up with UNDP, The Nature Conservancy and other partners in connection with the Global Support to National Biodiversity Strategies and Action Plans (NBSAP) project and its Expert Review Support process. The six-week course was offered in English, French and Spanish, with Laurent facilitating the French. The course description and syllabus are at <http://nbsapforum.net/#read-resource/2573>. The MOOC playlist of weekly webinars in all three languages is on the NBSAP Forum at: <https://www.youtube.com/playlist?list=PL8vwCyAB16RoXpLPC07iMXb8G6y8tRhet>

New Wilmette Institute course: Sustaining 11 Billion People

Can the Earth survive humanity, or will we destroy our home and cripple our future? The Wilmette Institute is offering a new course "Sustaining 11 Billion People: Challenges for an Ever-Advancing Civilization"; with IEF member Paul Hanley as lead faculty. The course is based on Paul's book *Eleven* and will run from 1 November to 19 December. You can read a review of the book at <https://iefworld.org/node/854>. Paul will be giving a free Web Talk on the subject on 29 October at 2 p.m. Eastern (USA) time (19:00 GMT). For more information, go to <http://www.cvent.com/events/sustaining-11-billion-people-challenges-for-an-ever-advancing-civilization/event-summary-94d28d93a7614ca892ca566162bec579.aspx>



FACULTY: [Paul Hanley](#), [Neil Whatley](#), [Gary Reusche](#), [Haleh Samimi](#)

Baha'u'llah stated that, "All men have been created to carry forward an ever-advancing civilization." Based on the book *ELEVEN*, this course investigates issues and principles involved for individuals, communities, and institutions in contributing to a sustainable civilization with 11 billion people, the UN population projection for 2100. Given that civilization is already unsustainable, what changes are needed to ensure that humanity can advance with an additional 4 billion people? Key to this process will be an ethical revolution that will reinforce efforts to reduce humanity's ecological footprint by seeding a new global culture. **Sustaining 11 Billion People: Challenges for an Ever-Advancing Civilization** shows how the principles and plans of the Baha'i Faith directly address these fundamental concerns.

The book *Eleven* must be purchased for this course. Please use this link, which allows you to choose from a range of sources:

<http://www.elevenbillionpeople.com/bookstore.html>

Wilmette Institute participation in Global Climate Change Week

As part of the continuing IEF collaboration with the Wilmette Institute (WI), a distance-learning programme of the American Bahá'í community, Christine Muller and other IEF members teaching in the WI courses on Climate Change and on Sustainable Development have led a WI contribution to Global Climate Change Week (9-13 October 2017) among academic institutions around the world. All the members of the WI community were invited to consider how they could mitigate climate change in their own lives and contribute to a wider awareness of the need for everyone to respond to this challenge. A special forum on the Wilmette Institute web site is devoted to sharing thoughts and reporting on experiences relevant to Global Climate Change Week. Last year's IEF conference in Bolivia was also a contribution to Global Climate Change Week.

The IEF and Climate Change

The International Environment Forum has long been concerned about human-induced global warming and the resulting climate change. Some of its members are scientists who have contributed to coordinating global observations of the climate system, the intergovernmental negotiations under the UN Framework Convention on Climate Change, issues of climate and energy governance, and renewable energy alternatives, working within intergovernmental organizations, NGOs or universities. As an organisation at the interface between science and ethics, the IEF has also drawn attention to the ethical implications of climate change, organising conferences on the subject, publishing papers, and preparing on-line courses. The IEF co-sponsored the first side event on ethics and climate change at the UN Commission on Sustainable Development in 2007. It held international conferences on climate change and ethics at Oxford University (2006), in Ottawa, Canada (2007), and Hobart, Tasmania, Australia (2011). It participated in the UN Climate Change Conference (COP15) in Copenhagen in 2009 and the preceding Science Conference, and it organised or contributed to 5 side events at the Paris Climate Change Conference in 2015.

The position of IEF can be summarised as follows:

The nature of the challenge

Our more advanced understanding of the inner workings of the climate system and of the socio-economic drivers of human interference with it has put us in the position of effectively managing the Earth's climate. While economic benefits of activities leading to greenhouse gas emissions are enjoyed at source, the adverse impacts from these emissions are felt globally and are hitting the poor and vulnerable hardest.

The evolving nature of the response to climate change

It is entirely possible with currently technologies to meet human development needs without exceeding the internationally agreed upper limit on warming, but this requires a combination of urgent and long-term responses.

The accepted paradigm that the climate challenge will be addressed primarily by government intervention is under growing pressure and a new paradigm with a narrower role for national Governments and increasing responsibility for non-state actors and sub-national governance, is now reflected in the Paris Agreement.

Motivation to build Humanity's capacity to solve collective challenges

The call to action on climate change has tended to be dominated by apocalyptic views of the future; a more hopeful narrative is needed to instill faith in the future and to mobilise the will to realise the vision of a just, low-carbon and climate resilient global community.

The root causes of the predicament we find ourselves in on climate are in fact the same as those underlying other global challenges; lasting solutions to this challenge will only be found when attention moves from its symptoms to its root causes.

Climate change is not an issue that can be solved in isolation, but is integrated with many other challenges facing humanity. It opens a dialogue on the consumer society and its use of energy; on the economy and extremes of wealth and poverty; on social justice and concern for future generations; on migration, immigration, and the integration of diverse peoples into harmonious communities; and on environmental sustainability, among others.

The threat of climate change has the potential of propelling Mankind forward on its path to stronger global governance just as threats to peace and security and the violation of human rights did last century.

Recognition of the spiritual dimensions of development and empowerment of constructive agents of change is essential to accelerate the transition out of the danger zone we find ourselves in today. Government policies, international treaties and other intergovernmental arrangement are necessary but not sufficient. Consumer choice, consumption patterns, public awareness and education are important determinants of success. There is a growing realisation that these issues must be addressed at the level of values if we are to see adequate change at other levels

The IEF web site has many available resources linked from its recently-updated climate change page (<https://iefworld.org/climate.htm>), including:

Scientific and Spiritual Dimensions of Climate Change - An Interfaith Study Course in English: <https://iefworld.org/ssdcc0.html>, French: <https://iefworld.org/ccFr0>, and Spanish: <https://iefworld.org/fl/ccSp.pdf>

Conference reports and presentations:

Implementing the Sustainable Development Goals as Communities and Individuals. IEF 20th Annual Conference, Santa Cruz de la Sierra, Bolivia, October 2015, a contribution to Global Climate Change Week. <https://iefworld.org/conf20>

IEF Events at the UN Climate Change Conference (COP21), Paris, December 2015. <https://iefworld.org/cop21>

Ethical Responses to Climate Change: Individual, Community, Institutions. IEF 15th Annual Conference, Hobart, Tasmania, Australia, 10-11 December 2011. <https://iefworld.org/conf15>

Climate change and human rights, 2010 Social Forum of the UN Human Rights Council, Geneva, Switzerland, 4-6 October 2010 with IEF participation. <https://iefworld.org/node/249>

On 2-4 November 2009, representatives of nine major faiths gathered at Windsor Castle, United Kingdom, to present their long-term action plans for climate change and the environment to UN Secretary-General Ban Ki-Moon. IEF helped to draft the action plan and was part of the Bahá'í International Community delegation. <https://iefworld.org/WindsorARC.html>

IEF participated in the United Nations Climate Change Conference (COP15) in Copenhagen, Denmark, 7-18 December 2009. <https://iefworld.org/COP15.html>

The IEF reported on its climate change activities to the International Climate Change Science Congress, Climate Change: Global Risks, Challenges and Opportunities, Copenhagen, 10-12 March 2009.

Multiple Dimensions of Climate Change, IEF session at the 2008 Bahá'í Conference on Social and Economic Development, Orlando, Florida, 20 December 2008. <https://iefworld.org/elpresent.htm#ClimateChange>

Responding to climate change: scientific realities, spiritual imperatives, IEF 11th Conference, Ottawa, Canada, 12-14 October 2007. <https://iefworld.org/conf11.htm>

The ethical dimensions of climate change, IEF co-sponsored side event, 15th Commission on Sustainable Development, United Nations Building, New York, 30 April 2007.

Science, faith and global warming: arising to the challenge, IEF 10th Conference, Balliol College, Oxford University, 15-17 September 2006. <https://iefworld.org/conf10.htm>

Updating the IEF web site

While it may not be noticeable from first appearances, a major effort has gone into updating the html coding of almost all the pages on the IEF web site. Many pages dated from the early years of IEF, and were coded in the html programming language used at that time. Only the content was revised and updated as necessary. With the release of html5 as the latest version of the language for web pages, many of the codes formerly used to format pages or to link within a page, say to a list of references, were deprecated and no longer recognized by modern browsers, lowering the readability of the pages and their rating and visibility by search engines. It was necessary to copy and download each page, correct all the coding to the latest standard, and reload the pages into the content management system. Over 400 of the most accessible pages have now had their coding updated.

Ending Hunger: What would it cost?

<http://www.iisd.org/library/ending-hunger-what-would-it-cost>



DOWNLOAD BRIEFING NOTE 682.43 KB

DOWNLOAD PRESENTATION 1.49 MB

The International Institute for Sustainable Development and the International Food Policy Research Institute joined forces to estimate what it would cost to end hunger, and the contribution that donors need to make.

Our analysis focused on the cost of ending hunger through increased spending on social safety nets directly targeting consumers, farm support to expand production and increase poor farmers' income, and rural development that reduces inefficiencies along the value chain and enhances rural productivity. The research marks the first time that a multi-country macroeconomic model has been combined with household surveys.

We found that it will cost on average an extra USD 11 billion per year of public spending from now to 2030 to end hunger. USD 4 billion of the additional spending needs to come from donors. The remaining USD 7 billion will come from poor countries themselves. Importantly, this public spending will generate on average an additional USD 5 billion of private investment per year until 2030.

Biodiversity for a world without hunger

<http://www.unep.org/stories/story/biodiversity-world-without-hunger>

October 12, 2017

World Food Day on 16 October is an opportunity to reflect on how healthy ecosystems can help to reduce the number of people who don't have enough to eat.



Photo Credit: Pixabay

Food security is notoriously complex. It is more about world politics, trade, infrastructure and economics, than food waste or meat-eating, important as these elements are.

But food security is also about healthy ecosystems and our ability to maintain the planet's biodiversity. For instance, without bees and other pollinating insects, we would struggle to get enough to eat – and pollinators' numbers are already declining around the world.

At the same time, after several years of decline, the number of chronically undernourished people increased in 2016, rising to 815 million, up from 777 million the year before. This recent uptick could signal a worrying reversal of trends – putting the 2030 goal of a world without hunger even further from reach. Experts say that a return to traditional food values could be part of the solution.



A selection of foods, herbs and spices grown in Sri Lanka ©: Amila Tennakoon

“We need to explore the nutritional value, cultural significance and market success of traditional foods for everyday diets,” says Marieta Sakalian, a UN Environment biodiversity expert. “Preserving local edible biodiversity, the lifeblood of what we eat, is in line with the 2030 Sustainable Development Agenda and essential if we want to feed the world's growing population in a sustainable, healthy and environmentally sound manner.”

Sakalian is part of a project that is working in Brazil, Kenya, Sri Lanka and Turkey to conserve and revive nutritious traditional edible biodiversity, and include it in diets for better health. The project also seeks to explore the nutritional value, cultural significance and market success of traditional foods for everyday diets. The project, Biodiversity for Food and Nutrition (BFN), is led jointly by UN Environment and the UN Food and Agriculture Organization and coordinated by Bioversity International, with financial support from the Global Environment Facility. National partners come from relevant ministries, the scientific community, non-government organizations, civil society and local communities.



Sri Lanka vegetable stand ©: Christopher

The BFN project is having an impact, for example, in Busia, western Kenya, where it has been raising awareness of the importance of local crops in the hope that people will begin to change their attitudes and consume more locally grown food.

The BFN team discovered that locally grown traditional vegetables had a poor image. People saw local crops as food for the poor or the elderly. They were thought to be bitter and difficult to prepare.

Anastancia Muleka, a mother of four, used to eat local vegetables only when her mother-in-law prepared them for her and her family. When her mother-in-law died in 2010, Anastancia stopped eating local vegetables entirely. But when she met members of BFN, she became convinced of their importance. BFN showed her how to plant and prepare local vegetables, and provided her with information about their nutritional value. Anastancia began growing such crops and found that by doing so, she was able to save money. Her children began to like the vegetables, and it was not long before local crops became a staple of her family's diet. "Frequent consumption of local vegetables has helped my skin to be smooth. I don't get sores any more," she said.

In Sri Lanka, the BFN project has organized a food festival to mark World Food Day. On 16 October the Plant Genetic Resources Centre in the country's Central Province, will host an exhibition of local food diversity. There will be cooking prizes for the most innovative and tasty dishes, and discussions on BFN with experts. The event is being organized in partnership with the Women's Agriculture Extension Unit, the Department of Agriculture, and the Ministry of Mahaweli Development and Environment.



Myristica fragrans nut, Sri Lanka ©: Ji-Elle

Further resources:
The theme for this year's World Food Day on 16 October is: *Change the future of migration. Invest in food security and rural development.*

UN Environment and IRRI join hands to drive climate-smart sustainable rice

<http://www.unep.org/newscentre/un-environment-and-irri-join-hands-drive-climate-smart-sustainable-rice>



Photo Credit: Photo: Sasint / Pixabay Rice

4 October 2017, Bangkok: UN Environment and the International Rice Research Institute today announced a new agreement to reinforce their long-standing collaboration to promote innovative environment-friendly technologies for rice production in developing countries.

A Memorandum of Understanding was today signed by the two institutions to strengthen collaborative initiatives focusing on climate-smart sustainable best practices in rice production, with a particular focus on meeting the needs of rice farmers in developing countries.

Collaboration began in 2008 when the two institutions established the Sustainable Rice Platform as a multi-stakeholder initiative, bringing together governments, private sector actors, research and grass-roots organization to address the many challenges facing the rice sector. The alliance was officially launched in 2011 and now counts 80 institutional members around the world, linking together research, production, policymaking, trade and consumption to enhance sustainability throughout rice value chains.

Rice is critical to rural economies and global food security, but rice farmers worldwide are increasingly suffering from the combined impacts of climate change, declining yields and loss in soil fertility. Droughts, floods, increasing temperatures and rising sea levels are all taking their toll, affecting livelihoods, and impacting on biodiversity and health.

Speaking at the opening of the First Global Sustainable Rice Conference and Exhibition held at the UN Conference Centre in Bangkok, Dr Matthew K Morell, IRRI's Director General, commented: "We are proud to strengthen our broad-ranging partnership with UN Environment through this Memorandum of Understanding, to work together on our shared goals. Given the many challenges the global rice sector faces as we look ahead over the next 25 years, major transformation will be needed in order to meet the needs of a fast-growing global population in a sustainable way.

“The International Rice Research Institute and other research institutions have developed a wide range of sustainable technologies that will help reduce use of water, chemicals and energy in rice, and protect the crop from pests, disease and the impacts of climate change. Together, through our collaboration under the Sustainable Rice Platform, we aim to help 1 million small farmers over the next 5 years to adopt climate-smart sustainable best practices.”

Under the agreement, the two institutions will work to enhance sustainable rice-based production and food systems through awareness raising, capacity development, knowledge exchange, and evidence-based analyses for policy support, as well as adoption of the new Sustainable Rice Platform Standard on Sustainable Rice Cultivation.

"We need to increase the adoption of climate-smart sustainable technologies to small-scale rice farmers around the world, and this partnership, as well as working with the private sector, will help in that job," said Erik Solheim, head of UN Environment. "This work goes beyond just putting food on plates. It's about boosting sustainable production, and therefore giving farmers and consumers a better deal. It's about delivering on our global goals, and taking concrete climate action."

Rice is grown by some 144 million small rice farmers and feeds 3.5 billion people around the world including 800 million living on below US\$1.50 per day. However, by 2050 the world will face a shortfall in rice supplies. While projections point to a 25% increase in global rice consumption over the next 25 years, yields in key rice producing countries may fall by up to 20% due to climate change impacts such as rising sea levels, salinity, temperature rise, droughts and floods. Rice also accounts for 9-11% of global emissions of methane- a potent greenhouse gas.

About UN Environment

UN Environment is the leading organization within the United Nations system in the field of environment and has as a major area of focus of its global mandate, the conservation, protection, enhancement and support of nature and natural resources, including biological diversity. UN Environment hosts the Secretariat of the Sustainable Rice Platform, a multi-stakeholder initiative with 80 institutional members, co-convened by UN Environment and the International Rice Research Institute to promote resource efficiency and sustainability in the global rice sector, through an alliance that links research, production, policy, trade and consumption. In 2015, the launch of the SRP Standard for Sustainable Rice Cultivation- the world's first voluntary sustainability standard for rice triggered commitments by a number of major private sector food industry actors to achieve 100% sustainable sourcing within their global corporate supply chains by 2020.

About the International Rice Research Institute

The International Rice Research Institute is a nonprofit, autonomous, nonpolitical, international organization established in 1960 under international treaty, with a mission to reduce poverty and hunger through rice science, improve the health of rice farmers and consumers and ensure environmental sustainability through collaborative research, partnerships and strengthening of national agricultural research and extension systems.

The Aquaculture Opportunity

Can the sector grow to provide seafood and jobs in harmony with the ocean?

https://global.nature.org/content/the-aquaculture-opportunity?intc=glob_sol.hp.single_promo



*Terry Sawyer and John Finger, co-owners of Hog Island Oyster Farm.
Photo © Torrey Johnson*

Terry Sawyer comes from a long line of farmers and ranchers, and he's learned a lot from his family—about maintaining the health of his broodstock and selecting the strongest performers for breeding; about managing the employees who help run his operation; and about the importance of stewardship and maintaining the health of the environment his farm depends on.

Sawyer's work is unlike that of his parents and grandparents, though, in that he doesn't worry about feed and water for his stock, and the sort of stewardship he's concerned with has more to do with watersheds than landscapes. That's because Sawyer, along with his partner John Finger, raises oysters, which require no food, land or freshwater.

Finger and Sawyer, co-owners of Hog Island Oyster Company, are part of the global aquaculture industry, which encompasses the farming of fin fish, shellfish and seaweed, in both marine and freshwater environments. When practiced well, aquaculture is one of most low-impact, resource-efficient ways of producing food. In fact, some forms of aquaculture, such as oyster cultivation, can actually help to restore coastal ecosystems.

This offers a reason for hope. We'll likely see another 3 billion people on the planet by 2050, leading to a massive increase in demand for food, land and water. We have to find ways to feed the planet without increasing pressure on both terrestrial and marine habitats. Aquaculture, done well, offers a huge potential not just for producing food for a growing planet, but to provide livelihoods to coastal communities and, in the case of shellfish or seaweed culture, help recover lost ecosystem services.

If we get it right, aquaculture could be our best hope to sustainably feed the planet.



Aerial view of a seaweed farm in Belize. Photo © The Nature Conservancy

Assessing Environmental Impact

The idea of aquaculture as a sustainable food source might surprise some—in fact, many assume that aquaculture is an environmentally damaging practice. That reputation is not entirely unearned. Poor practices with salmon farming in in 1980s and 1990s and the ongoing destruction of mangroves to create

shrimp ponds in some parts of South Asia, for example, have caused significant environmental damage and stained the reputation of the whole sector.

All forms of food production can have environmental impact, of course, including aquaculture. But new technology and lessons from the last forty years have led to better practices that are being adopted by substantial segments of the industry. Better siting practices, for example, ensure that fin fish can have less impact on the surrounding environment. While big challenges remain, the use of antibiotics for disease treatment and the amount of wild fish used in feeds has dramatically declined in some sectors.

Fish are far more efficient feeders than land-based livestock like beef, pork or even chicken; fish production also generates fewer carbon emissions and utilizes less fresh water and arable land per pound of production than their land based counterparts. With wild caught fish stocks in decline, fresh water sources overdrawn, and limited food production left in our soils, that greater efficiency is particularly important for food security.



Freshly harvested oysters from Big Island Aquaculture on the Chesapeake Bay. Photo © Caroline Spruill

Shellfish and seaweed are even more efficient feeders—they rarely require any additional inputs, feeding instead on ambient phytoplankton and nutrients. And in some cases, shellfish and seaweed don't just require minimal inputs—they can actually improve the health of their immediate environment by removing impurities. Oysters can filter 50 gallons of water a day. Seaweed, too, is incredibly efficient at removing excess nutrients from the water, which can improve the health

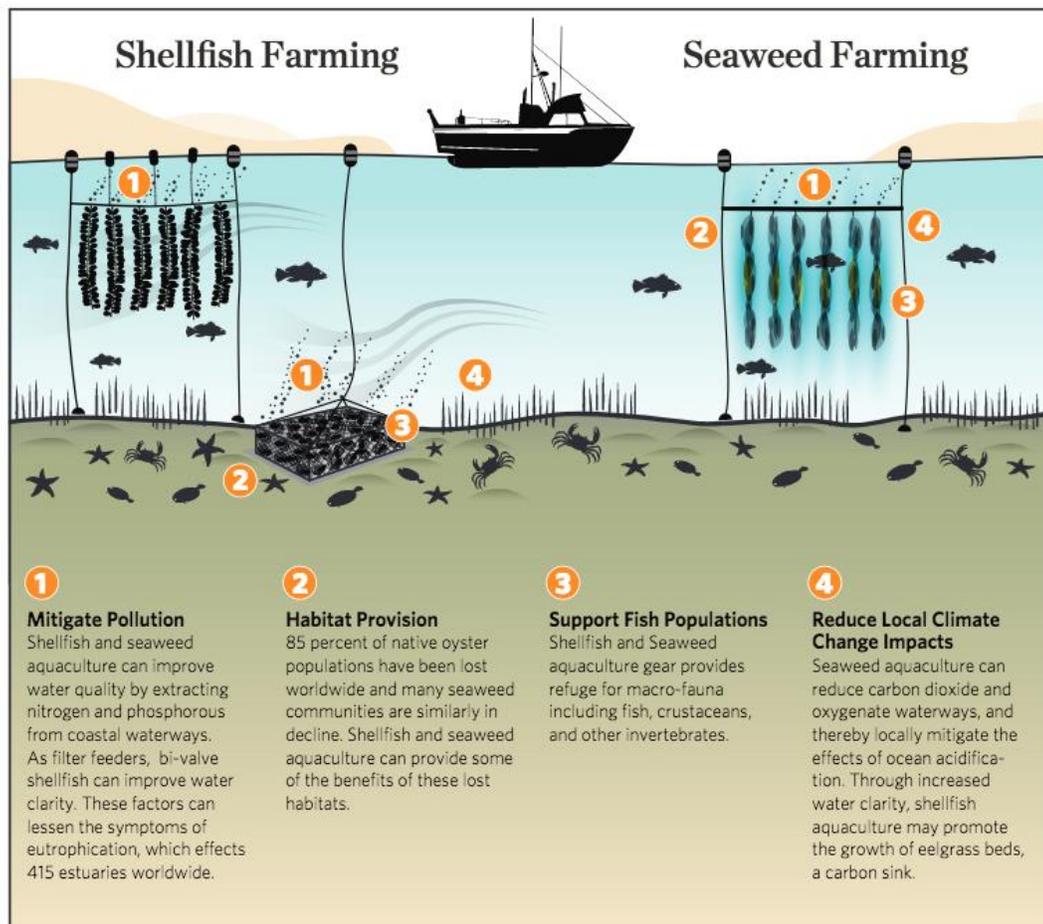
of eutrophic estuaries, like many in the United States, as well as carbon dioxide, which can mitigate ocean acidification in localized areas. Shellfish and seaweed farms also provide habitat for wild fish species and increase the diversity of species in sea beds, as can other forms of aquaculture infrastructure.

“There are all these problems facing coastal ecosystems—pollution, habitat loss, overfishing, the impacts of climate change—and depending on how and where aquaculture is done, you could make those challenges

worse, or ameliorate them,” says Robert Jones, Global Aquaculture Lead at The Nature Conservancy. “That amelioration piece is really interesting. Our work to date has focused on figuring out when and where that’s possible.”

Infographic: Ecosystem Benefits of Aquaculture

Coastal ecosystems are threatened by coastal pollution, loss of habitat, overfishing and face an added threat amplifiers of climate change. When done in the right way and in the right places, commercial aquaculture can accelerate ecosystem recovery in addition to providing sustainable seafood and green jobs in coastal communities.



70% of the planet produces 2% of our food

Collaborating With Industry

Bringing these efforts to scale, though, will require influencing a booming aquaculture industry.

“This is a really layered issue, with elements of sustainable and local food production, job creation, and environmental protection,” Jones says. “The opportunity we see is to shape the trajectory of the industry to not just minimize negative impacts, but also to become a food production sector with benefits for the environment, both indirect and direct.”

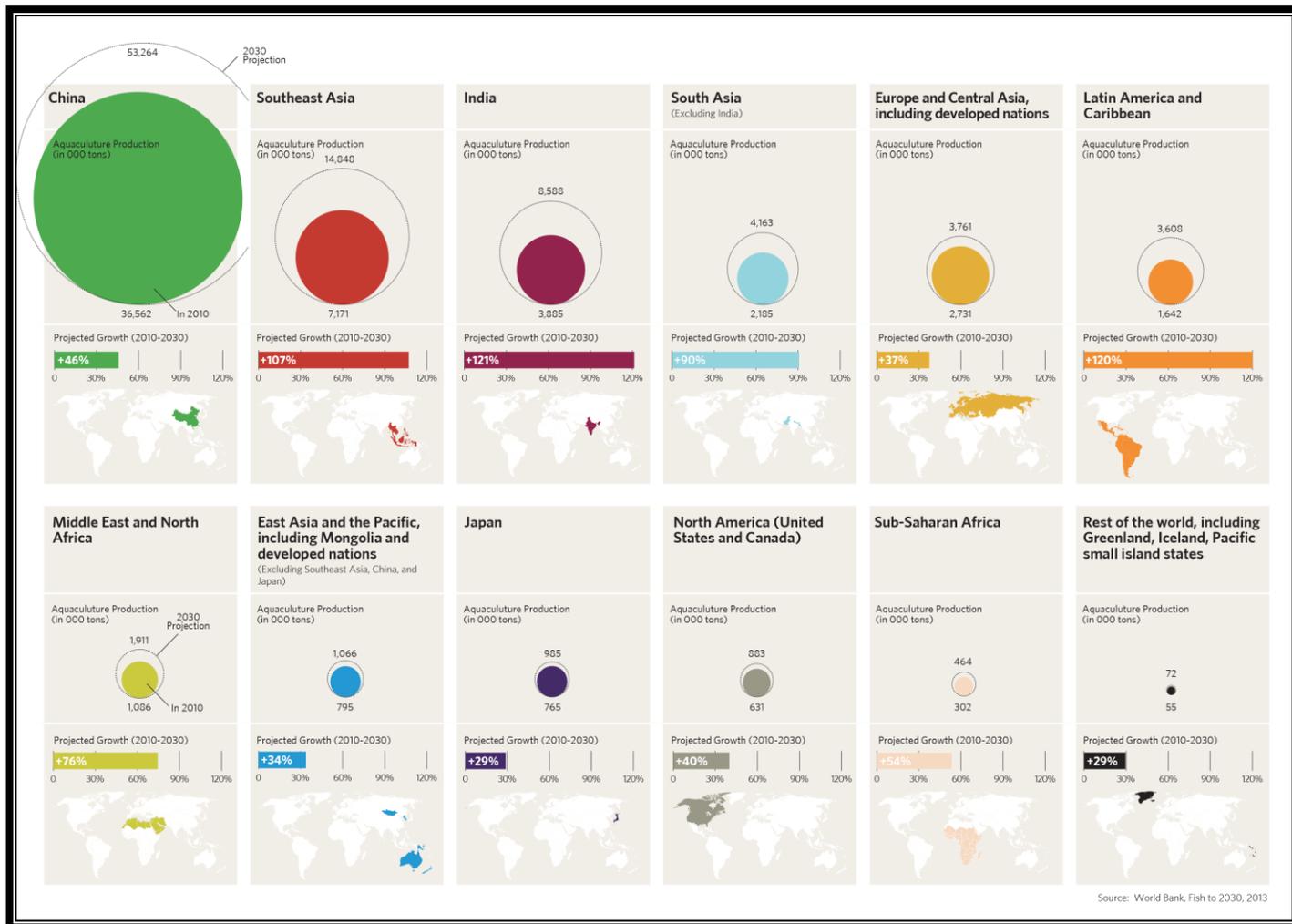
How that trajectory plays out could have a huge impact on the planet.

Although the ocean covers 70 percent of the Earth, it currently produces just 2 percent of our food, including both marine aquaculture and wild caught fisheries. But when it comes to cultivating marine species for aquaculture, “we’ve just hit the tip of the iceberg,” Jones says.

Already the industry comprises over \$150 billion in farm gate value—bigger than the global beef industry. Some estimates suggest that the industry could see another \$200–400 billion in investments by 2050 in farm infrastructure alone. Combined with the growth in ancillary businesses, such feed innovations, grow-out technology, and animal health, aquaculture represents a massive potential for investment—and for environmental impact.

Infographic: Aquaculture Production and Growth

As new technologies and species develop, aquaculture will grow within new and existing geographies. Aquaculture is now the fastest growing form of food production on the planet, growing at an annual rate of 6% per year. Click on the image below for a larger version.



“There’s a huge influence opportunity right now,” says Maria Damanaki, Global Managing Director for Oceans at The Nature Conservancy. “How can we direct innovation and growth in aquaculture towards opportunities that also improve aquaculture’s environmental performance?”

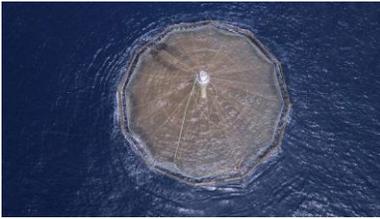
Fortunately, making aquaculture more sustainable doesn’t mean it has to be less profitable. In fact, most of the environmental challenges for aquaculture—habitat impact, over-reliance on wild forage fish for feed, disease, and genetic mingling of farmed and wild stocks—are also business challenges. For example, finfish aquaculture can’t continue to grow and be profitable without reducing its use of wild forage fish, which constitute 60 percent of operating costs for some operations. Siting fish pens in too-shallow water, a major source of negative environmental impact, is also bad for farmed fish stocks and cuts into operators’ bottom lines, as does disease in farmed stocks.

“As pioneers in this space, we have a responsibility to create strong partnerships to ensure the industry develops responsibly at all levels.” - Brian O’Hanlon, founder of Open Blue

“Industry needs help in these areas, and there is overlap between what we need to achieve as environmentalists and what they do as business people,” Jones says. “We’re not in the business of producing food, but we can help ensure food is produced with minimal environmental impact. We want to work with businesses and governments to create business opportunities and set up regulatory systems in ways that allow for growth, but are also protecting the environment.”

There are good reasons for aquaculture operators to welcome the involvement of environmental NGO’s like the Conservancy. NGOs can forge alliances and help to catalyze work on problems that are too expensive for any one organization to tackle. NGOs also bring a level of third-party credibility, Sawyer of Hog Island says—

both with consumers concerned with environmental impacts and with farmers who need assistance navigating an often-slow moving regulatory environment. Those collaborations are vital for the long-term sustainability of the industry.

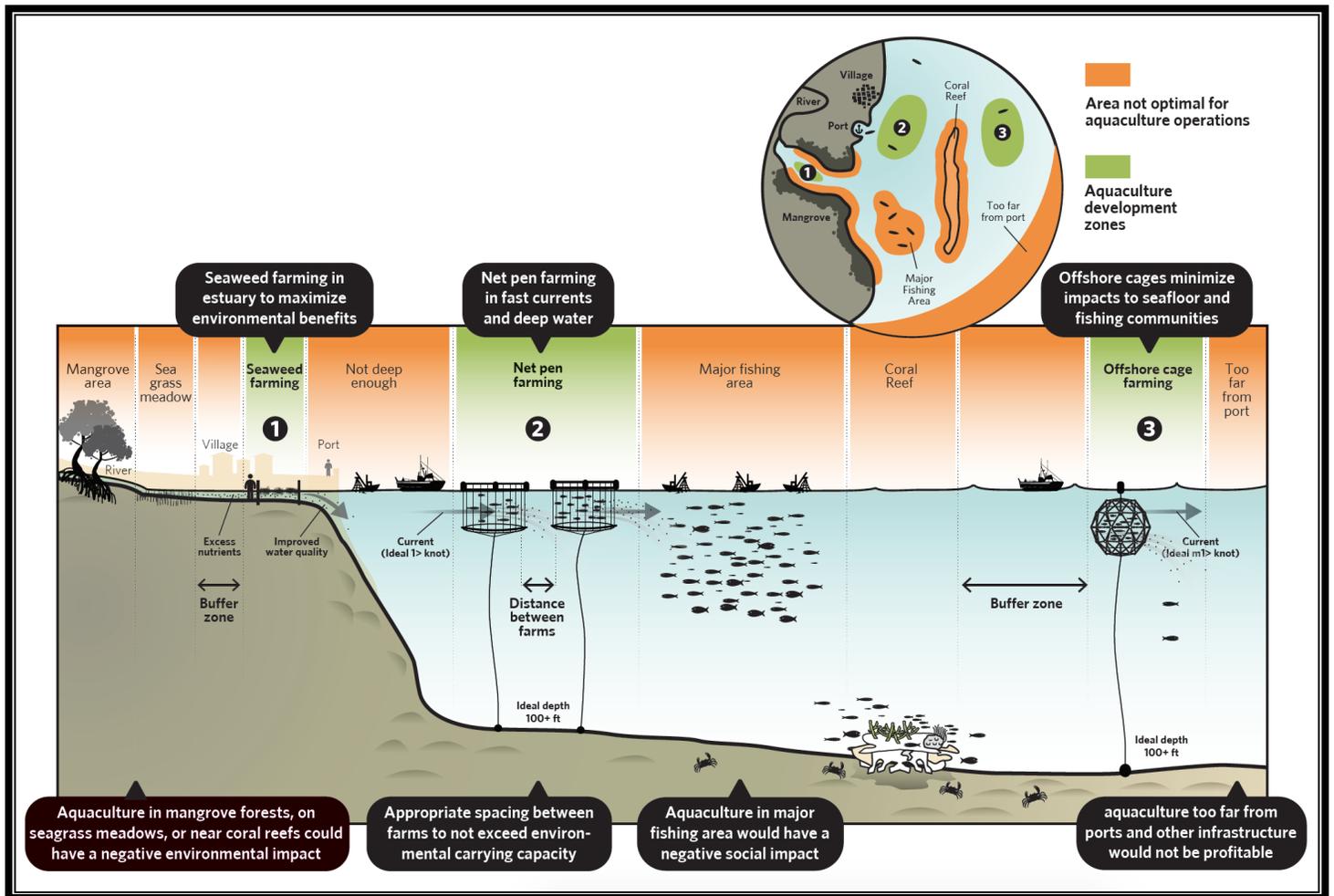


Aerial view of an Open Blue SeaStation. Photo © Open Blue

That’s especially important in deep-water open ocean farming, a segment of the industry that is beginning to shift from an experimental stage to a period of growth and maturity, says Brian O’Hanlon, founder of Open Blue, a company that grows cobia in deep water off the coast of Panama. “As early movers and pioneers in this space, we have a responsibility to create strong private, government, academic and NGO partnerships that will help ensure the industry develops responsibly at all levels.”

Infographic: Smart Growth in Aquaculture

Siting of aquaculture operations is the first and most critical consideration to minimize negative impacts of aquaculture operations. It is also a critical factor in determining the profitability of an aquaculture operation. To protect the environment and ensure economic growth, aquaculture operations should be sited in optimal locations based on environmental, economic, and social factors.



“Aquaculture, done in a socially and environmentally friendly manner, is the only way to meet the growing demand for seafood, while also creating jobs, generating revenues and taking pressure off over-stretched capture fisheries.” - Randall Brummet, The World Bank

Local Communities, Global Impact

The Nature Conservancy is uniquely positioned to assist the industry with these goals, Damanaki says. “Aquaculture is essentially a hybrid of agriculture and fisheries, two sectors where we have a lot experience collaborating with industry. We’ve led some innovative work on finance for sustainable agriculture and siting and planning in the marine sector, as well as restorative shellfish work—we can apply all of that experience toward aquaculture.”

But the scope of the Conservancy’s work goes beyond mitigating negative impacts, she adds. “We know that aquaculture can provide sustainable food and jobs. We’re trying to show that it also can restore ecosystems.”
Aquaculture by Design, Chesapeake Bay

Project sites around the world are geared toward answering this question. Projects in California and the Chesapeake Bay, for example, are looking at the impact and potential benefit of oysters on water quality and eelgrass growth. In Indonesia and Belize, meanwhile, projects sites are focused on seaweed cultivation and its potential impacts on benthic ecosystems.

“Seaweed cultivation might seem like an insignificant aspect of global conservation, but in Indonesia, it really matters,” Jones says. Approximately 1 million people farm seaweed there, including some of country’s poorest citizens. In East Nusa Tenggara, where the Conservancy is working, there’s little arable farmland and fishing stocks have declined severely. “These people are facing the impacts of climate change day in and day out,” Jones says.

Seaweed cultivation offers a source of income with potentially little environmental impact—and that offers rare job opportunities in a region where empowering work for women has been scarce. The Conservancy works with residents locally, including indigenous groups, on the technical aspects of farming, including how to avoid damage to eelgrass beds and other natural habitats, as well as the economic and regulatory aspects of running an aquaculture business.



A woman sorts seaweed after harvesting it in Rote, Indonesia. Photo © Robert Jones

In Belize, a similar seaweed project focuses on assessing the potential habitat benefits of seaweed farms for commercially important coral reef dwelling species. Randy Tucker and Luis Godfrey, former fishermen who now grow seaweed with the Conservancy’s assistance, have already observed juvenile lobster, conch and hogfish returning to the areas where they’re cultivating seaweed.

“It gives me great pleasure to see these inhabitants hanging out in the seaweed we’re planting,” Godfrey says. If more fish return to the area, he and Tucker would like to bring tourists to their operation. “We’ll still go to out to Keys, but we’ll also bring them to the seaweed farm, too, and show them what we’re doing and tell them why.”

Godfrey says he’d like to see more young people join him in seaweed cultivation, especially those who might otherwise pursue fishing or lobstering. As in Indonesia, many of Belize’s wild stocks are overfished and declining, creating both environmental and economic problems. A growing aquaculture presence could address both issues—creating jobs and food while minimizing environmental impact.

“Meeting the growing demand for seafood is an enormous business opportunity for poverty alleviation,” says Randall Brummet, a senior fisheries specialist at the World Bank. “Aquaculture, done in a socially and environmentally friendly manner, is the only way to ramp up supply to meet this demand, creating jobs and generating revenues while taking pressure off over-stretched capture fisheries.”

And, for people like Luis Godfrey, aquaculture can offer not just a source of income, but a meaningful vocation. “Just being in the water excites me, gives me more pleasure,” Godfrey says. “The sea life is my life.”