



FEED-X

Search and Select Brief

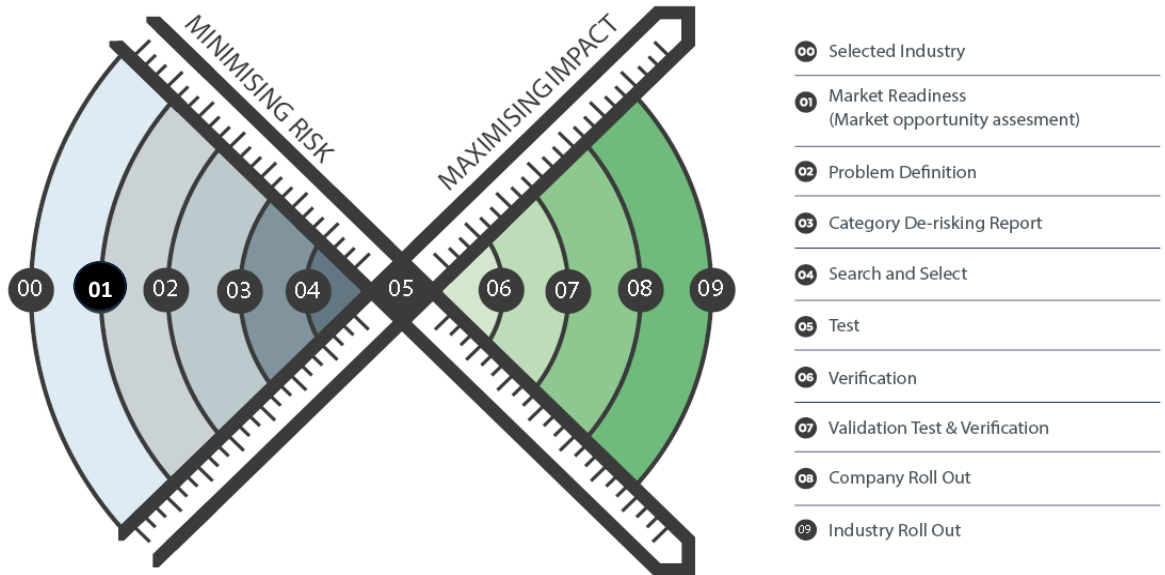
Summary

1. Introduction

Project X was incubated in WWF in 2015 to enable value chain transformation by increasing the speed and scale at which entire industries transition in their sustainability agendas. Since February 2018 Project X has been established as a B Corp that still works closely with WWF.

Our mission is to transform the sustainability performance of ten industry value chains most responsible for biodiversity decline and climate change impacts, in ten years. We work on the premise that no single organisation or sector can tackle industry-wide change on their own.

We provide a solution, which is scientifically researched, reviewed and tested, and which offers systemic impact, thus embedding long-term sustainability in it. We do this through a proven market-pull approach with 9 clear stages.



Minimising Risk (stages 0-4) – We first secure advanced commitment from a lead corporate (major player in the industry) to procure sustainable solutions at scale. We then invest heavily in independent analysis experts to unpick the value chain and examine diverse risks to the adoption of various sustainable solutions. A short-list of solution types suitable for pilot testing is identified and those providers are invited to pitch their solutions to a selection panel. This is all undertaken transparently to ensure industry-wide buy-in and consensus on the most appropriate and sustainable solutions.

Maximising Impact (stages 5-9) – We short-list the highest performing solutions, which are tested at scale by the lead corporate, with ensuing results demonstrated and independently verified. The lead corporate is given first mover advantage on the evidenced solutions, following which we collate expressions of interest from other interested corporations. Advance market commitment from corporations accelerates the price performance of the sustainable solutions, compared with business-as-usual technologies, to further encourage industry-wide adoption.

FEED-X

There are not enough resources to provide sufficient food for 9.5 billion people in 2050. The vision of the FEED-X pilot programme is to remove the barriers to sustainably fed, affordable food by 2025. The focus is to source, test, finance and scale alternative feed ingredients such as protein, oil, and additives into the global feed industry and its goal is to shift 10% of the feed industry (representing 107 tonnes) through to sustainable purchasing of solutions to increase the sustainable performance of feed.

The programme will initially hone down on salmon and shrimp as two aquaculture species with wholly different feed requirements and industry structures' needs – however its long term aim is to shift the feed industry in general

Stage 3: The Category De-risking

Category De-risking is a fundamental step in every Project X programme to help define what are the most sustainable, scalable and investible solutions before entering into the search and selection phase for SMEs that can fit the brief for the industry. This stage is both a research and engagement tool in that it works with corporations, financiers and academics to research, analyse and drive consensus on a clear set of recommendations for the best solutions to solve industry challenges, on a category or thematic level which were defined in stage 2, the problem definition and value chain assessment stage.

This stage seeks to allow adoption to take place
FEED Buyers in Skretting-Nutreco
Feed buyers in 10% of industry

This stage enables key communities to meet their risk assessments
Finance/investor community finance the innovations selected
Insurance community insure the innovations selected
Retailers purchase more sustainable fish and shrimps

Each research theme seeks to understand risks posed by scaling up innovations with the greatest potential to deliver sustainability gains in the feed value chain by looking at risk across six themes: environmental, nutritional, ethical, social acceptability, economic, and political. The results allow Project X to identify a short list of innovations, evaluate and scale the best in class SMEs

Definitions

CATEGORY: is a lack or a needs outcome statement that describes the intervention into the system opening the door for innovation.

CATEGORY DE-RISKING: Is the assessment of risks posed by scaling-up innovations, which have the greatest potential to deliver sustainability gains in the value chain across 6 themes or lenses: Nutrition, Environmental, Ethical, Policy-Legal, Social Acceptability, and Economic.

The results of these six studies have been integrated and applied to brief the search and select phase; stage 4 of the 9 nine stage model. We have used a decision tree to show how the criteria from the six lens studies can be applied to guide the application questions and scoring of the solutions that are submitted.

Stage 4: Search and Select

In order to assess the innovations independently, transparently and objectively we have proposed a systematic way of evaluating the risk and potential of the solutions proposed to meet the FEED-X goal. The following pages illustrate how new ideas are assessed through our process.

Judges will aim to assess the merit of each innovation applying the following criteria, but ensuring that innovations that are completely new to the industry will be strongly considered.



CDR Integrated Results - Criteria

Each of the six lenses have analysed the categories using criteria against which the categories were assessed

Environmental Lens

- Land use/Biodiversity impact – hectares/unit produced
- Climate change/GHG emissions – CO2/unit produced
- Water use – Litres/unit produced
- Fossil fuel Energy use – KWh/unit produced

- Risk aspects considered: benchmarked against known value of proteins/ ingredients used by the feed industry

Nutrition Lens

- Crude Protein % - greater than 60% for Salmon and, Shrimp – greater than 40% (or an ability to be concentrated to these %)
- Anti-nutritionals – type and affect (permanence)
- Ash content – less than 20%
- Toxicity – no chemicals/minerals or organism
- Fibre content less than 10%

- Critical Risk aspect if the solution was deemed unsuitable nutritionally for Salmon and Shrimp it was not suitable in any other risk aspect. The overall risk rating was assigned high or 0

Legal (political) Lens

- Compliant with EU/US laws
- compliance is attainable – a similar ingredient/process is approved but the ingredient/process itself is not
- compliance is not attainable in the short term
- Compliance is unattainable under the current legal framework
- Unknown or insufficient data available

Social Acceptability Lens

- APPEAL: A broad emotional reading of how likeable the claim is
- RELEVANCE: A measure of how well the claim fits.
- PURCHASE: A measure of how likely the respondent would be to buy the product.
- OVERALL CLAIM SCORE RANKING
- Conditions of progression
- Consumer opinion/expert opinion

Economic Lens

- Production cost/tonne
- Feed rate - Kg/ha/day
- Available volumes/price sensitivity
- Feed conversion ratio (FCR)

- Risk aspects considered
 - Modelled Economic Viability
 - Rational for expecting lower FCR

Ethical Lens

- Animal wellbeing - behaviour
- **Disease** – incidence/persistence: condition, gut
- Body Damage – Injuries: fin, vertebrae, eye, snout, wounds
- Mortality

- **Risk aspects considered for raw material;** risk of wild caught species, replaceability of the protein, digestibility of the protein, use of animals as protein source, slaughter/death of animal, benefits and risk associated with non target species and seaweed
- *Social wellbeing – 9 criteria to assess specific suppliers*

Categories of Innovation Searched

Categories De-Risked: a, b and c.

Categories De-Risked but require more information: d, e, f & g.

Feed ingredient solutions creating:

- a) **A positive environmental benefit by using waste-streams, such as food by-products, CO2 and energy;**
- b) **Positive health effects for fish and shrimp and the consumer;**
- c) **Restorative environmental benefits.**

d) Feed production technology solutions creating positive environmental benefits by using;

- i. Renewable energy sources;
- ii. Environmentally friendly packaging waste;
- iii. Energy waste;
- iv. Efficient and sustainable transport systems

e) Feed technology solutions that increase on farm fish and shrimp performance, for example by;

- i) Monitoring of their health
- ii) Reusing of the feed-waste waters from pens and ponds

g) Solutions that improve the sustainability of feed in some way not considered before

The next three pages present the decision tree, as a means of showing how the criteria will be applied to the new solutions submitted through the application process.

Firstly it needs to be established how relevant is the idea and how viable is the solution proposed, in terms of economically, sustainability and how innovative or novel is it.

Secondly we need to establish does it fit one of the previously assessed categories of innovation already de-risked and if it does whether it falls into the low risk categories or more information is required from the application process for it to be considered low risk.

Thirdly for those innovations that are other than low risk or not yet assessed we need to apply the criteria to see how adequately they compare with what we have assessed. The application asks the questions that enable a series of points to accumulate depending upon the response. This gives a sense of the best potential innovations or solutions and where their may be gaps to be filled later. The points are guidance and although a panellist may recommend other innovations and solutions this will be accompanied by a clear rational.

Decision Tree – Curation process overview

1

Curation Stage 1

Business viability: IP owned/registered, salaries and taxes paid, invoices (volume/time/price), certification, endorsements and profit/cash flow

Innovative, sustainable and economically scalable solutions

What problem is the solution trying to address and how does the solution do this in a way that affects feed?

Is an innovation claim being made in a category of interest?

Is it recognised /verified by a third party?

Is a sustainability claim being made?

Is a sustainability claim substantiated with data or benchmarking or verified?

Is the process of production and nutrition of solution sound?

Has scalability been thought about and is there a business case to be made?

Is it legally compliant in the EU or US or similar to something already approved ?

Are the customer acceptance challenges or benefits okay/ good?

Risk Score looked up

1b

FEED
Ingredient

FEED
Production

FEED
performance

It fits into an approved category of innovation – it's an existing low risk priority solution

2

Curation Stage 2

Sustainability

- Land/ sea areas affected
- GHG emissions
- Litres of water used
- Fossil fuel energy used/ produced
- Modelling on the environmental impacts/ benefits of producing solution at scale

Economic Viability

- Cost/ unit produced competitive?
- Current amount produced?
- Maximum amount which could be produced and by when?
- Maximum amount could produce/ year and how much investment would be required?

Ethical Criteria

- Ensure wellbeing of animal, insect or other living creatures involved.
- Affect or lessen impact on wild caught species.
- Affect feed conversion ratio.
- Feed affect non target species.

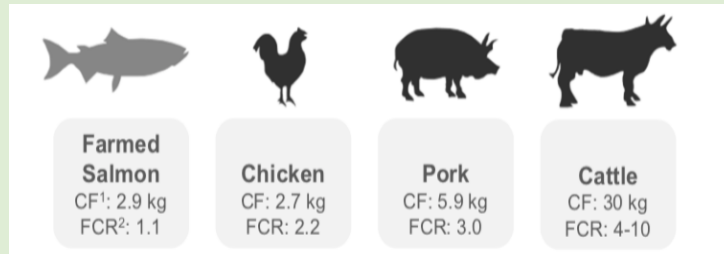
Social Criteria

- Basic worker rights
- Worker protection
- Vulnerable staff
- Health provision
- Staff training programme
- Gender equality policy
- Working flexibility
- Third party partnerships/ certifications or are applying
- Other

Benchmark Information on Ingredient Innovation Categories

General benchmark data for ingredients

Environmental



- CF: carbon footprint, related to environmental impact from animal protein production.
- FCR: Feed conversion ratio, the kg of feed needed to increase animal's bodyweight with 1kg. (Global Salmon initiative, 2018).
- Wheat requires approximately 500 to 4000 litres of water per kg produced
- Fossil fuel use is 73 kWh per tonne of milk produced
- Salmon carbon footprint on standard diet (kg CO₂/ kg edible meat) = 2.9kg
- Salmon water consumption on standard diet (litre/ kg edible meat) = 2,000l

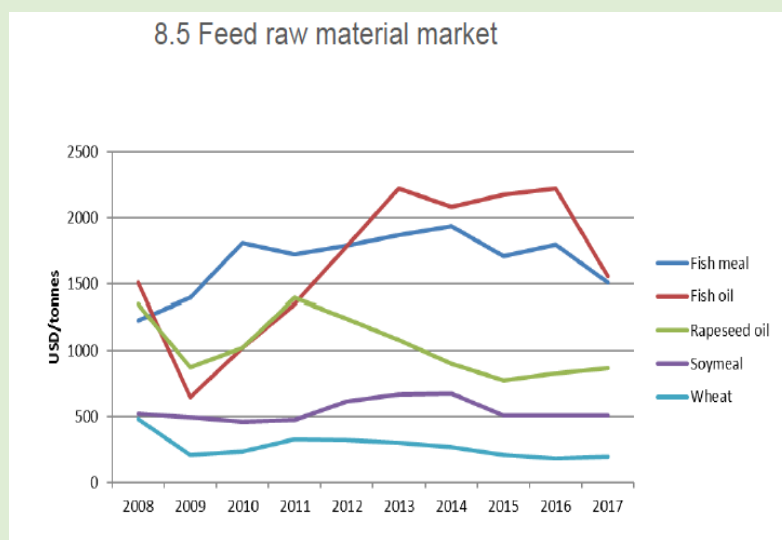
Nutritional

Typical feeding patterns throughout the growth cycle

Growth intervals	0.1 – 0.2 kg	0.2 – 1 kg	1 – 2 kg	2 – 3 kg	3 – 4 kg	4 – 5 kg
Feed consumption (Norway)	0.08 kg	0.75 kg	1.00 kg	1.05 kg	1.10 kg	1.20 kg
Time, months	2	4	4	3	2	2

- Salmon on standard diet: Protein retention = 31%, Energy Retention = 23%, Edible Yield = 68%, Edible meat per 100kg fed = 61kg

Production



References:

- 1) Global Salmon initiative (2018)
- 2) Salmon Industry Handbook (2018)