Deforestation-free and Sustainable Vegetable Fats and Proteins for Aquaculture Feed

Dr. Emanuele Novelli, ISCC System GmbH
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Aquaculture gains relevance in respect of fisheries’ captures for human fish consumption, causing the growth of feed demand.
Relevant amounts of vegetable meals and oils are already part of the diet of the main fed-inland fish species group

World finfish aquaculture production and diet* of the three most relevant species group** (2014)

- Carps, Barbels, and other Cyprinids: 28.2 million tons
- Tilapias and other Cichlids: 5.3 million tons
- Salmons, Trouts, Smelts: 3.4 million tons

Feed composition:
- **Carps, Barbels, and other Cyprinids**: 30% Rapeseed Meal, 12.5% Soybean Meal, 12.5% Wheat, 12.5% Maize, 4% Spirit-based Distillers Grain
- **Tilapias and other Cichlids**: 30% Rapeseed Meal, 12.5% Soybean Meal, 12.5% Wheat, 7.5% Maize, 12.5% Cotton Seed Meal, 4% Spirit-based Distillers Grain
- **Salmons, Trouts, Smelts**: 15% Rapeseed Oil, 12% Soybean Meal, 12% Wheat, 21% Other Plant Proteins Sources

Fish meal and fish oil have higher prices in comparison to vegetable meals and oils – incentive for substitution of fish oil and fish meal

**Prices** of fish-, soybean-, rapeseed- oil and meal (2011 – 2016)

Fish oil
Fish meal
Rapeseed oil
Soybean oil
Soybean meal
Rapeseed meal

** Fishmeal, 64/65%, Bremen fca; Soya meal, 49%,Arg,cif Rott; Rape meal,34%,fob ex-mill Hmb; Fish oil,any orig,cif N.W.Eur; Soybean oil, Brazil, fob; Rape oil, Dutch, fob ex-mill
* Monthly notation until April 2016
Source: ISTA Mielke GmbH (2016) Oil World
Substitution of fish meal with oilseed meal has already started. Increasing amounts of oilseed meals are used

Evolution of Fishmeal and Oilseed meal used as Feed in Aquaculture Production of Salmon and Shrimp

Big amounts of soybean meals are used by aquaculture feed producers.

Estimated Production of Feed for Aquaculture and Share of Soybean Meal in 2015

51 Million tons

25%

75%

Other Ingredients

Soybean Meal

About 25% of the world aqua-feed is composed by soybean meal!

Source: Elaboration based on FAO (2011), “Demand and supply of feed ingredients for farmed fish and crustaceans”
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The availability of vegetable oils and meals (example soybean) for feed steadily increases…


...however risks for unsustainable production practices remain. These are often connected to deforestation.

**THE GRAN CHACO**

The Gran Chaco was one of the last frontiers in South America – but agricultural development, largely driven by soy, is gathering pace.

**DEFORESTATION IN THE CHACO**

From 2010 to 2012, a total of **823,868 ha** was cleared in the three main countries, three-quarters in Paraguay.

**New soy-driven forest destruction exposed in South America**

22 May 2017

The watchdog NGO Mighty Earth followed up its February investigation into deforestation for soybean production and found that companies are sourcing from farms in Brazil and Bolivia where clearance is still occurring.

In central Brazil, the NGO Mighty Earth team found that roads had been constructed on three **soy plantations** in the Brazilian Cerrado between December 2016 and January 2017. [...] the cutting of new roads is a strong indication that **crews will soon clear the adjacent land. [...]**

Investors and funds drop companies with connections to deforestation and support companies implementing sustainable supply chains

World’s largest sovereign wealth fund just dropped 11 companies over deforestation

Six palm oil companies, four pulp and paper companies, and one coal company were dropped from its investment portfolio.

Norway’s Government Pension Fund Global has divested its shares in more than 100 companies between 2012 and 2015 over concerns around global warming, deforestation, and sustainability. Image: Richard Casey / Shutterstock.com

Norway’s Government Pension Fund Global (GPFG), the world’s largest sovereign wealth fund, dropped 11 companies in 2015 over their connections to forest destruction.

$400 Million Fund Launched in Davos to Stop Tropical Deforestation and Boost Farming

More and more companies producing aqua-feed make voluntary commitments on no deforestation and sustainable supply chains...

In 2014, Cargill endorsed The New York Declaration on Forests, announcing at the United Nations Climate Summit our goal to **eliminate deforestation across our agricultural supply chains**, halving it by 2020 and ending it completely by 2030.

We are committed to **eliminating deforestation from our agricultural supply chains worldwide**, employing tested methodologies that incorporate carbon and biodiversity protections.

BioMar has a programme seeking to **eliminate use of raw materials causing deforestation of tropical rainforests** within 2020.

By 2020 we will contribute to the development of an industry based solution to **reduce deforestation associated with the primary production of crops**.

Our responsible sourcing policy is clearly built on the pillar ‘**responsible raw materials**’.
...nevertheless there is still a long way to go before implementing fully sustainable feed supply chains.

Source: www.wwf.org
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ISCC is a leading certification system for all types of agricultural, forestry and alternative raw materials and products

All Feedstocks, including:

- Camelina
- Canola/Rapeseed
- Cereal
- Corn
- Palm
- Shea
- Soy
- Sugarbeet
- Sugarcane
- Sunflower
- Waste & Residues
- Wood
Currently more than 14,000 ISCC certificates have been issued in more than 100 countries

- System users in 100+ countries
- 14,000+ certificates
- 3,000+ system users
- 32 certification bodies
- 670+ ISCC trained auditors
- Training Program (58 Trainings so far for auditors and system users)

Several tools and procedures to facilitate audits (combined-audits)

- 6 Voluntary add-ons
  - NoGMO for feed
  - GHG emissions
- Stakeholder dialogue: 90 ISCC Association members
- Strong regional stakeholder dialogue: 5 Technical Committees
- Integrity Program 3 auditors

Use of innovative methods to verify land use change

Integrity Program 3 auditors

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ISCC is a multi-stakeholder initiative. It is governed by an association with currently 90 members. New members are welcome.
ISCC certified producers comply with a set of ecological and social criteria. Traceability is secured along the whole supply chain.

At plantation, farm or forest management unit:
- Protection of biodiversity
- Preservation of carbon sinks
- Good working practice
- Human and social rights

Along the supply chain:
- Traceability and quality management

ISCC stands for **zero deforestation** and **does not allow compensation**!
ISCC defines six principles for the sustainable cultivation of biomass

**PRINCIPLE 1**
Zero deforestation
Protection of primary forests, high carbon stock areas, peat- and wetlands, protected areas and highly biodiverse areas

**PRINCIPLE 2**
Good agricultural practice
Agricultural and forestry production shall protect soil, water and air and ensure a sustainable use of land

**PRINCIPLE 3**
Safe working conditions
Ensure workers' health and safety during work. Improve competence and knowledge via training

**PRINCIPLE 4**
Social conditions
Ensure good labor conditions and limit impacts to surrounding communities

**PRINCIPLE 5**
Compliance with laws
Comply with all regional and national laws and international treaties

**PRINCIPLE 6**
Good management practices
Recording system and compliance of subcontractors
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ISCC offers the possibility of certifying the supply chain with many chain of custody options (I) - Segregation

Sustainable and not sustainable material separated - All elements of the supply chain must be certified

Supply Base Gathering Transport Processing Trading End user

Farm/Point of Origin FGP Soybean Mill Trader/warehouse Feed Producer

ISCC certified ISCC certified ISCC certified ISCC certified ISCC certified

Sustainable material can be traced back to the origin

Non-certified material

* Voluntary individual certification possible
ISCC offers the possibility of certifying the supply chain with many chain of custody options (II) – Mass balance

Certified processing unit can mix sustainable and non-sustainable material - Each player can source sustainable material from any certificate holder!

Supply Base  Gathering  Transport  Processing  Trading  End user

* Voluntary individual certification possible

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A core pillar of ISCC certification is the carbon footprint verification. In addition, ISCC has developed a specific add-on for Non GMO feed.

ISCC supports companies in reducing their GHG emissions.

Non GMO for food & feed

- Seeding material or other agricultural inputs are Non GM materials
- Physical segregation of GMO material from Non GMO material
- Appropriate measures, e.g. safety distances to avoid GMO contamination
ISCC offers innovative tools for specific sustainability risk analysis & land use verification (GRAS tool)

With GRAS sustainability can be checked from your desktop
The identification of Land Use Change between 2000 and today is the key function of GRAS

- **Heatmaps** showing LUC from 2008 to 2015
- Enhanced Vegetation Index (EVI) based on MODIS time series is used for **Land Use Change verification from 2000 until today**
- **Pansharpened Landsat** images for verification of kind of land use change (e.g. forest to plantation)
- Methodology has been tested successfully in, among others, Argentina, Brazil, USA, Canada, Indonesia and Malaysia
- GRAS is hosting **30 Terabytes** of processed EVI data locally
- GRAS EVI covers currently 69 countries
Through the use of innovative technology GRAS can recognize if, where and when deforestation has taken place.
GRAS facilitates risk assessments for whole sourcing areas and uncovers where in-depth analysis is required.
Example Paraguay: GRAS can map farmers based on deforestation and grassland conversion.

Legend:
- ▲ Country elevator
- ○ Sourcing area
- ▼ Farmers sourcing area linked to deforestation/grassland conversion
- ☾ Farmers sourcing area not linked to deforestation/grassland conversion

Supplying farmers to country elevator 1

© GRAS GmbH
Example Paraguay: GRAS can map farmers based on deforestation and grassland conversion

<table>
<thead>
<tr>
<th>Producer</th>
<th>Total Area LUC (ha)</th>
<th>Grassland conversion (ha)</th>
<th>Deforestation (ha)</th>
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<tbody>
<tr>
<td>Farmer A</td>
<td>497</td>
<td>497</td>
<td>497</td>
</tr>
<tr>
<td>Farmer B</td>
<td>211</td>
<td>141</td>
<td>70</td>
</tr>
<tr>
<td>Farmer C</td>
<td>189</td>
<td>189</td>
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</tr>
<tr>
<td>Farmer D</td>
<td>138</td>
<td>138</td>
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<tr>
<td>Farmer E</td>
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<tr>
<td>Farmer F</td>
<td>107</td>
<td>66</td>
<td>41</td>
</tr>
<tr>
<td>Farmer G</td>
<td>102</td>
<td>8</td>
<td>94</td>
</tr>
<tr>
<td>Farmer H</td>
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<td>100</td>
<td></td>
</tr>
<tr>
<td>Farmer I</td>
<td>95</td>
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</tr>
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<td>Farmer J</td>
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<td>Farmer M</td>
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<td>Farmer N</td>
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<td>Farmer O</td>
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<td>Farmer P</td>
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<td>19</td>
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<td>Farmer Q</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Farmer R</td>
<td>2</td>
<td>2</td>
<td>0</td>
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<tr>
<td>Farmer S</td>
<td>1</td>
<td>1</td>
<td></td>
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<tr>
<td>Farmer T</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Farmer U</td>
<td>1</td>
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<td>0</td>
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Note: Fictive example. Risk level can be defined according to the needs of the company.
GRAS Company Dashboard - to trace back supply chains and to verify sustainability criteria and sourcing regions

**Supply Chain of: Plant 1**

**Farm 2**
Location: Example town  
Size (ha): XXXX  
Tons of soybean / year: XXXX

**GRAS Sustainability Analysis**

**Biodiversity:**
- No protected areas: ✔

**Land Use**
- No deforestation: ✔  
- No peatlands: ✔  
- No fragile soils: ✔  
- No pesticides: ✔

**Emissions / t of soybean oil**
Processing: XXXX  
Transportation: XXXX  
Methane capturing: XXXX

**Soybean delivered to**
- Example Oil Mill  

= The farm fulfills sustainability requirements  
= The farm does not fulfill requirements
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Conclusions

• The increasing demand for aqua culture feed causes a shift from the use of fish meal and oil to vegetable meal and oil as feed ingredient

• The increasing production of vegetable meal and oils has a high risk of causing deforestation

• Feed producers are under observation of NGOs and consumers. Retailers request proof that supply chains are sustainable and deforestation free – ISCC offers deforestation free supply chains

• Sustainability certification of vegetable proteins and fats is operational and already reality – ISCC certified supply chains for soybean meal, rapeseed oil and many other vegetable ingredients

• Leading companies are using ISCC PLUS to prove the sustainability of their products

• GRAS is a tool for sustainability and deforestation-free supply chains; verification of land use allows avoiding risks related to deforestation; customer and stakeholder communication
Thank you!