Aquaculture Stewardship Council

ASC Pangasius Standard

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Responsibility for this Standard

The Technical Advisory Group of the Aquaculture Stewardship Council is responsible for this document.

Versions Issued

Version No.	Date	Description Of Amendment
0.1	August 2010	Original version developed and approved by the Pangasius Aquaculture Dialogue Steering Committee under the original title "Pangasius Aquaculture Dialogue Standards"
0.1	May 2011	Handover of the Standard by the Pangasius Aquaculture Dialogue Steering Committee to the Aquaculture Stewardship Council
1.0	January 2012	Update of the Standard to meet ASC style requirements (e.g. inclusion of introduction chapters 'about the ASC' and 'overview of the ASC system', formatting and wording). The content of the actual Standard remained unchanged from version 0.1.

About the ASC

ASC is the acronym for Aquaculture Stewardship Council, an independent not for profit organisation. The ASC was founded in 2009 by the WWF (World Wildlife Fund) and IDH (The Sustainable Trade Initiative) to manage the global standards for responsible aquaculture. ASC's standards were first developed by the Aquaculture Dialogues, a series of roundtables initiated and coordinated by the WWF.

What the ASC is

The ASC's aquaculture certification programme and label recognise and reward responsible aquaculture. The ASC is a global organisation working internationally with aquaculture producers, seafood processors, retail and foodservice companies, scientists, conservation groups, social ngo's and the public to promote the best environmental and social choice practices in aquaculture.

What the ASC does

Working with partners, the ASC runs a programme to transform the world's aquaculture markets by promoting the best environmental and social aquaculture performance. The ASC seeks to increase the availability of aquaculture products certified as sustainable and responsibly produced. The ASC's credible consumer label provides third party assurance of conformity with production and chain of custody standards and makes it easy for everyone to choose ASC certified products.

What the ASC will achieve

The ASC is transforming aquaculture practices globally through:

Credibility: Standards developed according to ISEAL guidelines, multi-stakeholder, open and transparent, science-based performance metrics.

Effectiveness: Minimising the environmental and social footprint of commercial aquaculture by addressing key impacts.

Added value: Connecting the farm to the marketplace by promoting responsible practices through a consumer label.

Overview of the ASC System

The ASC system is made up of 3 components:

1. Aquaculture Farm Standards

The ASC works with independent third-party certification organizations that provide certification services for aquaculture operations that grow one or more of the species for which the standards have been, or are being, developed by the Aquaculture Dialogues.

The species groups were chosen because of their potential impact on the environment and society, their market value and the extent to which they are traded internationally or their potential for such trade. The species covered include: abalone, bivalves (clams, oysters, mussels and scallops), cobia, freshwater trout, pangasius, salmon, seriola, shrimp, and tilapia.

Through the Aquaculture Dialogues more than 2,200 people have participated in the development of the ASC Standards including fish farmers, seafood processors, retailers, foodservice operators, NGOs, government agencies and research institutes. Universal, open and transparent, the Aquaculture Dialogues focused on minimising the key environmental and social impacts of aquaculture. Each Dialogue produced standards for one or a range of major aquaculture species groups. The standard creation process followed guidelines of the ISEAL Alliance the *ISEAL Code of Good Practices for Setting Social and Environmental Standard*. This code of good practice complies with the ISO/IEC Guide 59 *Code of good practice for standardization*, and the WTO Technical Barriers to Trade (TBT) Agreement Annex 3 *Code of good practice for the preparation, adoption and application of standards*. The standards are science-based, performance-based and metrics-based and will apply globally to aquaculture production systems, covering many types, locations and scales of aquaculture operations.

2. Independent 3rd Party Audits Conducted by accredited Conformity Assessment Bodies (CAB)

Farms that seek ASC certification hire a CAB (conformity assessment body) that has been accredited by Accreditation Services International GmbH. (ASI). Only farms that are certified by a CAB accredited by ASI are eligible to sell certified product into a recognized chain of custody and have that product eligible to carry the ASC ecolabel.

Accreditation is the process by which CABs are evaluated to determine their competency to provide certification to the ASC standards. The accreditation process includes annual evaluations of each accredited CAB and the ASC audits they perform. ASC has exclusively appointed ASI to provide accreditation services for ASC. ASI is fully independent of ASC. ASI is based in Bonn, Germany and also provides accreditation services to Forest Stewardship Council (FSC) and Marine Stewardship Council (MSC). Despite similar sounding names, all of these organizations are independent of ASC.

ASI is responsible for evaluations of CABs against the requirements in this document. All accreditation decisions are taken independently by ASI. The independence of ASC, ASI and the CAB ensures that high quality, objective audits and certification decisions are performed without bias for all clients around the world.

3. MSC Chain of Custody Certification and the ASC ecolabel

The ASC ecolabel has been developed for use by certified and licensed farms, processors and distributors so that all parts of the value chain and especially consumers can easily identify ASC

certified product(s). The use of the ASC ecolabel can be applied only to products that are sold through a consecutive, certified chain of custody that ensures traceability of certified products from production to final point of sale. For ASC, chain of custody is certified through application of the MSC chain of custody system, to which ASC CoC requirements have been added as a scope, to ASC certified aquaculture products. Only products that originate in ASC certified farms and are sold through an MSC certified chain of custody (with ASC CoC scope) are eligible to carry the ASC ecolabel.

Just as with the ASC standards, the ASC ecolabel is owned by ASC which regulates all aspects of its use.

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INTRODUCTION

Seafood is one of the most important sources of protein worldwide. Half of the seafood we eat comes from aquaculture; it is the fastest-growing food production system in the world. However, as the industry expands, so does its footprint on the environment and on society. It is imperative that we face the challenge of minimising these potentially negative impacts. The goal of Aquaculture Stewardship Council (ASC) is to transform aquaculture towards an environmental and social responsible food source.

One of the cornerstones of this transformation is creating robust and credible requirements for responsible aquaculture production. Requirements help reassure seafood buyers that aquaculture products do not harm the environmental or have socially adverse impacts. One way buyers can support sustainability is by purchasing certified products that have been produced in compliance with the ASC Standard.

Through a multi-stakeholder process called the Pangasius Aquaculture Dialogue (PAD), science-based requirements for the pangasius aquaculture industry have been created. The requirements, combined in the "ASC Pangasius Standard", are numbers and/or performance levels that must be reached to determine if an issue is being addressed. The requirements, when adopted, will help minimize the key negative environmental and social issues associated with pangasius farming.

- Each requirement is based on an issue, impact, principle, criteria and indicator, as defined below:
- Issue: A concern to be addressed
- Impact: Matters that need to be minimized
- Principle: The high-level goal for addressing the impact
- Criteria: The area to focus on to address the impact
- Indicator: What to measure in order to determine the extent of the impact

The ASC Pangasius Standard is the product of the 600-plus people who participated in the PAD from September 2007 until its completion in August 2010. This includes producers, environmental and social non-governmental organizations, retailers, aquaculture associations, academics, researchers, government representatives, independent consultants and others. The PAD was coordinated by World Wildlife Fund (WWF).

The ASC Pangasius Standard and process are described in this document, along with the underlying rationales for how particular requirements are intended to address key impacts. The document will be supplemented by an auditor guidance document detailing the methodologies used to determine if the ASC Pangasius Standard is being met, as well as a Better Management Practices (BMP) manual explaining specific steps that can be taken by producers to achieve the ASC Pangasius Standard. The BMP manual will be particularly useful to those producers who do not have the capability to test new and innovative techniques that could be used to meet or exceed the ASC Pangasius Standard.

PURPOSE, JUSTIFICATION AND SCOPE OF THE STANDARD

Purpose of the Standard

The purpose of the ASC Pangasius Standard is to provide a means to measurably improve the environmental and social performance of pangasius aquaculture development and operations.

Justification for the Standard

The justification for the standard, as agreed by consensus at the first PAD meeting, is based on the following points:

- Pangasius is increasingly popular among consumers. While it used to only be eaten in Vietnam, it is now exported to more than 100 international markets.
- Pangasius farming is experiencing an extremely fast growth, with production increasing more than 60-fold in the last decade.
- There is a desire by the stakeholders who participated in the PAD to safeguard the sustainability of pangasius farming and consumers' safety, therefore maintaining quality and productivity.
- There is a need to be proactive rather than reactive to problems.
- There is a need for a multi-stakeholder, consensus-based and transparent process to create metrics-based requirements.

Scope of the Standard

Issue areas of pangasius aquaculture to which the Standard applies

The ASC Pangasius Standard established principles, criteria, indicators and standards to address the negative social and environmental issues related to pangasius aquaculture.

Operational components of pangasius aquaculture to which the Standard applies

Pangasius aquaculture and its value chains generally consist of the following operational components:

- Supply chain inputs (e.g., water, seed, feed, chemicals and medicines)
- Production systems (e.g., ponds, pens and cages, as well as the other equipment and operations associated with production)
- Processing
- Chain of custody (e.g., from production, through processing, export, import, distribution and retail)

The ASC Pangasius Standard is designed to address the most significant impacts of pangasius aquaculture, which are mostly from the production systems and the immediate inputs to production (e.g., feed, seed and water).

The ASC Pangasius Standard apply to all production systems currently used for pangasius production, such as ponds, pens and cages. Throughout the standard, the word "farm," therefore, is used to indicate an establishment which uses either ponds, pens or cages to produce pangasius.

Species and geographic scope to which the Standard applies

The ASC Pangasius Standard applies to the production of two pangasius species: *Pangasianodon hypophthalmus*[1] and *Pangasius bocourti*[2].

The ASC Pangasius Standard applies globally to all locations and any scale of pangasius aquaculture production system.

Unit of certification to which the Standard applies

The unit of certification is the specific aquaculture operation to be assessed and monitored for compliance with the Standard. The size of the production operation can vary considerably and needs careful consideration when determining the entity that will seek certification. As the focus of this Standard is on production and the immediate inputs to production, the unit of certification will typically consist of a single farm or some other, yet to be defined, entity.

The unit of certification may also encompass a group of operations that, logically, should be considered collectively, especially in the case of small-scale farms producing the same species and using similar management regimes. For example, they may be in close proximity to each other, share resources or infrastructure (e.g., water sources or effluent discharge systems), share a landscape unit (e.g., a watershed), and/or be under the same management. This group or cluster must be a legal entity that shares a common management structure so that the ASC Pangasius Standard is binding for each individual producer. Certification will not be transferable to another farm, production site or production system that does not undergo auditing.

Regardless of the specific situation, farms and other users often can have cumulative negative effects on the environment and society. As a result, some of the requirements included in the ASC Pangasius Standard are independent of what a producer can achieve at the farm level and rely on the efforts of the producer to act as an advocate and steward of their environment.

[1] Common name in Vietnam: tra

[2] Common name in Vietnam: basa

PROCESS FOR CREATING THE STANDARD

The ASC Pangasius Standard was developed through transparent, consensus-oriented discussions with a broad and diverse group of stakeholders.

The steps in the process are described below:

- Under the leadership of WWF, the PAD was created in 2007.
- In 2007, WWF notified ISEAL of the intent to apply the "Code of Good Practices for Setting Social and Environmental Standards" to the PAD. ISEAL approved this step and accepted WWF as an associate member on behalf of all of the Aquaculture Dialogues.
- From 2007 to 2010, all PAD meetings were publicized on the Aquaculture Dialogues website, in seafood trade publications, and in several other publications read by key stakeholders. Key stakeholders also were asked directly by WWF and others to participate in the PAD in order to ensure its credibility. This was in line with the PAD's goal of opening up the process to anybody with an interest in pangasius aquaculture.
- From 2007 to 2010, five PAD meetings were held in Vietnam to discuss and finalize the PAD process, governance structure, goals, objectives and requirements document.

DATE	LOCATION	PARTICIPANTS
September 26-27, 2007	Ho Chi Minh City	81
March 27-28, 2008	Can Tho	103
December 3-4, 2008	Can Tho	83
August 5-6, 2009	Ho Chi Minh City	107
March 4-5, 2010	Can Tho	121

- In 2007, PAD participants agreed on eight key environmental and social issues associated with pangasius aquaculture and on the principles to address each issue.
- In 2007, PAD participants agreed on the objectives of and justification for the PAD, as well as the PAD process.
- In 2008, PAD participants agreed on the following governance structure for the development of the requirements:
    - The Process Facilitation Group (PFG) was charged with managing the PAD process. (See list of PFG members in Annex A.)
    - Seven technical working groups (TWGs), one for each principle, were charged with drafting the principles, criteria, indicators and requirements. (See list of TWG members in Annex B.)

  - Final decision-making authority was given to the participants of the PAD meetings. Final decisions were made by consensus. The PAD used the definition of "consensus" provided by the International Organization for Standardization, which is: "General agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process seeking to take into account the views of interested parties, particularly those directly affected, and to reconcile any conflicting arguments. Consensus need not imply unanimity."

- In 2008, each TWG appointed a coordinator responsible for moderating the TWG discussions and compiling the TWG outcomes. (See list of coordinators in Appendix B.)
- In 2008, TWG members held discussions by e-mail and through in-person meetings until they reached consensus (although sometimes not unanimity) on the draft principles, criteria, indicators and requirements.
- In December 2008, the first draft of the principles, criteria, indicators and requirements were presented at a PAD meeting. Input from the meeting was used by the TWGs and PFG to revise the document.
- In 2008 and 2009, the PAD held outreach meetings with key stakeholders to engage them in the PAD process and receive their feedback on the draft Standard. These included thorough consultations with small-scale farmers in An Giang, Dong Thap and Can Tho provinces which were conducted through field visits (some which was part of two international M.Sc. theses largely focused on assessing the challenges of small-scale pangasius farmers in complying with the Standard). Outreach also included ad hoc meetings with processors and government officials at the provincial and national levels.
- In April 2009, the draft Standard document was posted for the first of two 60-day public comment periods.
- In August 2009, the feedback from the first public comment period—as well as some key questions regarding the feedback – was presented and discussed at a PAD meeting. The PAD participants reached consensus (although sometimes not unanimity) on all matters discussed.
- From September to October 2009, the TWGs met to revise the Standards document, based on decisions made by the PAD participants.
- In November 2009, the revised Standard document was posted for the second of two 60-day public comment periods.
- In December 2009, the feedback from the first public comment period, as well as the PFG's and TWGs' answers to the comments received, was posted on the PAD website.
- In March 2010, the feedback from the second public comment period—as well as some key questions regarding the feedback—was presented and discussed at a PAD meeting. The PAD participants reached consensus (although sometimes not unanimity) on all matters discussed.
- From March to July 2010, the TWGs met to revise the Standard document, based on decisions made by the PAD participants.
- In September 2010, the feedback from the second public comment period, as well as the TWGs' answers to the comments received, will be posted on the PAD website.
- The Standard document was finalized in August 2010.
- A total of 638 people have been actively involved in the process, as summarized in the table below.

- In May 2011 the Standard was officially handed over to the Aquaculture Stewardship Council.
- In October 2011 the Standard was renamed to ASC Pangasius Standard.

TYPE OF STAKEHOLDER	NUMBER OF STAKEHOLDERS
Farmer	110
Academia	106
Government	73
Input supplier (e.g., seed, feed and chemicals)	53
NGO	52
Non-farmer (e.g., employee and agriculture farmer)	51
Farmer cum processor	48
Media	42
Consultant	39
Buyer	37
Certifier	11
Processor	8
Inter governmental organization	8

Continuous improvement of the ASC Pangasius Standard

As stated in the ISEAL "Code of Good Practices for Setting Social and Environmental Standards,"

". . . Standards shall be reviewed on a periodic basis for continued relevance and effectiveness in meeting their stated objectives and, if necessary, revised in a timely manner."

It is implicit in the development of the ASC Pangasius Standard that the numerical values, or "tolerance levels," will be raised or lowered over time to reflect new data, improved practices and new technology. These changes will correspond to a lessening of impacts rather than an increase in impacts. Changes to other components of the ASC Pangasius Standard is also recognized as a way to reward better performance and, as science and technology allow for more precise and effective measures, the ASC shall remain open to adopt these new findings within the scope of the ASC Pangasius Standard.

1. PRINCIPLE: LOCATE AND OPERATE FARMS WITHIN ESTABLISHED LOCAL AND NATIONAL LEGAL FRAMEWORKS

Issue: Legal compliance

Principle 1 reinforces the need to follow national and local laws wherever pangasius farming is taking place. The requirements go beyond the law and serve as a complement to the legal framework in pangasius producing countries. Although the ASC Pangasius Standard may be different from the laws where pangasius aquaculture is practiced, under no circumstance should the ASC Pangasius Standard contradict such laws.

1.1 Criteria: Local and national regulations

INDICATOR	REQUIREMENT
1.1.1 Presence of all pertinent permits and registrations required by local and national authorities	Yes
1.1.2 Presence of documents proving compliance with pertinent tax laws	Yes
1.1.3 Presence of documents proving compliance with pertinent water discharge (including water effluents) regulations	Yes
1.1.4 Presence of documents proving compliance with local and national legal regulations on land and water use	Yes

Rationale—Local and national regulations shall be adhered to, as local regulations sometimes concern a different level of detail compared with national regulations. In cases of conflict between national and local regulations, national laws take precedence.

As it is extremely difficult to audit for compliance to all laws in a country, PAD stakeholders decided the focus of the requirements should be the four indicators included under this criteria.

Due consideration shall also be given to customary laws[3] and are addressed within Principle 7.

[3] Customary law: Traditional common rule or practice that has become an intrinsic part of the accepted and expected conduct in a community

2. PRINCIPLE: FARMS MUST BE LOCATED, DESIGNED, CONSTRUCTED AND MANAGED TO AVOID (OR, AT LEAST, MINIMIZE) THEIR NEGATIVE IMPACTS ON OTHER USERS AND THE ENVIRONMENT

Issue: Land and water use

The responsible use of land and water resources is fundamental to sustainable pangasius aquaculture. The siting, design and construction of pangasius farms often have a negative impact on other resource users and the environment. To address this, a growing number of countries have established land and water use plans. Some also have created aquaculture development plans and zoning regulations for certain aquaculture activities. Respecting these planning decisions and adding additional considerations to ensure environmental and social sustainability forms the basis of the following section of the ASC Pangasius Standard.

2.1 Criteria: Meeting official development plans

INDICATOR	REQUIREMENT
2.1.1 Farm[4] located in approved aquaculture development areas	Yes

Rationale—Although some countries may not have aquaculture development plans identifying approved aquaculture development areas, it is important, when these plans exist, to confirm that the unit of certification is within the identified zone. In areas where there is no official aquaculture development plan, the PAD assessment will serve as the appropriate intermediary tool.

2.2 Criteria: Conversion of natural ecosystems

INDICATOR	REQUIREMENT
2.2.1 For ponds[5], evidence[6] that only land that has been allocated to agriculture or aquaculture for 10 years prior is used for new pond development or for farm expansion	Yes
2.2.2 Evidence that a contribution of at least USD $0.50 per ton of fish produced has been paid to the environmental and social restoration fund[7] annually	Yes

[4] Pond, cage and pen-based facilities

[5] For Ponds established after the publication of the PAD standards

[6] From government organizations

[7] To be identified by the Aquaculture Stewardship Council (ASC). If a fund has yet to be created and recognized by the ASC at the time of auditing, then standard 2.2.2 will not be considered

2.2.3	Evidence[8] that no earth has been discharged into common[9] water bodies	Yes
2.2.4	Evidence[10] of no negative impacts on endangered species[11]	Yes

Rationale—As pangasius farming is conducted in a relatively limited production area and farms are most commonly established by converting rice fields, certified farms must be able to establish and expand into land that has been allocated for farming for the last 10 years without having to convert natural ecosystems (e.g. mangroves and wetlands). Establishment of the farm and expansion of an existing farm shall not result in conversion of wetlands (following the RAMSAR[12] definition[13]) and any other ecosystems other than agriculture or aquaculture land.

Farms established before the ASC Pangasius Standard was issued may have caused negative impacts on the environment or society. In addition, pangasius farms must use land and water, which, most likely, are associated with a certain degree of impact on the environment and other resource users. For these reasons, the PAD decided to establish a restoration fund to support activities aimed at compensating for such impacts. At the time of writing of these requirements there was no restoration fund in place. However, it is expected that the Aquaculture Stewardship Council (ASC) will identify such a fund.

Discharge of earth during farm construction has been reported by some local communities as having affected their livelihood by negatively impacting water quality. Discharge of land in water bodies also affects the aquatic ecosystem. This practice should, therefore, be avoided.

An increasing number of species worldwide become endangered because of human activities. Pangasius farming should be conducted in a way that does not put further pressure on those species.

[8] For ponds established after the publication of the PAD standards

[9] Exception made for discharge into water bodies belonging to the farm and without negative impacts to other water resource users

[10] Farmers shall submit the result of a search of published and grey (e.g. local newspapers, magazines) literature. Statements from local communities and organizations shall also be produced

[11] As set by IUCN and national authorities

[12] The Convention on Wetlands (Ramsar, Iran, 1971) -- called the "Ramsar Convention" -- is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories (www.ramsar.org).

[13] Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres

2.3 Criteria: Site connectivity

INDICATOR	REQUIREMENT
2.3.1 Farm does not impede navigation, aquatic animals or water movement	Yes
2.3.2 For cages, minimum width of the water body[14] without cages (see Diagram 1, Annex C)	≥ 50%
2.3.3 For pens, maximum width a farm can occupy, calculated when the water body level/width is at its minimum (see Diagram 2, Annex C)	≤ 20% percent of the width of the water body
2.3.4 For pens, maximum number of contiguous pens allowed (see Diagram 3, Annex C)	Two, only if a stretch of river bank that is at least the length of the two pens is left free from farms on both sides of the pens

Rationale—Indicators 2.3.1–2.3.3 are meant to ensure that pangasius farms operate in a manner that allows boats and aquatic organisms to move (both horizontally and vertically) in what the ASC Pangasius Standard has coined a "reasonable space." Reasonable space means the available space, where the siting of farms would not obstruct or cause major diversions for navigation. Reasonable space also applies to operational activities of farms (e.g., repairing activities). These should not impede boat and aquatic organism movement.

The ASC Pangasius Standard recognizes that the water bodies used for pangasius production are important, economically, for other types of industries that may use them for transport. A main driver for the requirements in 2.3 is to minimize user conflicts. Requirement 2.3.4 is meant to allow for organisms living on the banks to have a "reasonable" space available, in spite of the fact that pens obstruct complete access to the river bank where they are located.

[14]Water body: Any pond, lake, canal, river, stream or any other distinct mass of water, whether publicly or privately owned, including the banks and shores thereof.

2.4 Criteria: Water use

INDICATOR		REQUIREMENT
2.4.1	Farm complies with water allocation[15] limits set by local authorities or a reputable independent institution[16]	Yes
2.4.2	For ponds, maximum ratio of total water abstracted[17] (not consumed) per ton of fish produced. Calculate abstracted water using formula in Annex D.	5,000 m^3/metric ton of fish produced

Rationale—Water use is an increasingly important global issue and its efficient use is an important part of sustainable production. Pangasius production can require higher levels of water use compared to terrestrial animal food production. The ASC Pangasius Standard has included a water efficiency requirement to encourage responsible water use. The 5,000 m^3/metric ton of fish produced requirement was set using actual data submitted by ASC Pangasius Standard stakeholders. It will serve as a starting place for the requirements and be revised in future versions of the Standard.

If the water allocation limits differ from the set 5,000 m^3/metric ton of fish produced, then farmers must comply with both requirements.

[15]Valid for both surficial water and groundwater. Surficial water is defined as “water collecting on the ground or in a stream, river, lake, wetland or ocean.” Groundwater is defined as “water beneath the earth’s surface that supplies wells and springs.”

[16]A reputable independent institution can be a government organization, an academic institution or an organization that is not linked specifically to the aquaculture sector, but has generated water use parameters for the region, or is responsible for water allocation. Reputability of the institution shall be demonstrated by the farmer showing peer reviewed articles and/or reports on water allocation. Documents produced for a sector other than aquaculture are also acceptable. A track record of at least three years of operation must be available.

[17]Water abstracted is water removed from the water body and introduced into the farm. It includes both surficial water and groundwater

3. PRINCIPLE: MINIMIZE THE NEGATIVE IMPACT OF PANGASIUS FARMING ON WATER AND LAND RESOURCES

Issue: Water pollution and waste management

The ASC Pangasius Standard recognizes it is difficult to operate commercial pangasius culture systems without having some impact on the water used. However, it is important to control the most important water parameters, such as nitrogen and phosphorous, and to develop specific water quality requirements for them. Monitoring of effluent water quality is critical to ensuring the aquaculture operations are not generating unacceptable levels of pollution. The values used in these requirements were based on actual data provided by producers and experts. The ASC Pangasius Standard agreed to set the requirements by using the median of all available data. However, in the absence of practical data from the producers, inputs from technical experts were considered as a starting point for this standard. It is expected that these numbers will change and the rationale for each one will be clarified as the requirement is improved over time.

3.1 Criteria: Nutrient utilization efficiency

INDICATOR		REQUIREMENT
3.1.1	For cages and pens, maximum amount of total phosphorus (TP)[18] added as feed per metric ton of fish produced	20 kg/t
3.1.2	For cages and pens, maximum amount of total nitrogen (TN)[19] added as feed[20] per metric ton of fish produced	70 kg/t
3.1.3	For ponds, amount of TP discharged per metric ton of fish produced (See TP measurement methodology and calculation in Annex D)	7.2 kg/t
3.1.4	For ponds, amount of TN discharged per metric ton of fish produced (See TN measurement methodology and calculation in Annex D)	27.5 kg/t

Rationale—Efficient use of nutrients in pangasius culture is key to better production in any type of system, as efficient nutrient utilization may result in less negative impacts on the receiving water bodies. There are several parameters that can be used to measure the impact of farm effluent on the

[18]TP includes all forms of phosphorus found in the sample (Adapted from Australian Government, Department of Meteorology)

[19]TN means the measure of all forms of nitrogen found in the sample, including nitrate, nitrite, ammonia N and organic forms of nitrogen(Australian Government, Department of Meteorology)

[20]Feed refers to all feeds or feed items, regardless of where or how they are produced, and applies to all farms seeking certification. Farms that meet the standards should be able to demonstrate compliance, regardless of whether their feed is made by a commercial feed mill or on site. See Principle 5 for further details.

water quality of a given water body (e.g., phosphorus, nitrogen, biological oxygen demand, chemical oxygen demand and suspended solids). However, members of the PAD agreed to prioritize the parameters that will be used in this requirement and focus only on the most important nutrients: nitrogen and phosphorus. Both nitrogen and phosphorus are key nutrients that affect eutrophication, and both are released from the culture system through feeds and fertilizer.

The level and amount of phosphorus and nitrogen was set using data provided by producers who are directly and indirectly involved in the PAD process. The PAD agreed that the median of the available data was to be used instead of the mean. It should be noted that the value set in this requirement is just the starting point and will be revised when relevant data becomes available.

Best estimates for TN and TP efficiency in cages and pens were taken from industry experts.

3.2 Criteria: Measuring water quality in receiving water body

INDICATOR	REQUIREMENT
3.2.1 Percentage change in diurnal dissolved oxygen[21] (DO) of receiving waters[22] relative to DO at saturation for the water's specific salinity and temperature. An exception is made for ponds that discharge water with TN and TP lower than the TN and TP of the intake water respectively (See DO measurement methodology in Annex D)	<=65%

Rationale—Diurnal fluctuation is the only parameter that the ASC Pangasius Standard considered in determining the impact of farm effluent on the quality of the receiving water body. Fluctuation of the level of oxygen in a given water body is influenced by the rate of photosynthesis and respiration in the said environment. The rate of fluctuation in a given water body can be best observed by comparing early morning DO levels to those in the late afternoon, as during the early morning DO is usually low because of animal and plant respiration. Conversely, DO peaks in the late afternoon, having built up through photosynthetic activity that releases oxygen in the water during daylight hours. The percentage change in DO is a good indicator of the biological activity in the water. A lower value of percentage change of DO indicates a healthy water body. In order to minimize the contribution of aquaculture activities to eutrophication and to maintain the good quality of the natural water bodies, the ASC Pangasius Standard included a set level for diurnal change. Measurements for DO must be taken twice during the day, one sample 1h (± 30min) before sunrise and the second two hours (± 30min) before sunset in order to get the maximum and the minimum levels.

Exemptions to this requirement were also identified and apply to farms that have "cleaner" water (i.e., where the value of the farm TP and TN is lower than that of the intake water), showing that the farm has an overall "cleaning" effect on water. This applies, regardless of whether the receiving water is

[21] DO is the concentration of oxygen dissolved in water, expressed in mg/l or as percent saturation, where saturation is the maximum amount of oxygen that can theoretically be dissolved in water at a given altitude and temperature (biology-online.org)

[22] "Receiving water" is the first natural water body that receives the water from the farm and does not belong to the farm

eutrophic. Although this may not be common practice at the time when these requirements were written, this exception has been included in the requirements.

3.3 Criteria: Measuring quality of pond effluents[23]

INDICATOR		REQUIREMENT
3.3.1	Maximum average percentage change of TP between inlet and outlet (See TP measurement methodology and TP discharge formula in Annex D)	100%
3.3.2	Maximum average percentage change of TN between inlet[24] and outlet[25] (See TN measurement methodology and TN discharge formula in Annex D)	70%
3.3.3	Minimum dissolved oxygen (DO) concentration in water discharged (See DO measurement methodology in Annex D)	3 mg/l

Rationale—The ASC Pangasius Standard determined that monitoring the amount of nutrients being released to the water from a pond system is not enough to determine or control the amount of nutrients being released into the natural environment. Hence, monitoring of the quality of water being released from the pond system is also included in the Standard.

The ASC Pangasius Standard determined key water parameters that need to be monitored in this Standard. Percent change, not absolute value, will be set as the requirement because the latter does not consider the quality of water that is coming into the aquaculture system.

[23]This criteria is not pertinent to either cage or pen cultures

[24]Inlet: The water in the intake canal, as close as possible to the farm or pond being certified

[25]Outlet: The actual water being discharged, not the receiving water

3.4 Criteria: Sludge disposal for ponds and pens, not cages[26]

INDICATOR	REQUIREMENT
3.4.1 Evidence that sludge is not discharged directly into receiving waters or natural ecosystems[27]	Yes
3.4.2 Evidence of a sludge repository of appropriate size (See Sludge Repository formula in Annex D)	Yes

Rationale—Waste management is closely related to water pollution issues. Sludge from ponds must be disposed of properly[28] and not discharged into public water bodies (i.e., places that are shared or belong to the government), given that sludge can be a significant pollution source.

3.5 Criteria: Waste management

INDICATOR	REQUIREMENT
3.5.1 Evidence of farm solid wastes being discharged into the natural environment	None
3.5.2 Evidence of human and animal solid wastes being discharged into the natural environment	None
3.5.3 Evidence of chemical and medicine wastes being discharged into the natural environment	None

[26]For cage culture, there are no standards for benthic monitoring included, as cages account for a small percentage of production. This situation will be monitored and revised if the production of cage culture rises significantly.

[27] "The complex of a community and its environment functioning as an ecological unit in nature." More simply, it's both living and non-living things that interact with each other. In these standards, both the terrestrial and aquatic ecosystems are considered.

[28]Proper disposal includes delivery to a regulated or dedicated landfill or farmers may re-use the sludge. Evidence of the re-use needs to be available for the audit process. Examples of re-use methods allowed by the standards are, as fertilizer or soil conditioner for the production of agriculture crops as landfill and other construction-related uses.

3.5.4 Evidence of proper disposal[29] of dead/moribund fish	Yes

Rationale—The construction and operation of pangasius farms involves the use of hazardous chemicals (e.g., combustibles, lubricants and fertilizers) and generates waste. The storage, handling and disposal of such hazardous materials and waste must be done responsibly, according to the law minimizing their respective potential impacts on the environment and human health. The ASC Pangasius Standard defines quantifiable indicators that imply the implementation of a management plan and the separation of waste, depending on their destination. The ASC Pangasius Standard determined that all hazardous materials and waste must be strictly controlled and that the proportion of recycled waste shall be improved over time, with an initial target of 50% of recyclable wastes. Another major waste stream is dead and moribund fish removed from ponds. Proper disposal (e.g., burial or incineration) is necessary to ensure that this waste does not impact the environment.

In the case of mass mortalities associated, for example, with pesticide/chemical pollution of the intake water or abnormal water conditions (linked to abnormal weather incidences), the farm shall still adopt proper disposal of the dead fish.

3.6 Criteria: Energy consumption

INDICATOR	REQUIREMENT
3.6.1 Information available on the following variables (per year per farm in the certification unit): – Fuel Used – Quantity of electricity – Amount of dead fish for each disposal method adopted	Yes

Rationale—Energy is consumed throughout the culturing, harvesting, processing and transportation stages of pangasius production. There are also many other energy drains to consider, such as energy consumed during the construction of facilities, while maintaining and updating facilities, during the production of those construction materials, and during the production of liming materials, fertilizers and other inputs. The ASC Pangasius Standard acknowledges that, at this time, there is insufficient data available for setting energy use requirements. Therefore, the ASC Pangasius Standard requires the collection of energy consumption data by audited farms in order to be able to set up energy requirements in the future. To be useful for addressing the issue of carbon emissions in the future, data collection needs to be as exhaustive as possible so that the conversion of energy consumption to carbon emissions will be feasible.

[29]Proper disposal of dead fish include: incineration, burial, fermentation and use as fertilizer and production of fish meal or fish oil. Dead fish should never be used for human consumption. Also acceptable if there is strong evidence that the mortality was not caused by an infectious agent or a pesticide/chemical pollutant, the fish can be used as feed for animals other than pangasius. Evidence on the cause of mortality shall be provided by the aquatic animal health specialist (see Principle 6).

All dead fish will lead to the production of greenhouse gases. Therefore, the amount of dead fish and the method adopted to dispose them shall be recorded and included in the computation of energy used.

4. PRINCIPLE: MINIMIZE IMPACTS OF PANGASIUS AQUACULTURE ON THE GENETIC INTEGRITY OF LOCAL PANGASIUS POPULATIONS

Issue: Genetics

Pangasius aquaculture can impact the genetics and biodiversity of wild pangasius populations when it's introduced as an exotic species and escapes into the surrounding ecosystems from culture facilities. Other impacts can come with the use of Genetically Modified Organisms (GMOs)[30] and hybridization.

4.1 Criteria: Presence of pangasius in the water drainage system

INDICATOR	REQUIREMENT
4.1.1 Farm is located in a river basin where the farmed species is indigenous or has a self-recruiting[31] stock established before January 2005	Yes
4.1.2 If a self-recruiting stock is established, evidence of no negative impacts on the environment[32]	Yes
4.1.3 If the species is not indigenous and does not have a self-recruiting stock established, evidence that the species cannot establish in the river basin[33]	Yes

Rationale—If pangasius farming occurs in locations where the farmed species is not indigenous or if a self-recruiting stock is not established, pangasius aquaculture can impact habitats and/or the genetic integrity of local pangasius populations. This type of aquaculture also can impact the environment if measures are not in place to minimize escapes from production systems, especially via drainage systems and during flood events. The ASC Pangasius Standard addresses this issue by ensuring that pangasius farming takes place only in locations where that species of pangasius is indigenous or has a self-recruiting stock established before January 2005. This date was set based on two pangasius generations (approximately three years each) in order to ensure that any farms which claim to be farming exotic species that are established can appropriately demonstrate via two generations of breeding that the species is indeed established.

[30] A GMO is an organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination (Directive 2001/18/EC)

[31] Self-recruiting is defined as naturally reproducing. Peer-reviewed papers, official government (competent authority) statements or other comparable references on multiple incidences of different age classes at different times and location are necessary as evidence.

[32] Peer-reviewed papers, official government (competent authority) statements or other comparable references are necessary as evidence

[33] Peer-reviewed publication in a reputable journal is required as evidence that the species cannot be established

The ASC Pangasius Standard recognizes that it may be possible to develop a technology to eliminate escapees. This will be considered in further revisions of the Standard. Possible exceptions also will be considered.

4.2 Criteria: Genetic diversity

INDICATOR	REQUIREMENT
4.2.1 Demonstration[34] that the seed[35] has been generated from the pangasius population naturally reproducing in the river basin[36]	Yes

Rationale—Genetic diversity is an important conservation issue, as escaped farmed pangasius have the potential to negatively impact the genetic diversity of wild pangasius by interbreeding. Genetic changes in captive bred or hatchery populations are likely in any stock of fish that is bred in captivity over several generations. Pangasius, in their natural habitat, have a complex population structure and there is evidence that different genetically distinct populations of pangasius species exist. Captive breeding may result in the mixing of genetically distinct stocks which may lower overall genetic diversity and reduce survival. Introducing a different strain of the same species (i.e., a population which is genetically different but still belonging to the same species) would therefore pose the risk of the different strain having an impact on the ecosystem when escaping, an impact that may not have been occurring with the original pangasius strain. The ASC Pangasius Standard addresses this issue by ensuring that seed used for juveniles is sourced from pangasius populations already established in the river system where the farming operation is located. Although this approach may represent a challenge for domestication programs, the ASC Pangasius Standard agreed to adopt a precautionary approach when dealing with introductions.

4.3 Criteria: Source of seed

INDICATOR	REQUIREMENT
4.3.1 Allowance for use of wild-caught seed for grow out	None

Rationale—There is concern that the use of wild-caught seed or wild collections of juveniles can lead to adverse impacts (e.g., decline) on wild pangasius populations as has occurred for other types of aquaculture (e.g., shrimp).

[34] A thorough map of pangasius establishment that indicated the range of the species, as well as distinct stocks, will be necessary

[35] Throughout these standards, the word “seed” is used for pangasius seed only

[36] This standard is applicable to all farms using seed sourced from either populations which are indigenous or populations which are established before January 2005

In addition, techniques used for catching wild seed are most often poorly selective, hence leading to high amounts of non-target species bycatch, impacting broadly on the aquatic biodiversity. Therefore, only hatchery seed should be used.

4.4 Criteria: Genetically engineered and hybridized strains

INDICATOR		REQUIREMENT
4.4.1	No use of genetically engineered (transgenic) or hybrid seed	Yes

Rationale—The potential for enhanced strains of pangasius to out-compete native fish species causing genetic pollution provides sufficient justification to exclude any breeding manipulation (transgenic or hybridization) of culture species within the ASC Pangasius Standard. Thus, transgenic and hybridized strains are prohibited from being reared under these requirements.

The use of GMOs and hybrid seed creates additional issues regarding genetic pollution and impacts on farm stocks and wild populations. These impacts can be prevented by avoiding the use of GMOs and hybrid seed which is mandated by the ASC Pangasius Standard.

4.5 Criteria: Escapees

INDICATOR		REQUIREMENT
4.5.1	Evidence that inlets and outlets to culture systems and all confinements are equipped with net mesh or grills appropriately sized to retain the stocks in culture preventing fish of any size (in the holding unit being assessed) to escape	Yes
4.5.2	Evidence of regular, timely inspections (at least once a day); mitigation and repairs are performed on net mesh or grills and recorded in a permanent register (available for inspection)	Yes
4.5.3	Bund[37] height sufficient[38] to prevent water spillage, along with escapees, in the rainy season when flooding occurs	Yes
4.5.4	Presence of trapping devices[39] placed in effluent/drainage canals or on water outlets to capture escapees; a record of findings and actions taken (available for inspection)	Yes

Rationale—Genetic changes in hatchery populations also are an important aspect of pangasius aquaculture and the risks associated with it must be acknowledged. Some genetic changes are likely

[37]Bund: berm containing the water in the pond

[38]Consider 10 years maximum water level (including cases of storms)

[39] These devices should not injure or compromise fish health (e.g., gill nets)

in any stock of fish that is bred in captivity over several generations. Therefore, minimizing escapes of captive-bred fish is essential to preventing the genetic disturbance of wild populations.

Pangasius escapees may also have an effect on local non-catfish biodiversity through such things as competition and habitat destruction. Little data or information on this issue was located for the ASC Pangasius Standard, making it challenging to develop metrics. As this requirement evolves, it is critical to assess these impacts and, where necessary, incorporate indicators and standards that measure and prevent any adverse impacts. This will be done in future versions of the Standard.

While a range of techniques and practices are available to prevent escapes, no foolproof system has been developed. Therefore, it is important to approach escapee management from the perspective of minimization rather than hypothetical elimination. Escape reduction also is a good business practice, as there are economic incentives to prevent escapes. The ASC Pangasius Standard mandate a series of BMPs to try to prevent escapes and ensure compliance.

4.6 Criteria: Pond maintenance as part of escapee management

INDICATOR		REQUIREMENT
4.6.1	Evidence that the bund has remained intact[40] throughout the culture cycle	Yes
4.6.2	Evidence assuring there has been no intentional release[41]	Yes

Rationale—As noted above, escapees from pangasius culture facilities can pose a conservation risk. While farmers can have measures in place to reduce escapees (i.e., criteria 4.5), occasionally major or catastrophic releases of farmed populations can occur if the pond dyke collapses, if the pond gets flooded, or if the farmer intentionally decides to release the stock to prepare the pond. These releases of farmed populations may have huge impacts on the environment (both pangasius and non-pangasius populations). Therefore, they are unacceptable under these requirements.

The rationale to have two separate, but slightly different, escapes criteria is that a farmer may be in full compliance with criteria 4.5 but then could have a disease outbreak and release the whole farmed stock. The farmer also may not have appropriately (during design/construction) built a strong dike. Hence, although the bund is high enough, it may collapse, thereby releasing many farmed pangasius. The ASC Pangasius Standard does not want farms certified in these instances.

[40]Has not been affected in such a way to allow the escapee in part or all of the farmed stock.

[41]Suspiciously long periods between crops can be an indicator of intentional releases. Fish sizes and records of previous crops may be used to identify suspiciously long periods between crops.

5. PRINCIPLE: USE FEED AND FEEDING PRACTICES THAT ENSURE THAT FEED INPUTS ARE SUSTAINABLE AND MINIMIZED

Issue: Feed management

Feed is one of the most important cost factors in pangasius production. Good feed management on the farm is a critical control point for success and plays an important role in controlling the direct and indirect environmental impacts of farming operations. Efficient feeding management and adoption of practices designed to minimize feed inputs (or maximise feeding efficiency),therefore, are important to manage production costs and environmental impact. These requirements are intended to provide a realistic starting point from which to improve the sustainability of pangasius aquaculture through more efficient feed management and, like the other requirements, will be subject to regular review.

5.1 Criteria: Sustainability of feed ingredients

INDICATOR		REQUIREMENT
5.1.1	Use of uncooked or unprocessed fish and/or fish products[42] (including trash fish) as feed	No
5.1.2	Use of pangasius *fish processing by-products*[43] as feed or feed ingredients	No
5.1.3	Fish products used in feed are not in the "threatened categories"[44] on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species[45]	Yes
5.1.4	Fish products used in feed are not from species listed in the Convention on International Trade in Endangered Species (CITES) Appendices I, II and III[46]	Yes

[42]Fish products are defined as all forms of fish or products derived from fish (e.g., whole fresh, frozen, minced, dried, meals, oils, and processing by-products)

[43]Trimmings, viscera, heads and frames from the processing of fish—either wild or farmed—are processing by-products. Generally, these are not counted as part of the "fish product" amount when calculating feed fish equivalencies, as this helps promote the best use of the wild-caught fish. However, it is not acceptable to use pangasius by-products in pangasius diets.

[44]Vulnerable, Endangered and Critically Endangered.

[45] www.iucnredlist.org Use latest version. A period of one year is allowed for adaptation to any new amendment, therefore if a new animal is added to the IUCN list, producers have one year to meet the standards.

[46]http://www.cites.org/eng/app/appendices.shtml

5.1.5	ISEAL-certified fishmeal and fish oil products must be used in feed	Within 3 years of becoming available in a region
5.1.6	ISEAL certified fishmeal and fish oil products must be used in feed	Within 5 years from the publication date of the ASC Pangasius Standard
5.1.7	Up to when requirement 5.1.5 or 5.1.6 can be met:	
	Interim Option A: Fishmeal or fish oil products used in feed have been sourced from fisheries with an average FishSource (FS) score	≥ 6.0 with no individual score < 6.0 or an N/A in the stock assessment category
	Interim Option B: Fish Products used in feed have been sourced from facilities certified as being in compliance with Sections 11 (Responsible Sourcing), 2 (Traceability), and 3 (Responsible Manufacturing) of the International Fishmeal and Fish Oil Organisation's (IFFO) "Responsible Sourcing Program for Certification of Responsible Practice for Fishmeal and Fish Oil Production	Yes

Rationale—Under these requirements, "feed" refers to all feeds or feed items, regardless of where or how they are produced. Farms that meet the requirements should be able to demonstrate compliance regardless of whether their feed is made by a commercial feed mill or on site.

There are concerns over the potential impact on marine biodiversity of sourcing fishmeal and fish oil as feed ingredients from wild fish stocks and the efficiency of its conversion to farmed fish through feed. Although the amount of fishmeal and oil used in feeds for pangasius is much less than in farmed shrimp or salmon, these requirements will, over time, ensure the efficiency of this conversion. The requirements also will ensure that the sources of these ingredients are managed properly, in order to avoid excessively negative impacts on their source populations and ecosystems. Where feeds are produced on farm, the farm will be required to demonstrate its compliance with the ingredient-sourcing requirements for feed. Where farms rely on commercial feeds, the requirements will require documented information from the feed supplier(s) to allow them to demonstrate that they meet the requirements.

Requirement 5.1.1 prohibits the direct use of unprocessed fish or fish products from wild fishery catch (sometimes referred to as "trash fish"), alone or in combination with other ingredients, as feeds for pangasius. Use of trash fish places undue pressure on vulnerable inshore fish stocks (including juveniles), can have deleterious effects on the culture environment, and represents a fish and public health risk, especially when uncooked.

IFFO reports that 25% of fishmeal currently being used for aquaculture is coming from by-products of fish processing. This amount is expected to increase. Although use of fish processing by-products is encouraged, the feeding of pangasius processing by-products to pangasius carries an unknown potential for spread of disease. At this time, no pangasius-specific scientific risk-assessment has been conducted to evaluate this risk. Therefore, PAD participants decided in Indicator 5.1.2 to disallow the use of pangasius processing by-products as feeds or ingredients of feeds for pangasius until such

time as the risk has been deemed to be within an acceptable range as defined by the national competent authority.

While the ASC Pangasius Standard encourages the use of fishery processing by-products, it recognizes that this can result in higher feed conversion ratios (FCRs), resulting in tradeoffs between effluent concentration and efficient use of marine resources. The ASC Pangasius Standard has attempted to address this tradeoff through use of an eFCR requirement (see Criteria 5.2) and effluent requirements (see Principle 3).

Indicators 5.1.3 and 5.1.4 ensure that species classified as vulnerable or endangered, those that have protected status and those in which trade is illegal are not used as feeds or as feed ingredients.

Fish and fish products (such as fishmeal and fish oil) used to manufacture feed shall be from legal, reported and regulated fisheries that respect the Food and Agriculture Organization of the United Nations' (FAO) "Code of Conduct for Responsible Fisheries,"[47] such as ISEAL-certified schemes or those verified by IFFO and FishSource. Ideally, the goal is that all feeds shall be from a certified sustainable fishery and a fishery where by-catch is maintained within acceptable limits. Feeds also shall not pose a threat to endangered species.

Current pangasius feeds (commercial or farm-made) mainly use locally sourced fishmeal from inshore fisheries off Vietnam, Bangladesh or India Traceability and fisheries certification currently are a challenge in Asia and the infrastructure to support good management of fisheries stocks is limited. This makes the process of creating auditable farm level requirements very challenging. Over time, it is envisaged that farms seeking certification under these requirements will use feeds that contain fishmeal and fish oil that are from certified sustainable and traceable sources. The current plan for implementation calls for the producer to demonstrate that the feeds being used meet the requirements of the Standard. This will require feed suppliers to provide information to support the farmer's declaration.

The ASC Pangasius Standard identified ISEAL member-certified fisheries as the most suitable sustainable fishery certification schemes, due to their transparency, verifiability and traceability. Currently, only the Marine Stewardship Council (MSC) meets these criteria. Quantities of MSC-certified fishmeal and fish oil are extremely limited, especially in the regions where pangasius is farmed. Demanding ISEAL-compliant fisheries would, under these circumstances, create serious difficulties for pangasius farmers and could negatively impact the rate of adoption of these requirements. To avoid this, two schemes (FS and IFFO) for responsible certification were considered as effective interim indicators until certified fishmeal and fish oil are available and to give the industry time to adapt.

IFFO

IFFO has developed a certification scheme for responsibly-sourced fishmeal and fish oil that is International Organization for Standardization (ISO) 65 compliant. To comply with the definition of "responsible sourcing," the applicant must be able to demonstrate:

- The responsible sourcing of legal, regulated and reported fishery material and avoidance of material sourced from IUU fishing activity
- Sourcing from fisheries that comply with the key requirements of the FAO "Code of Conduct for Responsible Fisheries"

[47] www.fao.org/docrep/005/v9878e/v9878e00.HTM

Fishmeal and fish oil produced according to this standard will be identifiable and traceable. In the time period until commercial amounts of local forage fisheries that are ISEAL-certified with regard to sustainability will be available, the IFFO's Sourcing Standard and Certification Program to Demonstrate Responsible Practice for Fishmeal and Fish Oil Production represents a good and practical alternative.

FS

The FS method was created by the Sustainable Fisheries Partnership to score fishery sustainability against a number of criteria. The score becomes a rough guide as to how these individual fisheries perform against these criteria.[48] Although they are not a comprehensive assessment of sustainability, FS scores can be considered strong indicators of a well-managed fishery, as assessed by existing fishery sustainability measures.

- FS scores are intended to be directly comparable to the MSC scheme. The formula is based on how MSC scores fisheries. Thus, an FS score for a given criterion of 8 or above is broadly equivalent to an MSC score of 80% (an unconditional pass), an FS score of 6 indicates an MSC score of 60 and is judged to be satisfactory. An FS score <6 is a strong indicator that the fishery would not be certifiable by the MSC.
- FS scores capture only some aspects of the fisheries considered by MSC. Other important features of sustainability are addressed in the 12 sections that comprise an FS fishery profile.

The current requirement for FS represents an improvement in promoting the use of sustainable fishmeal and fish oil over the current situation and is a realistic goal, given the current status of available information on forage fisheries used in aquafeeds in Asia.

It should be noted that even the interim requirements provide a significant challenge to the pangasius industry, as there are currently no local wild fishery sources of fishmeal and oil that comply with either interim scheme. Implementation of the interim or full requirements without adequate consideration of the availability of fishmeal and fish oil that comply with these requirements could unfairly disadvantage farmers seeking certification by forcing them to rely on feeds made with more costly imported ingredients and could also negatively impact adoption of the requirements.

The timeframe for adoption of the requirements should reduce the risk of non-compliance through lack of available and affordable ingredients, preferably locally sourced, while ensuring that there was sufficient incentive to improve on existing practices.

In order to reconcile these two points, two milestones have been identified by the ASC Pangasius Standard for compliance. If MSC-certified fisheries are available in the region (or, in the interim, stocks meeting the interim requirements), certified farms will have a maximum of three years to switch to feeds made using these. Should such stocks not be available within five years after publication of the ASC Pangasius Standard, this requirement will be revised to ensure that progress towards compliance is enforced.

Feeds use a number of ingredients from terrestrial sources, including animal and plant products, some of which may be genetically modified. Although there may be environmental and social issues associated with these ingredients, the ASC Pangasius Standard decided not to cover these under the current requirements. It is intended that these will be covered in a separate feed and feed ingredients Dialogue or in a future revision of these Standard.

[48] The criteria are precautionary management, scientific basis for fishery management, compliance, fish stock health and future prospects for fish stock

5.2 Criteria: Efficient management of feed use on the farm

INDICATOR		REQUIREMENT
5.2.1	Maximum weighted[49] average of economic Feed Conversion Ratio (eFCR) for the complete production cycle	1.68
5.2.2	Maximum Fish Feed Equivalence Ratio (FFER)	.5

Rationale—Good on-farm feeding management and feeding efficiency are important to achieving the efficient use of available feed resources. Good feed management on the farm is essential to achieving efficient use of available feed resources and minimizing waste[50]. Feeding rates and the conversion of feed to fish should be within good standards of efficiency and consistency. FFER and eFCR provide useful means to measure whether fish product use is being managed and wastes are being minimized.

Calculation and monitoring of feed conversion (the amount of feed used to produce a given weight of fish) is one of the simplest and most powerful ways that farmers can determine feed use efficiency. By encouraging farmers to record this number and work to reduce it, the requirements will promote a better use of resources by the farmers, as well as a greater understanding of their activities.

The eFCR accounts for the biomass, or weight, of fish stocked and represents the amount of feed used to support the change in fish biomass over the farming period in an individual pond. The eFCR will vary between ponds on a site, the duration of the farming period and the life-cycle stage or size of the fish. On an individual farm site, the pond size, number of fish stocked and weight of fish harvested can also vary. Therefore, in order to provide a simple way to adjust for these factors in the overall performance of the farm, the weighted average eFCR is used.

Actual production data was obtained from over 100 individual ponds in different farms using different feeds and the weighted eFCR calculated. Based on the median value[51], the weighted eFCR was established as 1.68.

FFER is a measure of the efficiency with which fish products used in the feed are converted to live fish and requires some measure of the amount of fishmeal and fish oil used in the feed, as well as the efficiency of converting fish to fishmeal and fish oil. Accepted estimates for the yield of fishmeal and fish oil from wild caught fish range from 22–27% for fishmeal and 3-7% for fish oil, depending on the species and season. For the ASC Pangasius Standard , global average fishmeal yield of 22.22 percent and fish oil yield of 5 percent are assumed. However, where possible, these yields should be adjusted to reflect the actual species used in feeds.

[49] Weighting to be conducted by the amount of fish produced in different farming units (e.g. ponds, pens and cages)

[50] In the context of Principle 5, waste refers to inefficient use of feed resources. Waste, as in waste products such as nitrogen and phosphorous, and their impact on effluent quality, are dealt with under Principle 3.

[51] The PAD agreed that the median value would be used to establish the standards for all indicators where data was available for analysis to arrive at a standard value.

It should also be noted that any trimmings, fishmeal or fish oil produced from fish processing by-products are not included in the calculation of FFER.

6. PRINCIPLE: MINIMIZE ECOSYSTEM AND HUMAN HEALTH IMPACTS, WHILE MAXIMIZING FISH HEALTH, WELFARE AND ENSURING FOOD SAFETY

Issue: Health management, veterinary medicines and chemicals

Managing the health of farmed pangasius stocks depends on the overall management of the farm, including the responsible use of veterinary medicines[52], chemicals and biological products[53]. This must be undertaken in a manner that focuses on ensuring fish health and maintaining food safety and quality, while also minimizing the impacts to human health and the environment.

6.1 Criteria: Mortalities

INDICATOR		REQUIREMENT
6.1.1	Maximum average real percentage mortality, from stocking to harvest, during the grow-out period (See Real Percent Mortality formula in Annex D)	20%

Rationale—One of the major impacts of aquaculture can be the enhancement and transfer of natural or exotic diseases. However, it is very challenging to write requirements to address this issue. One of the best options to ensure that disease transfer is minimized is through ensuring optimal fish health. A key measure of fish health is survival during the grow-out period.

The survival rates set in these requirements serve as a performance-based indicator for successful disease prevention. Given that survival depends upon different factors, such as water quality and feeding, these indicators are also included elsewhere in this set of requirements. The use of good management practices should result in a consistent survival rate among holding units. The proposed requirement provides room for isolated mortalities, but farmers will have to react quickly to prevent disease from spreading to other holding units and farms.

Although mortality is related to the size at stocking, these requirements do not specify seed size, since stocking different sizes is a management practice that the farmer can consider to reach compliance to this performance-based requirement.

Farmers shall provide written records on the number of fish stocked and number of fish harvested. Numbers can be calculated by taking the total weight and dividing it by the average weight of the fish. Farmers shall maintain details on the weight of each basket/container at harvest, in addition to the total weight.

[52]Veterinary medicines include (a) any substance or combination of substances presented as having properties for treating or preventing disease in animals; (b) or any substance or combination of substances which may be used in, or administered to, animals with a view either to restoring, correcting or modifying physiological functions by exerting a pharmacological, immunological or metabolic action, or to making a medical diagnosis (Veterinary Medicines Directorate – UK).

[53]Vitamins and minerals are not included under this issue.

6.2 Criteria: Veterinary medicines and chemicals

INDICATOR	REQUIREMENT
6.2.1 Use only veterinary medicines, chemicals and biological products approved for aquaculture by relevant national authorities and not banned for food fish use in the potential importing country	Yes
6.2.2 Use only veterinary medicines and chemicals for therapeutic use prescribed by an aquatic animal health specialist[54] based on a verified condition; follow the label specifications concerning the use of the substance for the given purpose[55]	Yes
6.2.3 Follow the aquatic animal health specialist recommendations on: 6.2.3.1 How to apply the veterinary medicine and chemicals prescribed 6.2.3.2 How to handle and store the veterinary medicines and chemicals prescribed 6.2.3.3 Who needs to be informed about the disease and how 6.2.3.4 How to limit the spread of the disease to neighboring wild or farmed populations	Yes
6.2.4 Allowance to sell fish or fish products before the completion of the withdrawal period specified on veterinary medicine or chemical labels or 750 °D if no withdrawal is specified on label	None

[54] Aquatic animal health specialist defined following government's regulations, if such regulations exist in the producing country. If the government does not regulate on this, the following people can be considered as specialists:

- Veterinarians with at least three months of academic training on fish health management (for a total of at least 60 hours). This training may be included with the veterinary degree.
- Aquaculturists (with university or vocational degree) who have completed at least three months of training on fish pathology and treatment (for a total of at least 60 hours). This training may be included with the university or vocational degree.

[55] Label specifications may be overridden by the recommendations of the aquatic animal health specialist when justification for the decision is documented in the farm book or approved in the animal health plan.

6.2.5	Allowance for the use of antibiotics critical for human medicine, as categorized by the World Health Organization[56]	None
6.2.6	Allowance for prophylactic use of veterinary medicines (excluding vaccines) prior to any evidence of a specific disease problem	None
6.2.7	Allowance for use of veterinary medicine (excluding vaccines) to serve as growth promoters[57]	None

Rationale—Veterinary medicines and chemicals can play an important role in maintaining fish health and survival, however, the over use of these medicines and chemicals can have environmental as well as human health impacts.

6.3 Criteria: Pangasius health plan

INDICATOR		REQUIREMENT
6.3.1	Presence of a written pangasius health plan reviewed yearly, updated and approved by a specified aquatic animal health specialist[58] (See Annex E for Health Plan Checklist)	Yes

[56]Refer to the second WHO expert meeting called Critically Important Antimicrobials for Human Medicine: Categorization for the Development of Risk Management Strategies to Contain Antimicrobial Resistance Due to Non-Human Antimicrobial Use, 29–31 May 2007

(http://www.who.int/foodborne_disease/resistance/antimicrobials_human.pdf). If an updated version of this list is made available, an allowance of one year is given to farmers to comply with the updated list.

[57]Growth promoters: Veterinary medicines, such as antibiotics, to be given to healthy fish for the sole purpose of making them grow faster (i.e., not to treat a specific disease).

[58]GlobalG.A.P. AB 5.2.3 was taken as reference and amended to fit with the requirements of the PAD stakeholders.

6.4 Criteria: Holding-unit specific record-keeping

INDICATOR	REQUIREMENT
6.4.1 Availability of records of the name, reasons for use, dates, amounts and withdrawal times of all veterinary medicines and chemicals used in hatchery and grow-out facilities	Yes
6.4.2 Availability of records of the source, size and quality of the seed stocked. Records of seed quality should include: 6.4.2.1 Description of gross signs and any abnormalities 6.4.2.2 List of veterinary medicines, chemicals and biological products used in earlier life stages 6.4.2.3 Results of pathogen testing, as legislated	Yes
6.4.3 Daily records showing regular monitoring of fish for signs of stress[59] or disease are kept	Yes
6.4.4 All mortality events with daily mortality above the average daily mortality in the farm are reported to the aquatic animal health specialist	Yes

Rationale—Daily records of mortality and clinical signs will also be used to revise the ASC Pangasius Standard so that performance-based metrics can be identified.

Note: Additional performance requirements on fish health could be identified when the ASC Pangasius Standard is revised.

6.5 Criteria: Fish welfare

INDICATOR	REQUIREMENT
6.5.1 Minimum average growth rate	3.85 g/day/fish
6.5.2 Maximum fish density at any time for ponds and pens	38 kg/m^2 for ponds and pens

[59]Signs of stress or disease include abnormal behaviour (e.g., swimming), reduced appetite and external abnormalities (e.g., lesions, spots and fin erosion).

6.5.3 Maximum fish density at any time for cages	80 kg/m^3 for cages

Rationale—A minimum growth rate was selected based on the assumption that farmed fish under good welfare conditions will show a good growth performance. However, the minimum growth rate requirement shall not be used to exclude organic or low intensity systems.

Fish stocking density is an important element of maintaining fish health and welfare. There is always a need to find the right balance between space efficiency, farming performance, disease control and fish welfare. Guidance on maximum fish densities for ponds, pens and cages (at any time during production) is an important tool for maintaining fish health.

6.6 Criteria: Predator control

INDICATOR	REQUIREMENT
6.6.1 Use of lethal predator[60] control	No
6.6.2 Mortality of IUCN red listed species	0

[60]Predators are defined as animals which have the potential to kill healthy pangasius. These standards include all types of predators during the production period, but only birds, reptiles and mammals during the period of preparation of the holding units (e.g., ponds, cages and pens). Rats and mice are excluded from consideration as they are unlikely to harm fish on the farm, be endangered or pose a conservation concern.

7. PRINCIPLE: DEVELOP AND OPERATE FARMS IN A SOCIALLY RESPONSIBLE MANNER THAT CONTRIBUTES EFFECTIVELY TO COMMUNITY DEVELOPMENT AND POVERTY ALLEVIATION

Issue: Social responsibility and user conflict

Pangasius aquaculture must be done in a socially responsible manner that ensures the operations benefit farm workers and local communities.
The labor rights of pangasius workers are important and farm work conditions shall ensure that workers are treated and paid fairly and have the ability to have a reasonable work/life balance in spite of the farm's need for work hours to be flexible. Where possible, pangasius aquaculture must also benefit local communities and, at the very least, not negatively affect communities.

7.1 Criteria: Labor law

INDICATOR	REQUIREMENT
7.1.1 Compliance with labor laws in the country where pangasius is produced	Yes

Rationale—Labor laws in the producing country set the minimum requirements for a farm to operate legally. For this reason, the laws shall be complied with in full. If the requirements of such laws somehow differ from the ASC Pangasius Standard, farmers are reminded that they shall comply with all the ASC Pangasius Standard, including those under this criteria (labor law) and the ones under other criteria and issues.

7.2 Criteria: Child labor[61] and young workers[62]

INDICATOR	REQUIREMENT
7.2.1 Minimum age of workers	Yes

[61]Child: Any person less than 15 years of age, unless local minimum age law stipulates a higher age for work or mandatory schooling, in which case the higher age would apply. If however, local minimum age law is set at 14 years of age in accordance with developing country exceptions under ILO Convention 138, the lower age will apply. Child labor does not include children helping their parents on their own farm, provided that working does not jeopardize their schooling or health.

[62]Young worker: Any worker between the age of child as defined and under the age of 18

7.2.2 For workers under 18 years old: 7.2.2.1 Work does not jeopardize schooling 7.2.2.2 Work, when added to the hours of schooling, does not exceed 10 hour/day 7.2.2.3 Work is restricted to light work[63] 7.2.2.4 Work is restricted to not hazardous work[64]	Yes

Rationale—Adherence to the child labor codes and definitions included in this section indicates compliance with what the International Labour Organization (ILO) and international conventions generally recognize as the key areas for the protection of child and young workers. Children are particularly vulnerable to economic exploitation, due to their inherent age-related limitations in physical development, knowledge and experience. Children need adequate time for education, development and play and, therefore, shall never be exposed to work or working hours that are hazardous to their physical or mental well-being. To this end, the requirements related to what constitutes child labor will protect the interests of children and young workers in certified aquaculture operations.

7.3 Criteria: Forced and compulsory labor[65]

INDICATOR	REQUIREMENT
7.3.1 Workers are free to terminate their employment and receive full payment until the last day of their employment, based on reasonable[66] notice given to their employer[67]	Yes

Rationale—Forced labor (e.g., slavery, debt bondage and human trafficking) is a serious concern in many industries and regions of the world. Ensuring that contracts are clearly articulated and understood by workers is critical to determining that labor is not forced. The inability of a worker to freely leave the workplace and/ or an employer withholding original identity documents of workers are indicators that employment may not be at-will. Employees shall always be permitted to leave the

[63]Light Work: (ILO convention 138, article 7.1) Light work is work that is 1) not likely to be harmful to a child's health or development and 2) not likely to prejudice their attendance at school, participation in vocational orientation or training programs, or diminish their capacity to benefit from instruction received

[64]Hazardous work: Work which, by its nature or circumstances in which it is carried out, is likely to harm the health, safety or morals of workers

[65]Forced (Compulsory) labor: All work or service that is extracted from any person under the menace of any penalty for which a person has not offered him/ herself voluntarily or for which such work or service is demanded as a repayment of debt. "Penalty" can imply monetary sanctions, physical punishment, or the loss of rights and privileges or restriction of movement (withholding of identity documents)

[66]As stated in the contract

[67] Employers are those workers who, working on their own account or with one or a few partners, hold the type of job defined as a self-employed job, and in this capacity, on a continuous basis (including the reference period) have engaged one or more persons to work for them in their business as employees

workplace and manage their own time. Employers are never permitted to withhold original worker identity documents. Adherence to these policies shall indicate an aquaculture operation is not using forced, bonded or compulsory labor forces.

7.4 Criteria: Health and safety

INDICATOR		REQUIREMENT
7.4.1	The employer provides a non- hazardous working and living environment	Yes
7.4.2	Workers are aware of the health and safety hazards[68] at the work place and how to deal with them	Yes
7.4.3	The employer records all accidents, even if minor,[69] and takes preventive and corrective action for each	Yes
7.4.4	Employer ensures that all permanent workers have health insurance[70]	Yes

Rationale—A safe and healthy working environment is essential for protecting workers from harm. It is critical for a responsible aquaculture operation to minimize these risks. Some of the key risks to employees include hazards resulting from accidents and injury. Consistent and effective employee training in health and safety practices is an important preventative measure. When an accident, injury or violation occurs, the company must record it and take corrective action to identify the root causes of the incident, remediate, and take steps to prevent future occurrences of similar incidents. This addresses violations and the long-term health and safety risks. Finally, while many national laws require that employers assume responsibility for job-related accidents/ injuries, not all countries require this and not all employees (e.g., migrant and other workers) will be covered under such laws. When not covered under national law, employers must prove they are insured to cover 100 percent of employee costs in a job-related accident or injury. Although covering the costs associated with permanent disabilities generated from an employment accident is important, this is, at present, unrealistic within the pangasius industry. However, if possible, including coverage for permanent disabilities will be pursued in ASC Pangasius Standard revision.

Note: During revision to the ASC Pangasius Standard, stakeholders should consider addressing the risk of long-term accidents (e.g., resulting from toxicity of chemicals).

[68]Hazard: The inherent potential to cause injury or damage to people's health—for instance unequipped to handle heavy machinery safely/ unprotected exposure to harmful chemicals

[69]Accidents that could not be handled in-house and, therefore, the person was taken to the closest clinic

[70]Health insurance is required for workers who are employed for >3months/year. If not covered under national law employers must provide insurance to cover 100% of any job-related accident/injury for permanent workers. The cost associated with permanent disabilities generated from a job related accident is, however, not included.

7.5 Criteria: Freedom of association and collective bargaining[71]

INDICATOR	REQUIREMENT
7.5.1 Workers[72] have the right to form or join organizations to defend their rights (including their right to collective bargaining) without interference from the employer and without suffering negative consequences as a result of exercising this right[73]	Yes

Rationale—Having the freedom to associate and bargain collectively is a critical right of workers because it allows workers to have a more balanced power relationship with employers when doing such things as negotiating fair compensation. Although this does not mean all workers of a certified aquaculture operation must be in a trade union or similar organization, workers must not be prohibited from accessing such organizations when they exist. If they do not exist or are illegal, companies must make it clear that they are willing to engage in a collective dialogue through a representative structure freely elected by the workers.

7.6 Criteria: Discrimination

INDICATOR	REQUIREMENT
7.6.1 Workers do not suffer any discrimination[74] from the employer or other workers	Yes

Rationale—Unequal treatment of employees, based on certain characteristics (such as sex or race), is a violation of workers' human rights. Additionally, widespread discrimination in the working environment can negatively affect overall poverty and economic development rates. Discrimination occurs in many work environments and takes many forms. In order to ensure that discrimination does not occur at certified aquaculture farms, employers must prove their commitment to equality with an official anti-discrimination policy, a policy of equal pay for equal work, as well as clearly outlined procedures to raise/ file and respond to a discrimination complaint in an effective manner. Evidence, including worker testimony, of adherence to these policies and procedures will indicate minimization of discrimination.

[71] Bargain collectively: Voluntary negotiation between employers and organizations of workers in order to establish the terms and conditions of employment by means of collective (written) agreements

[72] Worker: A person who enters an agreement of any duration with an enterprise to work for the enterprise in return for remuneration in cash or in kind. Immediate family members of the farm owner (i.e., children, spouse, parents, brothers and sisters) and exchange labor may not be considered as workers, unless they express their desire to be workers.

[73] Workers must not be prohibited from accessing such organizations when they exist. If they do not exist or are illegal, companies must make it clear that they are willing to engage in a collective dialogue through a representative structure freely elected by the workers.

[74] Including but not limited to: race, caste, origin, color, gender, age, disability, religion, sexual orientation, resident or migrant, union and political affiliations

7.7 Criteria: Discrimination

INDICATOR	REQUIREMENT
7.7.1 Employers treat all workers with dignity and respect	Yes

Rationale—The rationale for discipline in the workplace is to correct improper actions and maintain effective levels of employee conduct and performance. However, abusive disciplinary actions can violate workers' human rights. The focus of disciplinary practices shall always be on the improvement of the worker. A certified aquaculture operation shall never employ threatening, humiliating or punishing disciplinary practices that negatively impact a worker's physical and mental health or dignity. Employers that support non-abusive disciplinary practices as described in the accompanying guidance, as well as evidence from worker testimony, shall indicate that a certified aquaculture operation is not employing abusive disciplinary practices.

7.8 Criteria: Working hours

INDICATOR	REQUIREMENT
7.8.1 Maximum number of regular working hours	8 hours/day or 48 hours/week (although these do not have to be consecutive hours)
7.8.2 Workers have the right to leave the farm after completing the standard work day	Yes
7.8.3 Minimum time off	Two nights/week off if residing on the farm and a total of four days/month off for all workers
7.8.4 Overtime hours: 7.8.4.1 Are voluntary 7.8.4.2 Do not exceed a maximum of 12 hours per week 7.8.4.3 Occur on an exceptional (not regular) basis 7.8.4.4 Are paid at a premium rate[75] (i.e., an additional 20% is paid to the normal salary)	Yes

Rationale—Workers shall not be obliged to live on the farm. Abuse of overtime working hours is a widespread issue in many industries and regions. Workers subject to extensive overtime can suffer consequences in their work/life balance and are subject to higher fatigue-related accident rates. In

[75]Premium rate: A rate of pay higher than the regular work week rate. Must comply with national laws/ regulations and / or industry standards. Must be 120% of normal rate or higher.

accordance with better practices, employees in certified aquaculture operations are permitted to work within defined guidelines beyond normal work week hours but must be compensated at premium rates. Requirements for time off, working hours and compensation rates, as described above, should reduce the impacts of overtime.

7.9 Criteria: Fair and decent wages

INDICATOR		REQUIREMENT
7.9.1	The employer pays at least minimum wages, as defined by law, or ensures that wages cover basic needs,[76] plus some discretionary income,[77] whichever is higher	Yes
7.9.2	Workers have the right to know the mechanism for setting the wages and benefits	Yes
7.9.3	Wages shall be paid in cash or in a manner most convenient to workers	Yes

Rationale—Workers shall be paid fair and equitable wages that, at a minimum, meet the legal minimum wage and the industry's standards. The wages should meet the minimum basic needs, as unfairly compensated workers can be subject to a life of sustained poverty. Certified aquaculture operations shall also demonstrate their commitment to fair and equitable wages by having and sharing a clear and transparent mechanism for wage setting and a labor conflict resolution policy that tracks wage-related complaints and responses. Company policies and practice shall also prohibit deductions in pay for disciplinary actions, and the payments shall be made in a manner convenient to workers. Having these policies outlined, in a clear and transparent manner, will empower the workers to negotiate effectively for fair and equitable wages that will, at a minimum, satisfy basic needs.

[76]Basic needs are determined by calculating the cost of the basic shopping basket needed for an adequate diet, the percentage of an average household's budget that goes to food and other necessary expenses, and the average size of a household in a given country. Recognized representative shopping basket surveys include those undertaken by national authorities and multi-lateral developmental agencies. A basic or living wage should be capable of sustaining 50% of an average-sized family with food, clean water, clothing, housing, transportation, schooling, obligatory tax payments, health care and an additional 10% discretionary income (SA8000). An employer shall minimally pay a full-time worker the basic needs wage (without financial deductions) or national legal minimum wage; whichever is higher. The basic needs wage/living wage refers to "take home payment.". Any obligatory expenses at the side of the employee/worker (e.g., uniform, tools and lunches) will not bring "take home" pay below a basic needs standard.

[77]For guidance and methods for basic needs wage calculation, see SA8000 Guidance Document

7.10 Criteria: Labor contract

INDICATOR	REQUIREMENT
7.10.1 Workers have copies of, and can understand, their labor contract[78]	Yes
7.10.2 Maximum length of probation period stated in the contract for workers, other than farm managers and workers with a university degree	1 month
7.10.3 Maximum length of probation period stated in the contract for farm managers and workers with a university degree	2 months

Rationale—The key to a fair and transparent exchange (work for income) is an agreement that is clear to both parties and can be verified during the contract period. Signed documents that both parties have access to at will are important for verification to take place. This will also ensure that conflicts around misunderstandings can be avoided and, if they occur, discussed in a mutually transparent manner. Revolving labor contract schemes, designed to deny long-time workers full access to fair and equitable remuneration and other benefits, are prohibited.

7.11 Criteria: Management systems

INDICATOR	REQUIREMENT
7.11.1 The employer ensures that all workers have appropriate channels to communicate anonymously with employers on matters relating to labor rights and working conditions	Yes
7.11.2 Percentage of issues raised by workers which are registered, tracked and responded to by the employer	100%
7.11.3 Percentage of complaints that are resolved[79] within one month after being received[80]	90%

[78]Where verbal contracts are practiced (e.g., remote rural locations, cases of illiteracy and small family farms), extra care needs to be taken that the contents of the agreement are fully agreed to and well-understood. Cross interviews must take place to establish that the employer and the employee understand in the same way the terms of the verbal agreement.

[79]Resolution of a conflict is defined as when both parties agree to remove it from the list of conflicts

[80]Complaints include the ones coming from other resource users, employees and buyers (e.g., middlemen or processors)

7.11.4 A plan for addressing the yet to be resolved conflicts is developed and complied with	Yes
7.11.5 Timeframe for the contracting[81] of suppliers and service providers that ensure suitable health and safety conditions for their workers[82]	Within 1 year from achieving certification

Rationale—Employers shall put in place systems that allow workers to communicate freely on any issues of concerns. Such a system should protect the anonymity of "whistle-blowers." Employers shall also keep records and track and resolve issues to the maximum of their ability. The figure of 90% is arbitrary and is meant to indicate that almost all the grievances are resolved quickly. Having a metrics-based requirements also allow for the percentage of complaints being addressed to be set at a higher level during revisions to these requirements. It is recognized that, at present, most suppliers and service providers contracted by farmers may not offer suitable health and safety conditions to their workers and that this is beyond the control of the farmer. A period of one year is, however, considered by the ASC Pangasius Standard to be a realistic timeframe for farmers to identify suppliers and providers that do offer such conditions.

7.12 Criteria: Record-keeping

INDICATOR	REQUIREMENT
7.12.1 Records of the hours worked by every worker employed in the farm are available	Yes

Rationale—Compliance to requirements on overtime requires a record of the hours worked by every employee to be accurately kept.

[81]Including either written or verbal contracts

[82]As defined in these standards

7.13 Criteria: Participatory social impact assessment for local communities

INDICATOR	REQUIREMENT
7.13.1 A participatory Social Impact Assessment (p-SIA)[83] is conducted (See Annex F for more information)	Yes
7.13.2 Local communities,[84] local government and at least one civil society organization chosen by the community have a copy of the p-SIA in locally appropriate language	Yes

Rationale—The people who live in communities around pangasius farms are critical stakeholders. Regular communication and consultation can build trusting relationships with local communities and prevent or minimize conflicts. The farms should contribute to poverty alleviation and food security so that there are net benefits to the local community.

The focus of the p-SIA criteria is on risks and impacts between surrounding communities and the farm. Information about technical operations on the farm that have no bearing on risks and impacts outside the farm need not be documented nor disclosed in the participatory processes.

The extent to which the steps in the p-SIA are done by outside professionals, or with outside professional consultants, or (almost fully) localized, with or without the use of high-end technical tools, can be appropriate to the scale of the farm. Area-size (ponds and additional grounds dedicated to the farm), farm-technology (intensive to extensive), and capital lay-out are good indicators to make judgments on the appropriateness of the methods and tools used in the p-SIA.

Small farmers can do these steps in locally organized processes and use hand-written documentation that gets posted on village public sign boards. Industrial estates of large size and investment will need to hire professional experts to assist in this process and are expected to adhere to methodological descriptions provided by the UNDP or World Bank. The only addition to existing generic descriptions of the p-SIA methodology is that a closure and reclamation plan is requested.

For new farms, the focus of this criteria lies in assessing future risks and impacts. It will be done before a physical start is made with farm establishment. For existing farms, the focus lies in assessing

[83] p-SIA: An assessment of positive and negative consequences and risks of a planned or ongoing project (e.g., a farm or farm development) undertaken in such a manner that all stakeholder groups have input in process, results and outcome of such an assessment, and that steps taken and information gathered is openly accessible to all.

[84] Community: A group of people with possibly diverse characteristics who are linked by social ties, share common perspectives, and are joined by collective engagements within a geographically confined area. Four common indicators are 1.) a state of organized society in small form (town, village, hamlet) that recognizes a single representative (leader, formal or informal); 2.) the people inside a confined geographical area; small enough to allow face-to-face interaction as the main form of contact between the individuals within the group; 3.) having a common good or a common interest and recognizing that, and been recognized as having that; and 4.) A sense of common identity and characteristics (i.e., “we” versus “them” feeling) on either/or social, cultural, economic, ethnic grounds.

actual risks and impacts. In both cases, the outcome is oriented towards identifying how to responsibly deal with these risks and impacts in negotiated processes with those who are affected.

In group certification approaches (cooperatives or an area of individual farms of which products are not individually traceable in trade), the whole group is the unit of interest.

Credible social sustainability requirements must be able to respond to real human concerns that arise in communities located near the farm, as well as on the farm. In particular, appropriate consultation must be undertaken within local communities so that potential conflicts are properly identified, avoided, minimized and/or mitigated through open and transparent negotiations on the basis of an assessment toward risks and current impacts on the surrounding communities. Communities will have the opportunity to be part of the assessment process. The impacts of aquaculture operations on minorities and those prone to discrimination will be accounted for, and opportunities for these groups of people should be identified, evaluated and addressed. Negative impacts may not always be avoidable. However, the process for addressing them must be open, fair and transparent. Therefore, these community requirements focus on due diligence through dialogue and negotiation with surrounding communities.

Commonly used prescribed methodologies exist for p-SIAs.

- See United Nations Public Administration Network's "A Comprehensive Guidefor Social Impact Assessment" (2006) for an example of a more comprehensive description of the methodology, and
- United Nations Environment Programme "Social Impact Assessment tools and Methods" Handout 13-2 in EIA Training Resource Manual (2002)
- for a short concise set of tools adapted to developing country rural context

7.14 Criteria: Complaints by local communities

INDICATOR	REQUIREMENT
7.14.1 A verifiable conflict resolution policy[85,86] for local communities is developed and applied	Yes
7.14.2 Complaint boxes, complaint registers, and complaint acknowledgement receipts in local language(s) are used	Yes

[85]The policy shall state how conflicts and complaints will be tracked transparently and explain how to respond to all received complaints.

[86]The process of resolution is documented and meetings are summarized. Summaries include an agenda (the list of concerns), resolutions or agreements reached, who shall take what action by when, and a list of participants. Local government and at least one civil society or customary organization chosen by the community shall have access to the conflict resolution process and the documentation thereof. A conflict is deemed resolved if both parties in the negotiation process have agreed to take it off the agenda.

7.14.3 Percentage of conflicts resolved within the date of being filed	Within 6 months: 50% Within 1 year: 75% Within 2 years: 100%

Rationale—Mutually fair and open negotiations will help resolve conflicts. The farm must, therefore, have a conflict resolution policy in place that describes how to make complaints as well as how the farm intends to address them. The contents of this policy must be known publicly (in surrounding communities) and the farm must provide verification as to the progress it makes in resolving outstanding concerns.

The requirement makes allowance for the eventuality that not all conflicts can be resolved easily and quickly. It must also be mentioned that conflicts may not necessarily be caused by farm development and/or operation. But the farm shall exercise due diligence (i.e., actively seek to determine and solve) with regard to complaints, provide the utmost effort to avoid doing harm to the interests of surrounding communities, and provide evidence for this according to the requirement.

7.15 Criteria: Preferential employment for local communities

INDICATOR	REQUIREMENT
7.15.1 Evidence of advertising positions within local communities before migrant workers are hired	Yes
7.15.2 An explanation on the reasons for employing each worker is available and the explanation justifies not employing workers from local communities	Yes, if workers outside the local community are employed

Rationale—Unskilled manual labor is common on many pangasius farms and, therefore, pangasius aquaculture can be very beneficial to rural village economies as a major source of employment. However, pangasius farmers often resort to hiring migratory workers and asking them to stay on, or close to, the farm. In doing so, the potential value pangasius farming has to local rural economies is lessened. The criteria is formulated to ensure people within the local work force are duly considered for jobs on the farm, and migratory workers are only hired when people within the local workforce do not meet requirements.

ANNEX A—LIST OF PROCESS FACILITATION GROUP MEMBERS

Name	Organization	Stakeholder Group
Antoine Bui	Binca	Buyer/processor
Corey Peet	David Suzuki Foundation	NGO
David Graham	BirdsEye/Iglo	Buyer
Flavio Corsin	World Wildlife Fund	NGO
Jack Morales	Sustainable Fisheries Partnership	NGO
Nguyen Hoai Nam	Vietnam Association of Seafood Exporters & Producers	Farmer/processor association
Nguyen Van Trong	Research Institute for Aquaculture N.2	Government
Pham Quoc Lam	Butler's Choice	Buyer
Pham Thi Anh	Van Lang University	Academia
Thuy Nguyen	Network of Aquaculture Centres in Asia-Pacific	IGO
Vo Thanh Khon	Binh An SeaFood Joint Stock Company	Farmer/processor

ANNEX B—LIST OF TECHNICAL WORKING GROUP MEMBERS

#	Name	Organization	TWG1	TWG2	TWG3	TWG4	TWG5	TWG6	TWG7
1	Albert Salamanca	University of Durham		X					X
2	Anne Laurance Huillery	Regal Springs (formerly Anova & Vinh Hoan)		X			X		
3	Antoine Bui	Binca			X	X	X	X	
4	Benjamin Belton	University of Stirling							X
5	Casson Trenor	Consultant (formerly Fishwise)				**XXX**	X		
6	Corey Peet	David Suzuki Foundation	X	X	X	X	X		X
7	Dan Fegan	Cargill			X		**XXX**		
8	Dang Van Vien	Vinh Hoan			X				
9	Dave Little	University of Stirling	**XXX**	X		X			
10	Dave Robb	EWOS					X		
11	David Graham	BirdsEye/Iglo					X		
12	David Penman	University of Stirling				X			
13	Dinh Thi Thuy	RIA2						X	
14	Dirk Lamberts	MRAG		X	X	X	X	X	X
15	Dirk Lorenz-Meyer	Behn Meyer Animal Nutrition			X		X		
16	Do Thanh Muon	Bureau Veritas Vietnam			X		X	X	
17	Flavio Corsin	WWF	X	X	X	X	X	X	X
18	Florentina Constanta Grecu	Triton Group (formerly Butler's Choice)							**XXX**
19	Francis Murray	University of Stirling	X	X		X	X		X
20	Gaetan Morizur	Ocialis					X		
21	Geert Depestele	Marine Harvest Pieters N.V.			X			X	
22	Heinzpeter Studer	Fair Fish						X	
23	Hua Thi Phuong Lien	AnGiang University			X		X	X	
24	Jack Morales	Sustainable Fisheries Partnership		X	**XXX**	X		X	X

#	Name	Organization	TWG1	TWG2	TWG3	TWG4	TWG5	TWG6	TWG7
25	Jan Koesling	Bayer						X	
26	Julien Vignier	Viking Fish Farm		X			X		X
27	Kelling Ingrid	WorldFish Center							X
28	Kjersti Gravningen	PHARMAQ AS in Vietnam						X	
29	Kwei Lin	Independent			X				
30	Le Nguyen Doan Khoi	University of Groningen/CanTho University	X					X	
31	Leo van Mulekom	Oxfam Novib							X
32	Ludwig Nägel	Independent			X		X		
33	Mags Crumlish	University of Stirling					X	X	
34	Mai Thi Thuy Hang	Xanh							X
35	Malinee Smithrithee	Department of Fisheries	X			X			X
36	Marc Campet	Ocialis			X		X		
37	Marie-Louise Scippo	University of Liege						X	
38	Md. Mofakkarul Islam	Bangladesh Agricultural University	X						
39	Mike Phillips	WorldFish Center							X
40	Mohammad Mahfujul Haque	Bangladesh Agricultural University		**XXX**					X
41	Nguyen Duong Hieu	TÜV SÜD PSB VIET NAM CO., LTD					X	X	
42	Nguyen Huynh Duc	Vung Vuong Sadec Company (Director)							
43	Nguyen Thanh Phuong	Can Tho University			X		X		
44	Nguyen Thi Bich	WWF	X	X	X	X	X	X	X
45	Nguyen Thi Hai Xuan	CEDMA/RIA1			X			X	
46	Nguyen Van Sang	RIA2				X			
47	Nguyen Xuan Nhan	Domenal Joint Stock company			X		X	X	
48	Nicolas Demblans	Distriblus Asia		X	X	X			
49	Nicolas Privet	Freshstudio (formerly ANOVA)				X	X	**XXX**	

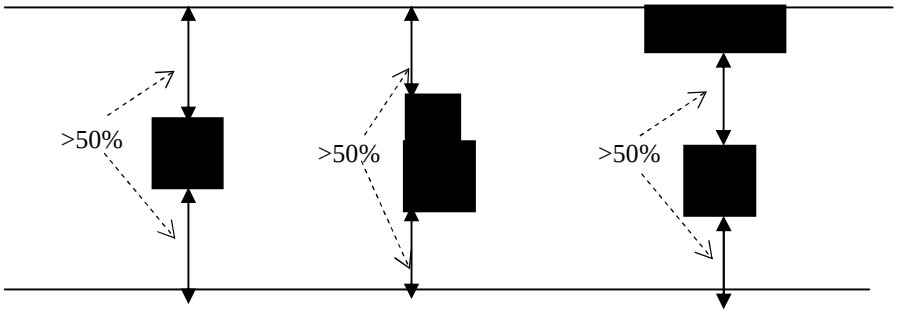
#	Name	Organization	TWG1	TWG2	TWG3	TWG4	TWG5	TWG6	TWG7
50	Patrick Kestemont	University of Namur						X	
51	Pham Quoc Lam	Butler's Choice							X
52	Phan Thi Hai Yen	Social Accountability International	X						X
53	Phil Nguyen	Asia Innovation		X	X		X	X	
54	Raphaela Legouvello	Aquaculture Health Consulting						X	
55	Reiko Omoto	University of Waterloo							X
56	Roel Bosma	Wageningen University			X		X		
57	Sena de Silva	NACA	X				X		X
58	So Nam	Inland Fisheries Research and Development Institute (IFReDI), Fisheries Administration, Cambodia				X	X	X	
59	Stefano Carboni	University of Stirling				X			X
60	Steven Schut	Wageningen University							X
61	Thuy Nguyen	Deakin University				X			
62	Timothy Fitzgerald	Environmental Defense						X	
63	Tran Truong Luu	Survey Design & Investment Consulting Joint Stock Company (SDICO)		X	X				
64	Uthairat Na-Nakorn	Kasetsart University				X			
65	Vincent Ruel	Virbac						X	
66	Vo Hoang Duy	Cuu Long University			X		X		
67	Vo Thanh Khon	Bianfishco	X	X	X	X	X	X	X
68	Wongpathom Kamonrat	Inland Fisheries Resources Research and Development Institute				X			
69	Xavier Bocquillet	formerly IMO			X				

Note: "XXX" indicates TWG coordinators

ANNEX C—DIAGRAMS

Diagram 1. Requirement for cages. Minimum width of the water body without farms

Examples of acceptable cage distributions (black rectangles indicate farming units)



Examples of unacceptable cage distributions (black rectangles indicate farming units)

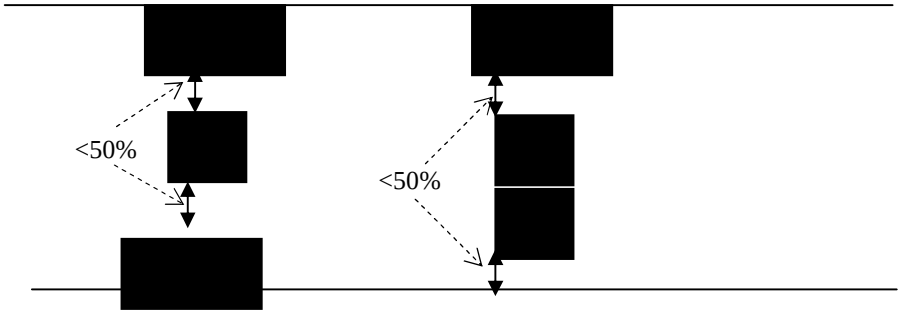
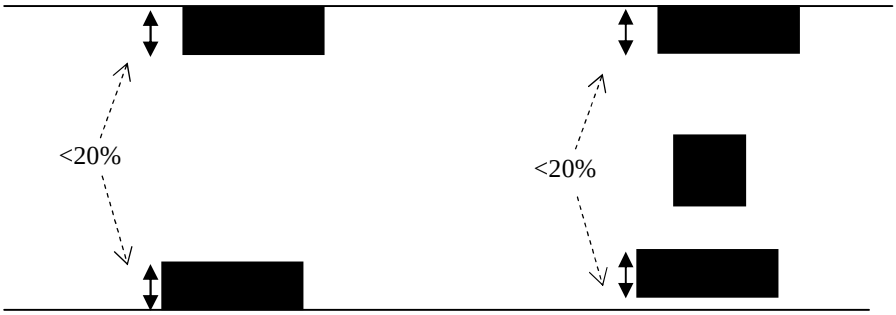


Diagram 2. Requirement for pens. Maximum width a farm can occupy, calculated when the water body level/width is at its minimum

Examples of acceptable pen distributions (black rectangles indicate farming units)



Examples of unacceptable pen distributions (black rectangles indicate farming units)

Diagram 3. Requirement for pens. Number of contiguous pens allowed

Examples of <u>acceptable</u> pen distributions (black rectangles indicate farming units)

or

Examples of <u>unacceptable</u> pen distributions (black rectangles indicate farming units)

or

ANNEX D—MEASURING METHODOLOGIES AND FORMULAS

Note: Farm results are acceptable for audit purposes if there is evidence of those being obtained following appropriate procedures or from an appropriate source. If farmers do not conduct regular testing, the certification body will use an appropriate testing laboratory/procedure.

Water abstracted (Criteria 2.4)

Water abstracted can be calculated as follows:

Code	Description	Example
PV	Pond volume	27,000 m^3
%E	% of pond water exchanged at each time	1/3 water exchange
EV	Exchanged volume/time	9,000 m^3 x time
T	Number of times in which water has been exchanged during one crop	100 times/crop
TEV	Sustainable Fisheries Partnership	900,000 m^3/crop
Q	Total exchanged volume/crop	300t
A	Quantify of fish harvested	3000m^3/t

EV = %E x PV

TEV = EV x T

A = TEV / Q

Total Nitrogen & Total Phosphorus Measuring Methodology (Criteria 3.1)

% Change = (value in outlet – value in the inlet) / value in the inlet

- TN shall be measured using the following method:
- Kejdalh and Indo-phenol Blue
- TP shall be measured using the following method:
- Kejdalh and Ascorbic acid
- Testing of water shall be conducted in the 2nd half of the crop (i.e. at least after 90 days from stocking)

- Farmers can provide test results directly. These have to be obtained following appropriate procedures (as defined in these requirements) or from an appropriate source
- If farmers do not test water or the procedures used are not appropriate, the certification body will use an appropriate testing laboratory/procedure
- Sampling of water shall be conducted preferably in the morning (i.e. before 11AM)

Dissolved Oxygen Measuring Methodology (Criteria 3.2)

- Measurements for dissolved oxygen must be taken twice during the day. In order to get the maximum and the minimum levels, measurements should be made
- 1h before sunrise (± 30 min)
- and two hours before sunset (± 30 min)
- Oxygen shall be measured using a hand-held oxygen meter or a more accurate (chemical) method. Accuracy of the method shall be proven through peer-reviewed documents
- DO to be measured fortnightly by the farmer from the time of stocking and regularly for the whole period the farm is certified. Data for at least three months shall be available to the auditor. Records provided by the farmers will be validated by the auditor, who will measure DO in the receiving water at every visit.

Percentage change in diurnal DO of receiving waters relative to DO at saturation (Criteria 3.2)

Percentage change in diurnal DO of receiving waters relative to DO at saturation =

$$= \left[\frac{\text{Max DO (mg/l)}}{\text{DO at saturation}_{\text{Max}} \text{ (mg/l)}} \times 100 \right] - \left[\frac{\text{Min DO (mg/l)}}{\text{DO at saturation}_{\text{Min}} \text{ (mg/l)}} \times 100 \right]$$

Total TN Discharge Formula (Criteria 3.3)

TN Discharge (g/kg fish) =

$$\frac{[\text{Total TN (mg/l) in pond water} - \text{total TN (in mg/l) in intake water}] \times \text{Total discharged volume } (m^3)}{\text{fish yield (kg)}}$$

Total TP Discharge Formula (Criteria 3.3)

TP Discharge (g/kg fish) =

[Total TP (mg/l) in pond water – total TP (in mg/l) in intake water]
x Total discharged volume (m^3)

---

fish yield (kg)

Sludge Repository Formula (Criteria 3.4)

- Sludge is pumped every two months
- About 20 cm of sludge are pumped at every time
- Evaporation rate is assumed to be 150 mm/month[87]

Therefore, the minimum sludge repository volume shall be calculated as follows

Volume = [Area of ponds[88] x 0.2m] - [Area repository x 0.3m]

Weighted eFCR Formula (Criteria 5.2)

eFCR Calculation (Pond):

Feed Used (Metric Tons)

Fish harvested (Tons) - Fish Stocked (Tons)

Yield Calculation (Pond):

Fish harvested (Tons) - Fish Stocked (Tons)

[87] Tri, Le Quang; van Mensvoort, M.E.F (2004) Decision trees for farm management on acid sulfate soils, Mekong Delta, Viet Nam Australian
Journal of Soil Research. September 01, 2004

[88] Consider only the area of the ponds from which sludge has to be removed over the following 2 months

Weighted eFCR Formula for Certified Farm (Criteria 5.2)

$$\frac{(eFCR1 \times Yield1) + (eFCR2 \times Yield2) + \ldots + eFCRn \times Yieldn)}{(Yield1 + Yield2 + \ldots + Yieldn)}$$

Feed Fish Equivalency Ratio (FFER) Formula (Criteria 5.2)

The FFER shall be calculated for both fishmeal and fish oil. The greater value shall be in compliance to the requirements. FFER calculations for fishmeal and fish oil shall follow the formulas below:

Feed Fish Equivalency Ratio (Fishmeal):

$$\frac{(\%\ \text{Fishmeal in feed} \times \text{eFCR})}{\%\ \text{yield of fishmeal from wild fish}^{89}\ (22.22\%)}$$

Feed Fish Equivalency Ratio (Fish oil)

$$\frac{(\%\ \text{Fish oil in feed} \times \text{eFCR})}{\%\ \text{yield of fish oil from wild fish}^{90}\ (5\%)}$$

Real Percentage Mortality Formula (Criteria 6.1)

Real Percentage Mortality (versus recorded mortality) is calculated as an average across all holding units in the farm over a one year period. This calculation must only include live fish and must not be performed by subtracting the number of dead fish from the stocked number or adding it to the harvested number. ONLY use complete crops, such as crops which have been either harvested or prematurely stopped for any other reasons.

$$\text{Real Percentage Mortality} = \frac{(\text{number of fingerlings stocked} - \text{number of harvested fish}) \times 100}{(\text{number of stocked fish})}$$

[89] Does not include fishmeal or trimmings from fish processing by-products
[90] Does not include fish oil from fish processing by-products

Average Growth Rate Formula (Criteria 6.4)

$$\text{Average Growth Rate (g/day/fish)} = \frac{\text{(weight at harvest (g) – weight at stocking (g))}}{\text{number of days of production}}$$

ANNEX E—HEALTH PLAN CHECKLIST (FOR CRITERIA 6.3)

The health plan must include:	Done	Still to do
1) Name and location of farm		
2) List of previously identified diseases		
3) Planned preventive methods and treatments (including chemicals, veterinary medicines, biological products and withdrawal periods) to be administered for previously identified diseases		
4) Pond preparation protocols		
5) Vaccination protocols (when applicable)		
6) Bio-security procedures		
7) Screening program in place for relevant pathogens		
8) Water management protocols for disease prevention		
9) Records of routine assigned aquatic animal health specialist visits are in place		
10) Frequency and methods of removal of sick and disposal of dead animals		
11) Other prevention plans where applicable		
12) Procedures for transportation of seed and of harvested fish		
13) Mechanism of responding to disease outbreaks, including reporting disease outbreaks to the fish health specialist and to others as appropriate		
14) Protocols for preventing disease spread (e.g., through water discharge and fish)		

ANNEX F—SOCIAL IMPACT ASSESSMENT (p-SIA) CHECKLIST FOR FARMERS (FOR CRITERIA 7.13)

A p-SIA is a risk assessment that assesses the impact of the farm on its environment and community, the extent of the impact and whom it will impact through a process in which farm and surrounding community (potentially affected stakeholders) have had open dialogues on impacts, risks, and ways to deal with these. Only those farm processes that present potential risks outside the farm (e.g. pesticide or antibiotic use and disposal for example) need to be reviewed in the p-SIA. The following nine facets should be considered.

	Done	Still To Do
1. The process and transparency of communication with stake-holders (e.g., affected people, groups and communities)		
2. Quality of the p-SIA process (e.g., is it participatory and transparent). (a) The intent to conduct a p-SIA is locally publicly communicated with sufficient time for interested parties to participate and/or get informed (b) In listing stakeholders, in making impact descriptions, and in preparation of a final p-SIA report-document, meetings with the listed stakeholders (or by stakeholders chosen representatives) have taken place (c) These meetings have been minuted and these records are attached to the final report; names and contact details of participating stakeholders included (d) Evidence is provided that draft and final p-SIA reports have been submitted to local government representative and, if stakeholders so desired, to a legally registered civil organization chosen by the stakeholders		
3. The risks, and actual impacts of the current or intended farm and at least two alternatives (one of these is the “no farm or no expansion” scenario). Concepts to cover include:		
a) Economic aspects (influence on employment opportunities, influence on other livelihoods in community)		
b) Natural resource access and use (land and water tenure, influence on quality and availability of natural resources incl. water)		
c) Human assets (food security, health and safety, education, indigenous knowledge)		

d) Physical infrastructure (access to roads, electricity, telephone, housing, waste disposal systems)		
e) Social and cultural aspects (indigenous/traditional/customary rights and beliefs, social exclusion/inclusion, gender equity, changes in age composition of the community, local informal institutions and organizations)		
f) Governance aspects (influence of aquaculture on norms, taboos, regulations, laws, conflict management, and whether these changes add up to more or less transparency, accountability and participation in decision making		
4. Research and report probable impacts that are likely to be most important. In doing this, it is important to arrange meetings with stakeholders to let them prioritize as well as to let them express how they assess/view/feel; identify both positive and negative risks and impacts. (this way of working also paves the way for handling trade-offs.)		
5. Do deeper investigations into priority impacts with focus on the question "What changes will lead to if they indeed come about?" Include: a) Physical effects to man-made and natural structures and processes b) Likely adaptations and the social and economic effects of making such adaptations c) How these effects and indirect effects would compare to having no intervention d) How effects may or might be cumulative.		
6. Make recommendations to maximize the positive and minimize the negative, with consideration to compensation options for those lands and people impacted; include recommendations on how to avoid these issues with the intended farm or farm development		
7. Propose a mitigation plan assuming the farm development will take place or continue (in an adapted form if that seems appropriate); include a closure and reclamation plan explaining how repair or restoration will take place after farm closure or bankruptcy.		
8. Develop and approve, with all stakeholders, a monitoring		

plan and indicators on positive and negative risks and impacts;make use of FDG[91] and/or PRA[92] methodologies in this step		
9. A summary with recommendations and conclusions is made available to all involved in the process and, through public local notices, made accessible to all members of the local community		

[91]Focus Group Discussions (FGD): A rapid way to collect comparative data from a variety of stakeholders in a group-setting. Very useful to list or brainstorm around concerns, to cross-check information for validation, or to obtain a list with a variety of reactions to hypothetical or intended actions

[92]Participatory Rural Appraisal (PRA): A term that covers a family of participatory approaches and methods to investigate with emphasis on local knowledge and perception. It includes group exercises through which stakeholders are encouraged to share information and make their own appraisals and formulate their own solutions. Originally developed for use in rural areas (with illiterate people), PRAs have been successfully employed in a variety of settings to enable local people to work together to plan appropriate developments in and for the community.

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- Daniel Fegan: Cargill
- David Graham: BirdsEye/Iglo
- David Little: University of Stirling
- Flavio Corsin: World Wildlife Fund
- Florentina Constanta: Independent advisor (formerly Butler's Choice)
- Jack Morales: Sustainable Fisheries Partnership
- Mohammad Mahfujul Haque: Bangladesh Agricultural University
- Nicolas Privet: Fresh Studio (formerly Anova Food)
- Nguyen Hoai Nam: Vietnam Association of Seafood Exporters & Producers
- Nguyen Van Trong: Research Institute for Aquaculture N.2
- Pham Quoc Lam: Butler's Choice
- Pham Thi Anh: Van Lang University
- Thuy Nguyen: Network of Aquaculture Centres in Asia-Pacific
- Vo Thanh Khon: Binh An SeaFood Joint Stock Company