ASC METRICS METHODOLOGY

Baseline Document

March 2020 Public Consultation

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Purpose and Scope of the Baseline Document

The aim of the ASC Metrics Methodology is to provide consistency to the metric standard-setting process of the ASC Standards. Such methodology must be robust – science-based where possible – and standardised in order to conduct efficient reviews of (set) metrics. Furthermore, the Methodology must be publicly available on the ASC website – including the data sets used (summarised and anonymised) and the analysis conducted upon them.

The present Baseline document is applicable to all species-specific metrics and includes general definitions that will be used throughout the process of metric-setting. This document will provide measuring and sampling guidance and define the minimum amount of data necessary for metric-setting.

Range of Activities within ASC Standard Setting to which this Document applies

The ASC standards apply to the planning, development and operation of several aquatic animals (finfish, shrimp/prawn and bivalves/molluscs) & seaweed aquaculture in various production systems. Existing standards are reviewed regularly in compliance with the ISEAL Standard-setting Code, and new standards have been and are being established on a species-group basis.

The ASC Metrics Methodology is both applicable to new standards as well as to the operational reviews of existing standards.

Metrics within ASC Standards

In principle, metrics are numbers that provide information about efficiency, performance, progress or quality of a process under question. In the ASC standards, metrics are used to describe performance levels. Metrics can be used to describe a desired or necessary range for certification as well as lower or upper cut-off values. Metric calculation is always done based on SI units[1] (metric system).

Definition of 'Good Data'

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[1] **The international system of units (SI system)** is built on seven base units (ampere, kelvin, second, metre, kilogram, candela and mole). Derived units can be used for calculations within the SI system.

"Good data" is generally defined as 'well sourced data collected in an empirical[2] manner and including metadata'. Metadata is data about the actual data and provides additional information (e.g. who collected the data, and when and where it was collected[3]). On this basis, the data collection can/could be replicated by a third party and thus be verified. All data used for metric-setting will transparently be made public and available on the ASC website. Farm data may be summarised and anonymised for this purpose.

Data collection should follow the certification requirements as specified in the audit manuals, where possible.

Types of Data relevant for the ASC Metrics Methodology

The aim of the Metrics Methodology is to have standardised protocols for data collection and analysis that will be used for metric-setting in existing ASC standards, as well as in new standards. The methodology therefore relies on data as a backbone for the standard-setting process. Such data can come from certified and non-certified farms, as well as from research studies or come as a result of stakeholder discussions. But it must aim to reflect, as best as possible, the global performance on a particular topic/matter. This global performance curve is greatly relevant to the ASC's Mission as ASC standards aim to capture the best performance, as indicated through specific research into the production of each species, and therefore responsibly drive the industry towards continuous improvement via certification of the latter.

Where applicable, data from all species and sub-species which can be certified under one standard should be assessed within the metric-setting decision-making process.

Farm Data

The backbone of the data for metric-setting within the ASC standards is existing data from both certified and non-certified farming operations. Therefore, knowledge about the aquaculture industry is crucial and this has to be revised regularly.

Certified Farms

All ASC certified farms are subject to yearly audits in order to verify compliance to the standards. These audits also include data collection according to the ASC Monitoring and Evaluation (M&E) strategy. Evaluation of existing standards/metrics are based on the M&E database and must include all available data in order to identify the performance of all ASC certified farms.

Non-certified Farms

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[2] **Empirical**: originating in or based on what is experienced, seen or measured rather than on theory
[3] **Bedoll, R. and Kimball, C. (1990).** The importance of metadata in mass-storage systems. Digest of papers. Tenth IEEE Symposium on Mass Storage Systems@m_Crisis in Mass Storage(MASS), Monterey, CA, USA, , pp. 111-116.

Data from non-certified farms must be obtained for metric-setting within new standards. The ASC will seek to base the revision of existing standards on farm data originating from an equal number of non-certified farms as that available from certified farm data, or from a statistically relevant subset; in order to allow for appropriate statistical analysis. The required number of farms will be determined by a power analysis. The main producer countries, according to the FAO[4], have to be represented in the dataset (based on the current FAO data -- e.g. the SOFIA[5] report; countries with more than 10% of world production for this species have to be included). Data collection will be announced on the ASC website and submission of data will be open to all farmers. If the required number of data submissions cannot be reached, revisions will be conducted based on the data provided. Satisfactory rationale must be given if the data does not cover all main producer countries. Such 'sufficient reasons' include:
- No available FAO data,
- Impossibility to collect data due to safety reasons in any given country/region.

Metric-setting within new ASC standards will require at least one independent field verification in each of the main producer countries to verify data submission through the online portal. Online submission of data will also be open to all farmers.

Studies/Research Data (Literature Review)

In order to ensure that certified farms exemplify best aquaculture practices it is essential to check peer-reviewed research studies. All consulted studies will be listed. Data collection should focus on the most recent studies, consulting older studies might however be necessary depending on the status of research in any particular field.
Data from at least one scientific study must be consulted in order to evaluate whether farming practices could be improved beyond the current status. Such study must be no older than five (5) years. If there are no such scientific studies available, contract research with credible research institutions can be commissioned by the ASC to that end.
Field studies provide valuable third-party, independent, insights in the status of investigated region, species and/or aquaculture practices. All publically available field studies must be consulted in order to provide an overview of the current status.

Farm Data from different Regions and/or Farming Practices

ASC standards are internationally valid and implemented according to ISEAL guidelines; therefore they are mandated not to favour any particular technology. However, there can be significant differences between both regions and farming practices, rendering it necessary to distinguish by region and/or farming practice. Data collection must therefore include information on both the region and the farming practice (metadata).

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[4] **FAO:** Food and Agriculture Organization of the United Nations
[5] **SOFIA**: The State of the World Fisheries and Aquaculture, a flagship biennial report from the UN FAO's Fisheries and Aquaculture Department.

Statistical analysis of data will be conducted individually on farming practices to identify potential significant differences between farming practices. Decisions regarding whether metrics applicable to all farming practices *where significant differences are observed between practices* should be considered individually, or as one 'overall' metric, will be taken on a case-by-case basis. Additionally, it is/will be necessary to include specific metrics only applicable for certain farming practices. These will be indicated accordingly and will have/have to be derived similarly to all other metrics, with their only distinction being that they are farming practices-focused.

Data Comparison / Decision Making Process

All collected data is to be merged in the Metrics Methodology Excel file including sufficient metadata in order to reconstruct the origin of each data point. The unit for the metric has to be set according to SI units (or derived from.) and should be the same for all collected data. Conflated data will then be presented in a Data Overview document with sufficient explanations. Calculations for data conversions [will] have to be explained in the document. If certain data points are to be excluded from further processing, sufficient reasons as to why this data point is not trustworthy have to be provided. Reasons for exclusion include (but are not limited to):
- Statistical identification as an outlier,
- Lack or inconsistency of metadata,
- Inconsistency with data from previous cycles/years.

Statistical analysis of all collected data has to be conducted in order to identify outliers. The data will thus be checked for normal distribution[6] and homogeneity of variance[7]. Potential outliers[8] have to be checked and decisions regarding whether to include outliers in further data comparison should be made on a case-by-case basis. If this statistical analysis is likely to cause all research results to be excluded from further data analysis, it would then be necessary to provide evidence that such research is not appropriate to describe the commercial culture of the specific aquatic species.

Statistical analysis should be conducted per topic (certified farm data, non-certified farm data, scientific research studies, field studies) to calculate the average value, median, quartiles, maximum and minimum values for each of the four. Averages, medians and/or percentiles will then be used equally for setting the metric performance level for the standard.

Exceptions

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[6] **Normal distribution** (or Gauss distribution or bell curve), symmetrical distribution of data with the bulk of data points being in the middle (average). Normality can be tested with graphical residual analysis.
[7] **Homogeneity of variance** (or homoscedasticity), collection of variable is homoscedastic if the sub-populations have the same variance. Homogeneity of variance can be tested with graphical residual analysis.
[8] **Outliers** are data points that are further away from the average than the rest of the data. Boxplots can be used to identify outliers.

- Direct concerns for animal welfare (specific documents that provide certain min/max values that cannot be changed?);
- Direct concerns for human welfare (e.g. even if this poisonous treatment is the best, it is still a 'no go' for health and safety reasons);
- National or international law.

Revision of Standard

Statistically defined metric performance levels will be discussed with stakeholders (farmers, scientists, regulators, and NGOs) separately or within working groups in order to decide whether the set-levels are deemed reasonable or not.
When the defined metric requirements are stricter than those required by law/regulation *and* that the implementation/achievement of the ASC metric does not result in a legal non-compliance, the ASC Standard must be adhered to.

Implementation of revisions will follow the normal ASC standard-setting protocols, with certificate-holders expected to comply with any new requirements within the timeframes stipulated in the revised ASC standard(s).