THE BLUE ECONOMY CHALLENGE

Join us as we reengineer AQUACULTURE *for* SUSTAINABILITY *to achieve a* BLUE REVOLUTION *for our oceans*

INNOVATOR'S HANDBOOK

Australian Government
Department of Foreign Affairs and Trade

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SECONDMUSE

NINESIGMA

A BLUE REVOLUTION FOR THE OCEANS

THE CALL TO ACTION

Aquaculture, the farming of fish and other seafood, has great potential to contribute to food security, nutrition, and economic growth for the developing world. It is currently the fastest growing animal food producing sector, and an increasing source of protein for human consumption. Most aquaculture occurs within the developing world. Despite its increasing importance, current aquaculture methods are neither sustainable nor scalable. The Blue Economy Challenge seeks to find ways to rethink aquaculture inputs, design, and products in way that meets human sustainability and development through long-term ecological sustainability.

THE PROBLEM

Global demand for protein is anticipated to skyrocket in the coming decades. Aquaculture has the potential to produce a significant proportion of the world's nutrition. While fisheries globally are nearing the point of collapse, the worldwide demand for protein is expected to continue to grow rapidly, especially as large populations in developing countries gain wealth and adopt middle-class diets higher in protein. Aquaculture is projected to at least double in outputs by 2050. This projection may be conservative, as aquaculture increasingly is a solution for offsetting land-based sources of protein. Aquaculture food supply per capita and total production value have grown at an annual rate of almost 9% for decades, and although this rate is around 6-6.5% today, farmed seafood has overtaken production from capture fisheries. Fish farming enables seafood consumption (and access to protein) to continue to increase even as marine fisheries production has flat-lined.

While the current aquaculture industry is a vital producer for the global fish market, supplying 58 percent of the fish we eat, much aquaculture (particularly predatory fish and prawn) remains unsustainable, degrading both land and marine habitat, risking the introduction or spread of invasive species and pathogens, and polluting surrounding ecosystems. Many aquaculture farms are also economically unsustainable. Ninety percent of aquaculture occurs in the developing world where lack of access to current technologies and capital, coupled with weak regulation, are barriers to change. Moreover, aquaculture is often a direct response to depleted fisheries, yet the aquaculture industry relies heavily on wild-caught fish to feed captive fish, which could lead to overfishing and undermine human and environmental sustainability in the long-term.

The opportunity for reengineering aquaculture in the Indian Ocean Region (IOR) is great. People in a number of developing countries of the IOR rely on fish for over half of the animal protein in their diets (i.e. Bangladesh, Comoros, Indonesia, Maldives, and Sri Lanka) [FAQ], and this will likely increase with growing populations. In 2012, aquaculture production in Southern and Eastern Asia (excluding China) accounted for 26% of world total production [FAQ] and in Indonesia, fishing and fish farming employs nearly 6 million people [FAQ]. With improvements and growth in the aquaculture industry, this sector could potentially improve the food security and livelihoods of many people in the developing economies of the IOR.

Aquaculture can be the protein source of the future, yet as the industry currently stands, it is in need of innovations to improve efficiency, sustainability, and long-term viability. Accordingly, we are inviting you to solve three of its major challenges.

WHY A CHALLENGE?

A Challenge is a new approach to an old problem. At the highest level, it is an open process that expands the pool of talent, creativity, and disciplines to find, create, incubate, and accelerate effective and impactful solutions to complex problems. With this approach, openness and participation are the catalysts for innovation.

Our philosophy of open innovation is (a) to harness prestige and intellectual curiosity to develop challenges, prizes, and crowdsourcing that will inspire individuals and teams to push past conventional limits and thinking and breakdown intractable barriers to change; (b) to encourage the development of new breakthrough innovations and solutions for aquaculture; (c) to entice new innovators from outside of the field to bring their ideas to bear on critical challenges and challenge traditional views and biases; and (d) to create new communities of practice that are focused on aquaculture and attract new solvers and solutions to particular problems, opening the door for new entrants and building momentum for new industries.

By thoughtfully opening up organisational and industry-wide challenges to the masses, we can unleash the creative potential that has the promise to make a lasting positive impact as people contribute their talents to issues they care deeply about.

The result is faster, better and cheaper solutions that will help us meet the growing demand for protein, and end hunger, improve economic outcomes, and sustain our oceans for future generations.

THE CHALLENGES

Challenge 1
RETHINKING FEED FOR AQUACULTURE

The Problem

While helping to relieve pressure on at-risk and collapsed fisheries, aquaculture has its own unique sustainability challenges. The most direct concern is the feed used in aquaculture. It accounts for 40-70% of production costs and puts heavy demands on wild fisheries, which are the primary source of current feeds. With the dramatic growth in the aquaculture industry, prices for fishmeal and fish oil—prime constituents of many aquaculture feeds—are increasing.

Fishmeal and fish oil largely come from harvested pelagic fish like anchovies or menhaden, which are currently sustainable fisheries, but these resources might be used for other beneficial purposes. Remarkably, for a yield of one kilo of farmed fish, particularly carnivorous fish, it can require inputs of up to 20 kg of wild fish. Further, some of the species harvested for fishmeal and oil are targeted indiscriminately and even referred to as "trash fish" when in actuality the catch from these trawls can include numerous fish of high value and ecological significance that are necessary for food security and sustainability.

By incentivising the creation of replacements for wild fish in feed, aquaculture could become significantly more sustainable, nutritious, and profitable. Moreover, by reducing the price of sustainable feed it could allow smaller farmers to enter the market. Potential replacement solutions include generating feed from soy, seaweed, ethanol/biofuel waste products, algae, yeast, bacteria, and insects

The Challenge

Create highly nutritional aquaculture feed replacements that matches or improves on the cost and nutritional performance of existing feedstock while reducing the burden on the natural environment. New feed replacements should eliminate or dramatically minimise their impact on wild fish stocks and and other environmental systems not use agricultural products used for human consumption. Feed replacements should have equal or greater nutritional value per dollar compared to commercially available fishmeal.

Criteria

Environmental Sustainability. Feed replacements should eliminate or dramatically minimise their impact on wild fish stocks. Feed replacements should not have any measurable increase in the use of antibiotics. The solutions will include clear mitigation plans for feed replacement that involves any potential trade offs in deforestation or excess demand on existing food and agriculture systems (i.e. corn, grain, etc.). Feed replacements must not deplete wild fishery stocks or offset other human-nutritional products (e.g. agricultural products currently used for direct human consumption). Replacement feed stocks for aquaculture that also can serve as substitutes for other types of feed will be favored.

Cost & Performance Criteria. These criteria include improved performance on a species' traditional feed conversion ratio, the expected profitability or the marginal costs and revenue for the feed replacement at scale, and the feasibility for scalability of the feed replacement to multiple identified geographies (i.e. market growth). The price point for the feed replacement should be US $1,500 ton/meal and US$750/ton to manufacture or lower. The feed replacement should have equal or greater nutritional value per dollar compared to benchmarked feed for protein (protein performance should be better than or as good as commercially available fishmeal), micronutrients, and Omega 3. As applicable, the feed replacement should demonstrate energy, material, and resource efficiency advantages.

Examples

1. Replacement fish feed from micro or macro algae or other nontraditional feed sources that minimise the number of trophic levels.
2. Feed replacements that can be generated in a closed-loop system that minimise direct or indirect environmental damage.

Challenge 2
DEVELOPING NEW OCEAN PRODUCTS

The Problem

The vast majority of aquaculture farms produce only a few products such as shrimp and certain finfish. In some cases, fish and other species from aquaculture farms can be less nutritious than wild fish and even potentially unhealthy for humans as a result of bioaccumulation of antimicrobial carcinogens, antibiotics, and toxic algae. There has been less focus placed on domesticating new wild fish species or on developing plant and shellfish products.

Harvesting seaweed or other ocean plant/algae, however, may have significant potential for providing sustainable food supplies, particularly in integrated production systems. These new products could improve local economies if they are successfully marketed locally or globally. Products made from seaweed, algae and kelp, for example, are not always palatable to a wide audience despite their high protein content. Some products may also provide environmental benefits. For example, seaweed production (such as sea lettuce) may be net-carbon-negative and improve local water chemistry affected by ocean acidification on a local level. Similarly, red seaweed thrives in nitrogen-polluted waters and removes excess nitrogen from the water.

The Challenge

Create new ocean products that vastly expand the diversity, sustainability, and quality of aquaculture products to meet growing food security needs while decreasing aquaculture's environmental footprint. Solutions must explicitly address the environmental sustainability and consumer acceptance of the product.

Criteria

Environmental Sustainability. The new ocean products must not cause environmental harm to an existing species, ecological communities or ecosystems, through direct or indirect effects. They must demonstrate system gains in sustainability, especially improved efficiency in energy, material, and resource advantages compared to existing aquaculture products. Products that also help address other environmental challenges, while producing new sources of food and nutrition for the developing world, are especially welcome.

Consumer demand. There must be a clear plan to demonstrate palatability, nutritional quality, pathway to scale and adoption, expected profitability for the new ocean product at scale, including across multiple identified geographies.

Examples

1. Production of food from algae for either humans or as inputs to aquaculture or agriculture farming systems.
2. Palatable products for local and/or international consumers using alternative ocean protein sources. For example, dulse, the red algae (seaweed) that tastes like bacon.
3. Production of more varied invertebrates or low trophic-level fish species.
4. Domestication of wild caught local fish (or other products) that are more suited to growing in local conditions lessening risk of contamination and environmental damage or contamination.

Challenge 3
SUSTAINABLE DESIGN FOR AQUACULTURE

The Problem

Aquaculture as an industry is poorly managed and relatively unregulated globally. According to the FAO, around 90% of the world's 18.9 million fish farmers are small-scale producers from developing countries. Access to the latest technology and practices for aquaculture farmers in developing countries remains a challenge due to a lack of information, training and capital. With 90 percent of the world's aquaculture taking place in developing countries it is essential that these farms are productive, economically and environmentally sustainable and that farmers can benefit from the latest technological and scientific advances.

Radical improvements in design can rethink both where we grow fish, as well as how we grow them. While redesigning aquaculture systems to reduce their environmental impact on coasts, we may alternatively rethink the need to grow fish in coastal waters. New techniques for open-ocean aquaculture could relieve pressure on near coast ecosystems and open up significant new space for producing seafood. Similarly, there may be opportunities to integrate aquaculture with terrestrial agriculture far from the coasts. Combined agriculture and aquaculture farms can also create new sources of vegetarian feed that provide substitutes for fish-based feeds, diversify incomes, and create secondary products through high quality organic fertilisers. Aquaculture in urban environments serves to bring food closer to consumers. Other models of urban aquaculture propose using barges to cycle riverine water through racks of mollusks to grow seafood while reducing the nutrient pollution in urban environments. Finally, significant opportunity exists in aquaponics, wherein aquaculture is integrated with farming such that high value plants directly utilise nutrient wastes from the fish produced.

Major economic pressures in the form of rising feed prices and denuded coastal habitat may also present opportunities to introduce better and more sustainable feed technologies or farming practices. Sustainable businesses can also demand higher prices for their products, create new distribution networks that help producers access larger or higher value markets, and be better insulated from price volatility. Finally, as with other forms of agriculture many aquaculture farms also suffer from inefficient storage, logistics and management, which reduces their ability to maximise productivity. Not having easy and reliable access to markets, both domestic and international, reduces the economic benefits for local communities.

The Challenge

Introduce new designs, methodologies, products and other innovations that are financially and environmentally sustainable, scalable, and will dramatically improve the efficiency of the farms thereby improving productivity, livelihoods, and market value. Solutions must be an entire aquaculture system design and they must decrease the total system loss compared to benchmarked systems (entries must compare system to status quo even if the solution is novel). These designs could support the uptake of the latest aquaculture farm designs, but in a cost-effective and culturally suitable way for subsistence farmers and small to medium sized aquaculture enterprises in developing countries. Such design improvements may include improvements in access to a market for their produce, including mechanisms, processes or technologies that can improve post-farm gate activities (including finance, distribution and transport) of aquaculture products.

Examples

1. Closed loop multitrophic systems that repurpose waste and diversify risk for the farmer.
2. Simple and easy to deploy aquaculture farm designs eg. 'Farm in a box'.
3. Farm system designs for farming of low trophic-level fish species, algae, invertebrates, or species that have a high feed conversion ratio.
4. Novel designs that rethink where aquaculture should take place that increase the efficiency, development impact, and sustainability over existing aquaculture systems. This includes aquaculture within cities, on barges, in reclaimed land, or farther offshore in the open ocean.
5. Solutions that eliminate water pollution from antibiotics, herbicides, pesticides, piscicides, disinfectants, suspended solids, and other effluents, and work to build up natural capital rather than degrade it, for development and sustainability benefits.
6. Solutions that reduce the number of trophic levels involved in the final aquaculture products, such as mariculture where the fish are fed feed from plants (i.e. seaweed) rather than from other animals.
7. Online tools that connect aquaculture farmers with distributors and markets, or improve the efficacy of supply chains within local, regional, national or international markets.

SELECTION CRITERIA

A global panel of experts from conservation, development, industry, and finance will assess the challenge entries against the following criteria:

- **Transformative**: whether the idea is revolutionary, novel, or questions fundamental assumptions in its approach.
- **Impactful**: whether the proposed idea will make a significant contribution in advancing conservation efforts or in improving the lives of people through dramatic improvements in efficacy, speed, efficiency, or cost.
- **Scalable**: whether the proposed idea is replicable and scalable to different communities, species, and contexts.
- **Sustainable**: whether the proposed idea is sustainable in both its design and tenure.
- **Feasible**: whether the proposed solution is realistic with an acceptable degree of risk, and noting where it sits on the development spectrum, from idea to deployment.
- **Profitable**: whether the proposed solution will be profitable or financially beneficial to those who seek to implement it, or will lead to intellectual property with the potential to be acquired and scaled through the developing world.
- **Leadership Potentia**l: individuals are vital to the success or failure of any endeavor. We will assess the leadership potential of the innovators and our ability to assist them in developing their skills.

ADDITIONAL FACTORS

Applicability of the Solution to the Developing World

All solutions must be feasible and suitable for aquaculture within the developing world with specific applicability to the Indian Ocean. This includes considering the environments and contexts where these solutions will be implemented, as well as education levels, costs, functionality, reliability and maintainability, distribution and supply chain, and scalability issues unique to the developing world. Finally, the solutions need to achieve benefits for the constituents of the challenge in terms of food security, economic growth and opportunity, and nutrition.

CHALLENGE TIMELINE

29 FEB 2016 – Challenge Opens: Collaborate, Innovate, & Submit

During this phase, applicants will submit their project ideas to address the challenges.

Applications Close on 30 June 2016 at 23:59, Canberra, Australia, time zone (GMT +11).

30 JUNE 2016 – 29 July 2016 - Review

Applications will be reviewed by a committee of global experts. The top 20 applicants will be notified in early August 2016.

AUGUST 2016 – Prepare

The top 20 applicants will prepare presentations for a virtual pitch session in August.

AUGUST 2016 – Demonstrate

The top 20 applicants will present their solutions to a panel of judges via Skype.

September – October, 2016 – Showcase & Award

DFAT will award AU$3 million to the top innovators. The products will be showcased to investors, as well as the development and aquaculture communities to garner support for scaling and adoption.

AWARDS

We will award up to AU$750,000 for solutions and innovations in the following categories:

DESIGN AND VALIDATION (UP TO AU$250,000)	POSITIONING FOR SCALE (AU$250,000-750,000)
Early stage financing allows you to validate your design for performance in the field. This iterative process can help shape your innovation and address any unforeseen difficulties or barriers.	**Late stage** financing supports innovations that performed well in the field and warrant market testing. This scaling process can help assess regional sensitivities, refine operational procedures and validate business models.
At this small scale, is it technically and financially feasible? Appropriate for the Indian Ocean region? In what ways does it improve on current practice?	*Is there successful uptake market integration? Will the social and environmental impacts improve lives and support a sustainable blue economy? Can this grant be used to leverage and unlock other finances?*
• The Blue Economy Challenge will not accept submissions that are lab bench scale, theoretical design, or limited to ideas on paper. • Prototypes or solutions must be at the stage of development to field test within 12 months of the award being granted.	

Design, Testing, and Iteration (Early Stage): The introduction of a solution in the field to gain an early, real-world assessment of the solution, to allow for further design and iteration, and to position the innovation for scale. This includes assessment of the technical, organisational, consumer demand, distribution, and financial viability aspects of the solution. Key activities could include initial field testing, assessing user feedback or demand, willingness to pay, and product design, as well as documenting social outcomes and real-world costs to implement the solution.

Testing and Positioning for Scale (Late Stage): Innovations beyond the prototype stage, where there is evidence of their success and uptake, and for which additional funding would allow the innovation to move toward scale within a single country or region. This may include testing for development impact, improved financial and nutritional outcomes and/or market viability, as well as an operational refinement to build paths to sustainability and scale.

All submissions will be judged against a set of selection criteria and assessed for scientific/technical rigour, cost effectiveness, cultural sensitivity and inclusion, and consideration of measurable development and environmental impact against current practices.

'We are just beginning to glimpse the enormous challenges and opportunities presented to us by oceans – in our case the mighty Indian Ocean.'

- Minister for Foreign Affairs, The Hon Julie Bishop MP

APPLICATION FORM PREVIEW

The online application form will be as follows. Please use this preview to prepare, but please note this is **not** a valid form.

All applications must be made online at: theblueecomonychallenge.org/application

Application Fields

**Denotes a required field*

1. **Organisation Name** (If you are not submitting this as part of an organisation, list your affiliation):*
2. **Organisation Type** (academic, industry, NGO, multilateral organisation, other_____)*
3. **Country where organisation is located**:*
4. **Phone Number**: * (Include Country Code)
5. **Team Members**:* (Table for all team members – name, email, nationality, and gender)
6. **Project Title**: *

7. What Challenge topic are you applying to?:*

(You many choose to submit more than one application if you want to apply to multiple challenge topics)

- o Challenge 1: Rethinking Feed for Aquaculture
- o Challenge 2: New Ocean Products
- o Challenge 3: Sustainable Design

8. Executive Summary: * (Up to 150 words)

Please provide a high level overview of your innovation, including the potential novelty and impact of the innovation for aquaculture in the developing world.

9. What award stage are you applying for?*

- o Design and Validation -- Early Stage
- o Positioning and Scale -- Late Stage

10. What is your proposed solution/innovation?* *(up to 750 words)*

provide an answer based on the challenge you are applying for.

10a. Project Details: Challenge 1: Rethinking Feed for Aquaculture

What is your proposed solution/innovation? (up to 750 words)*

Please outline your proposed aquaculture feed replacement that matches or improves on the cost and nutritional performance of existing feedstock while reducing the burden on the natural environment. Include within your proposal the nutritional performance specifications with regard to protein, micronutrients, and omega 3s. Also include the performance specifications for cost and profitability; energy; material and resource efficiencies; environmental sustainability over existing wild caught fish feeds; other necessary factors.

Nutritional & Performance Criteria. Include the nutritional performance specifications of your proposed aquaculture replacement feed with regard to protein, micronutrients, and Omega 3s. The feed replacement should have equal or greater nutritional value per dollar compared to benchmarked feed for protein (protein performance should be better than or as good as commercially available fishmeal), micronutrients, and Omega 3. Demonstrate if there is decreased feed conversion ratios or an improved percent on a species' traditional feed conversion ratio for the feed replacement.

Continued

Environmental Sustainability. Please describe how feed replacements eliminate or dramatically minimise their impact on wild fish stocks and do not have any measurable increase in the use of antibiotics. Feed replacements must not deplete wild fishery stocks or offset other human-nutritional products (e.g. agricultural products currently used for direct human consumption). The solutions will include clear mitigation plans for feed replacement that involves any potential trade offs in deforestation or excess demand on existing food and agriculture systems (i.e. corn, grain, etc.). Replacement feed stocks for aquaculture that also can serve as substitutes for other types of feed will be favored. Include performance specifications to demonstrate energy, material, and resource efficiency advantages, and environmental sustainability over existing wild caught fish feeds.

Cost Criteria. Please describe the expected profitability or the marginal costs and revenue for the feed replacement at scale, and the feasibility for scalability of the feed replacement to multiple identified geographies (i.e. market growth). The price point for the feed replacement should be US $1,500 ton/meal and US $750/ton to manufacture or lower.

10b. Project Details: Challenge 2: New Ocean Products

What is your proposed solution/innovation? (up to 750 words)*

Please outline your proposal for a new ocean aquaculture product. Describe how the product could meet food security needs and/or lead to economic growth. Directly address the environmental sustainability of the product, including improvements in energy, material and resource advantages compared to existing aquaculture products. Please demonstrate how you will generate consumer demand and adoption by meeting palatability (human or otherwise) and nutritional criteria.

10c. Project Details: Challenge 3: Sustainable Design

What is your proposed solution/innovation? (up to 750 words)*

Please outline your proposal for new aquaculture system designs, methodologies, products and other innovations that are financially and environmentally sustainable, scalable, and dramatically will improve the efficiency of the farms. Directly address how the proposed solution/innovation will improve productivity and livelihoods. Solutions must be an entire aquaculture system design and they must decrease the total system loss compared to benchmarked systems (entries must compare system to status quo even if the solution is novel).

Such design improvements may also include improvements in access to a market for their produce, including mechanisms, processes or technologies that can improve post-farm gate activities (including finance, distribution and transport) of aquaculture products. These designs could support the uptake of the latest aquaculture farm designs, but in a cost-effective and culturally suitable way for subsistence farmers and small to medium sized aquaculture enterprises in developing countries. Such solutions must reflect the technological maturity of the relevant markets, must consider energy supply/requirement issues, must be environmentally sustainable, and must not increase the overall net costs of post farm gate activities.

11a. Early Stage applicants: In 500 words or less, please describe your prototype, who your users, customers, and partners will be, and what the existing and proposed funds will be used for, including descriptions of potential field tests, and business scaling strategy.

11b. Late Stage applications: In 500 words or less, please provide evidence of the impact of your innovation to date, the results of any field tests, evidence demonstrating performance and/or adoption of your innovation, and how these funds would help you scale your innovation within the Indian Ocean region, including through unlocking additional financing, or securing additional partners.

12. What is the applicability of your proposed solution/innovation to the Indian Ocean countries? *(up to 500 Words)*

Please describe the feasibility and suitability of your solution for aquaculture within the Indian Ocean region, as well as developing countries more generally. Specifically, describe how your solution would work within the environments and contexts where these solutions will be implemented, including local capacity, operating costs, functionality, reliability and maintainability, distribution and supply chain, and scalability issues unique to the pilot region context. You may include web links to images or videos to illustrate your solution. You can include more supplemental materials further down this page.

13. Supporting Evidence *(up to 500 words)*

We are looking for solutions/innovations that are beyond a theoretical concept. In this section, please provide supplementary materials that show the level of development of your solution/innovation. You may provide images, videos, scientific peer-reviewed

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articles, white papers, product brochures or case studies of your proposed solution. You can refer to specific sections of these supplementary materials to backup the requirements for Early Stage and Late Stage grants (i.e. a scientifically robust strategy or a statistically robust evidence of impact). When possible, please include publicly available materials through URL's.

You may include up to two pdf files: List URLs, one per line.

14. Describe your team, including your combined relevant experience, and leadership potential* *(Enter up to 250 words.)*

15. Describe your in-country partners (if you have any) who will help you implement your innovation/solution. In which country do you plan to pilot your innovation/solution?* *(Enter up to 250 words)*

16. What are the three key things that are critical to take your solution to scale in the Indian Ocean in the next 2-3 years and why? How will you address these?* *(Enter up to 500 words.)*

17. From the AU$3 million Challenge Fund – how much funding do you require to implement your solution or run a pilot as described above? Early Stage grants are up to AU$250,000 and Late Stage grants range from AU$250,000-AU$750,000. * ___ AU$

18. How do you expect to utilise the funding? Provide a brief outline of how you plan to spend the grant.* *(Enter up to 250 words.)*

19. Please describe your business case for your innovation/solution and how the grant funding will catalyse your operations?* *(Enter up to 150 words)*

20. Please describe any funding that you have received so far to develop the solution/prototype. What was the source of this funding? Are there any in-kind or financial contributions that you (or your partners) would make to this program? *(Enter up to 125 words. For example, previous investment, crowdfunding, bank loans or grants.)*

21. Where can we learn more about your project?

- o Website:
- o Twitter:
- o Other:_____

22. How did you hear about the Blue Economy Challenge

(check all that apply)?

- o NineSigma Ninesights Community
- o ConservationXLabs
- o innovationXchange
- o DFAT
- o Word of mouth
- o Twitter
- o Facebook
- o Email
- o Other_____

Continued

Application Submission

23. Please confirm that, if your application is a finalist, at least one team member can participate virtually by Skype for a virtual pitch session sometime in August 2016. [ ] Agree

24. I have read and understand the terms and conditions below. * [ ] Agree

Terms & conditions

- I am submitting to the Blue Economy Challenge only non-confidential materials which I have the rights or permissions to distribute. I warrant that the materials I submit and DFAT's use of these materials will not infringe on the Intellectual Property Rights or Moral Rights of any person.
- I am authorised to submit this material to the Blue Economy Challenge. I indemnify all Challenge participants, partners and organisers, and all DFAT officers, employees, contractors and/or agents from and against all claims arising in relation to my submission, and/or intellectual property.
- These terms and conditions do not affect the existing ownership of intellectual property.
- I grant Blue Economy Challenge organisers, partners, and DFAT officers, employees, contractors and/or agents, a perpetual, worldwide, royalty free, non-exclusive license to share and distribute my submission materials for review purposes and for the marketing and promotion of the Blue Economy Challenge program.
- I understand that the Challenge organisers may alter the Terms and Conditions at any time after informing all applicants of the changes in writing.

[Preview & Submit Button]

DEFINITIONS AND TERMS

Questions about aquaculture: the U.S. National Oceanic and Atmospheric Administration (NOAA) has a useful site "Basic Questions about Aquaculture."

Bioaccumulation – The accumulation of substances, like pesticides or other chemicals, in an organism when it is exposed to and absorbs substances in air, water, food, soil, etc.

Closed-loop multi-trophic system – "Closed-loop" or recirculating aquaculture systems (RAS) are systems that continuously filter and recycle water. Multi-trophic means that there are multiple tropic levels, or species that occupy different levels of the food chain. "Integrated multi-trophic aquaculture" (IMTA) is a practice where by-products from one aquatic species acts as inputs for another.

Disinfectants – Antimicrobial agents applied to non-living objects, including water for wastewater treatment, to destroy microorganisms.

Effluents – Wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Environmental (ecological) sustainability – The short Wikipedia definition of "sustainability" is "the capacity to endure." Three broad criteria for ecological sustainability are: the rate of harvest of renewable resources should not exceed the rate of regeneration; for non-renewable resources, there should be equivalent development of renewable substitutes and; waste generation should not exceed the capacity of the environment to assimilate (adapted from Herman Daly. 1990. Toward some operational principles of sustainable development. Ecological Economics). In the context of this challenge, solutions and innovations must not cause environmental harm to an existing species, ecological communities or ecosystems, through direct or indirect effects.

Feed conversion ratio– A measure of an animal's efficiency to convert feed mass into mass gained by the animal.

Herbicides – Chemicals used to control unwanted plants.

Macro algae – Also known as seaweed, these are the multicellular algae.

Micro algae – Also known as microphytes, microscopic unicellular algae.

Natural capital – The economic notion of capital, but applied to goods and services provided by the natural environment. Natural capital assets provide people with free goods and services. For example, a mangrove provides coastal protection from storms and it also provides fish-spawning grounds.

Piscicides – A class of pesticide that is poisonous to fish.

Pesticides – A chemical or biological agent used to control or destroy "pests."

Supply chain – A system that moves products or services from the supplier to the customer.

Suspended solids – small, solid particles that do not dissolve in water, but remain in suspension. The amount of suspended solids is an indicator of water quality.

Sustainable development – There are three generally accepted "pillars" of sustainability: economic, environmental, and social/cultural. In the context of this challenge, refer to the United Nation's Sustainable Development goals for a comprehensive overview.

Trophic-level – The position an organism occupies in the food chain: primary producers (plants – algae and seaweed), herbivores, and predators.

CONTACT

For more information please contact us at:
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http://theblueeconomychallenge.org

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