



NL Agency
Ministry of Economic Affairs

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Sustainability indicators for aquatic
biomass - results of a first pilot and
multi-stakeholder workshop

BIO-
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NL Agency

Colophon

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1 Introduction

The use of aquatic biomass as a feedstock for biofuel production and for other applications is gaining increasing interest. One of the reasons is the suggested sustainability potential of aquatic biomass, compared to biomass grown on land: aquatic biomass production does not (necessarily) entail the use of land suitable for food production, while high specific production rates are being claimed.

Unlike for biomass grown on land, there is no commonly accepted set of sustainability criteria designed to test sustainability aspects of particular aquatic biomass projects. Consequently, it is difficult for project developers and other stakeholders to substantiate sustainability claims of these projects.

In the framework of NL Agency's Netherlands Program for Sustainable Biomass, a first set of indicators of sustainable aquatic biomass production was developed by Proforest, drawing on existing sustainability standards for agricultural commodities, aquaculture and biofuels. This set of indicators was field tested on an aquatic biomass project in Vietnam, which uses a co-culture production system of algal biomass and shrimps in shrimp ponds.

The results from the field test were incorporated into the draft indicators, leading to the development of an additional module for algal biomass production in co-culture pond systems with aquaculture. Further modules for other production types may be developed. The draft set of indicators is available from the NL Agency website (<http://www.agentschapnl.nl/en/content/aquatic-biomass-value-chain-indicators-march-2013>).

Following the publication of the draft indicators, NL Agency have organised a one-day workshop for stakeholders in aquatic biomass production, processing and use. This workshop was also linked to work which is being executed under the Green Deal 'Noordzeeboerderij'.

The objective of this workshop was threefold:

1. To present to relevant stakeholders the draft set of sustainability indicators;
2. To discuss sustainability issues of aquatic biomass production;
3. To assess whether stakeholders are interested to jointly develop the draft indicators further, to what ultimately could become a standard for aquatic biomass production.

In addition, the workshop provided ample opportunity for networking.

This report summarises the workshop results, including conclusions on a process towards further standard development.

Chapter 2 summarises key features of the workshop. Chapter 3 summarises outcomes of the discussion on sustainability issues in aquatic biomass production. Chapter 4 summarises workshop conclusions and Chapter 5 indicates the next steps in a possible process towards further best practise guidance/standard development.

2 The workshop

2.1 General

The workshop was held on 23 May 2013 in Utrecht (the Netherlands), and attended by some 25 participants. Participants included representatives from aquatic biomass project developers, research institutes, consultants, and the Dutch normalisation institute. While the majority of participants was Dutch, they also included experts from Germany, USA and the UK.

The workshop had been advertised using an e-mail database available at NL Agency and the organising consultants, and also through NL Agency's regular digital newsletters.

Organisation and facilitation of the workshop was done by Arjen Brinkmann (Brinkmann Consultancy), Bilge Daldeniz (The Proforest Initiative) and Martijn Vis (BTG).

2.2 The workshop programme

Below is the workshop programme. The workshop comprised both plenary sessions and discussions in breakout groups, during which participants worked in smaller groups of approximately 6 people.

9.30	Welcome & introduction to the workshop
9.45	Aquatic biomass project introductions by participants
10.45	Presentation on environmental & social sustainability standards
11.15	<i>Networking coffee break</i>
11.45	Break out session for group discussion: Key challenges for sustainability of aquatic biomass production
13.00	<i>Networking lunch</i>
14.00	Presentation of NL Agency draft sustainability indicators
14.30	Familiarisation with content of NL Agency indicators (group exercise)
15.00	<i>Networking coffee break</i>
15.15	Break out session for group discussion –further development of standard – process and content
15.45	Plenary discussion on further development of sustainability indicators & follow-up steps
17.00	Close of workshop

2.3 Workshop participants and their activities

During the workshop, participants presented their activities in the field of aquatic biomass in five minute pitches. Research institutes like NIOZ, TNO, ECN, IVM, IMARES and the German UMZICHT presented their research activities varying from aquatic biorefinery concept development, LCA, innovation analysis to research on nutrient use of macro algae in the North Sea. Companies and project developers like Algen Sustainables, ABC Kroos, Mature Development, Algaecom, Ecofys, Feyecon presented their activities, covering mainly pilots and demos on production of various types of aquatic biomass like duck weed, macro algae in the Mekong delta of Vietnam, macro algae in the North Sea, and land based micro algae production. Participants active in biomass sustainability and certification were represented by NEN and co-organisers Proforest, Brinkmann Consultancy and BTG.

During the meeting the question was raised whether the current group was representative for the international algae community. With a few exceptions, in particular UMZICHT (DE) and Algen Sustainables (VN/USA), most participants at the workshop represented Dutch research institutes and companies. Elsewhere in Europe, the USA, Asia and Latin America much work has been performed on algae production for decades. The European Algae Biomass Association gives an impression of the European parties active in algae research and production. Like in the Netherlands, research companies exceed the share of industrial companies. Large oil companies like Shell and Exxon Mobile have invested in algae research and demonstration for biofuels production but recently withdrew their involvement. Many workshop participants confirmed that that they did not focus (anymore) on biofuels production from algae, but (re)focus on algae production for extraction of proteins and other biobased products. The overall picture shows international potential for the development of sustainability criteria and indicators that should be applicable to all applications of algae, and not be limited to biofuels production.

3 Sustainability issues in aquatic biomass production

3.1 Introduction

This chapter summarises sustainability issues in aquatic biomass production, as they were identified the group discussions during the Workshop. Sustainability issues were categorised around three subjects, i.e. 'economic issues', 'environmental issues' and 'social issues'.

3.2 Economic issues

The following questions were used as guidance for group discussions on economic sustainability issues:

- What factors determine the viability of aquatic biomass production and processing?
- What are the operational challenges?
- What factors influence successful commercialisation of algae production?
- In how far are biofuels regulations relevant for algae production (e.g. EU RED?)

Groups identified the following issues:

- Valorization of all fractions from aquatic biomass as key element to ensure economic success (cascaded use);
- Sound business modelling (long-term viability);
- Avoiding perverse incentives, fraud and bad use of subsidies;
- Application of viable and proven technologies;
- Link to viable supply chains (including for certification)
- Good monitoring & management;
- Avoid risks, since the industry has not yet developed, we are on time to avoid certain biomass sustainability risks;
- Create room for innovators, prevent them to make big errors.

The above economic issues were identified in the group sessions, however time prevented to detail these issues further during the workshop.

3.3 Environmental issues

The following questions were used as guidance for group discussions on environmental sustainability issues:

- What are typical pollution sources in aquatic biomass operations?
- What are the environmental benefits of algae production?
- What might be the typical negative environmental impacts?
- What environmental risks are there?

Groups identified the following issues:

- Excessive use of fertilizers and other chemicals;
- Introduction of invasive species and their negative impact on biodiversity;
- Energy use (in particular for harvesting, and potential pumping of the system);
- Greenhouse gas balance (uncertain what the balance looks like);
- Use of fresh water; pollution of water;

It is difficult to benchmark a project's environmental impact, as LCA data are absent or insufficient.

The above environmental issues were identified in the group sessions, however time prevented to detail these issues further during the workshop.

3.4 Social issues

The following questions were used as guidance for group discussions on social sustainability issues:

- What might be possible impacts of the operation on the local community?
- What be possible labour/workers' issues?
- Who would you say are the main stakeholders of an aquatic biomass operation?
- What might be possible issues for projects based in the Global South?

Groups identified the following issues:

- Water use rights – ownership rights of water areas is often (even) less clear less than land ownership of agricultural land;
- Land use issues if aquatic biomass is performed on land (e.g. in pond systems);
- Potential competition with food;
- Potentially additional source of income, e.g. for shrimp farmers
- Labour conditions in off shore cultivation
- Mechanisation of labour to get the large scale production viable

The above social issues were identified in the group sessions, however time prevented to detail these issues further during the workshop.

4 Work shop conclusions

4.1 **Standard development process should fit with industry maturity**

The workshop concluded that the aquatic biomass industry in Europe is in its infant stage, with most projects still at research or pilot level. It was felt that the immediate further development of a standard would be premature, and may put an unreasonable burden on innovative project developers (costs). This perception was further strengthened by the fact that (Dutch) NGOs have not yet identified aquatic biomass production as a particular 'risk area' for unsustainable development.

It was also noted that the aquatic biomass industry appears much more advanced in areas such as South-East Asia and the USA, and further development of a standard might be more feasible.

However, it was also concluded that it would be advantageous to incorporate sustainability thinking into projects from the start to avoid negative environmental impacts and additional costs at a later stage.

4.2 **Feedback on draft indicators**

It was well received that the draft indicators drew on existing sustainability standards in associated industries (aquaculture, biofuels and agricultural commodities), avoiding duplication of efforts especially for general cross-cutting sustainability aspects.

The discussions on the day also confirmed key environmental, social and economic sustainability issues of the aquatic biomass industry (see section 3), which are also addressed in the current draft indicators.

Feedback showed furthermore, that the draft indicators were viewed as comprehensive, yet potentially challenging for projects in their current state of maturity to comply with (see above).

And it was also noted that specific production types would have additional sustainability issues, whilst at the same time some of the current indicators would not be applicable to them (see below).

Variety of aquatic biomass production systems may require different standards
There are many different types of aquatic biomass production, which constitutes a potential challenge for a standard to cover aquatic biomass production in general.

In particular the difference was highlighted between aquatic biomass production on land or near shore (in basins and ponds), and off-shore biomass production in large natural aquatic ecosystems (sea).

For aquatic biomass production systems on land, it was felt that existing standards for biomass on land may provide a useful basis (e.g. NTA 8080, RSB), and that amending or expanding these standards to include aquatic biomass may be a cost-effective way forward.

For offshore production of aquatic biomass it was felt that the sustainability issues at stake might be quite different than for biomass production on land (e.g. invasiveness, competition with other uses of the sea), and that for that reason existing biomass standards may be less suitable. It was suggested that, prior to developing a completely new standard, a 'code of good practice' might be developed and disseminated amongst relevant stakeholders.

4.3 Multi-stakeholder processes support building and strengthening the industry

Participants felt that the workshop and potential follow-up events facilitate bringing aquatic biomass stakeholders together, thereby developing new insights (on sustainability issues, standards development or related matters) which help to shape a new industry and give it a joint voice

5 Next steps

The workshop report and draft indicators will be shared with a wider group of stakeholders, who were unable to attend the workshop to gather further feedback. In addition, it will be shared with a number of existing voluntary schemes, which may consider the findings in relation to the scope of their scheme and future standard development in their scheme.

The project partners welcome comments and are open for collaboration proposals to further the work on sustainable aquatic biomass production.

The draft indicators and workshop outputs may serve as a starting point for the development of best practise sustainability guidance and/or a sustainability standard for aquatic biomass production.

Annex List of workshop participants

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