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D4.2.2 Key success factors for transitioning to a sustainable seaweed supply in the 2 seas region

as part of the Interreg 2 seas ValgOrize project, January 2021



NORTH SEA FARMERS

Preface

This report is part of the Interreg 2 seas project ValgOrize. The project is coordinated by Flanders Research Institute for Agriculture and Fisheries (BE) and includes 10 other partners among which; Flemish Institute for Technological Research (BE), Royal Netherlands Institute for Sea Research (NL), HZ University of Applied Sciences (NL), North Sea Farmers (NL), Zeewaar BV (NL), University of Littoral Côte d'Opale (FR), University of Lille (FR), University of Greenwich (UK), Marine Biological Association of the United Kingdom (UK), Nausicaa (FR). The ValgOrize project runs for a period of four years, started in 2018 and is funded by Europe via the Interreg 2 Seas Programme. For more information about the project, visit <https://www.interreg2seas.eu/en/ValgOrize>

This report is a co-production of Anke Bergmans from Mountainview Research and several team members of North Sea Farmers; Lotte Bronswijk, Marlies Draisma, Eef Brouwers, Femke Prins and Koen van Swam. As a community of businesses with a passion for seaweed, North Sea Farmers work towards positive climate impact. By growing a sustainable seaweed sector, we aim to improve biodiversity, reduce carbon emissions and be part of the circular economy. We are a non-profit organisation with an ANBI status. For more information, visit <https://www.northseafarmers.org/>

In the ValgOrize project, the North Sea Farms are leading the study on valorisation aimed at supporting and accelerating the development of a technically and commercially viable seaweed supply chain for food applications, and the development of a roadmap towards sustainable production of micro-algae for food applications.

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Disclaimer

All data that has been collected is used for purposes of the Interreg 2 seas ValgOrize project and only to the context it is necessary to fulfil those purposes. North Sea Farmers attempts to work only with reliable and accurate data. However, North Sea Farmers do not give any warranty or other assurance to the content of the material appearing in this report. Furthermore, no rights can be derived from this publication.

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0.1 About ValgOrize

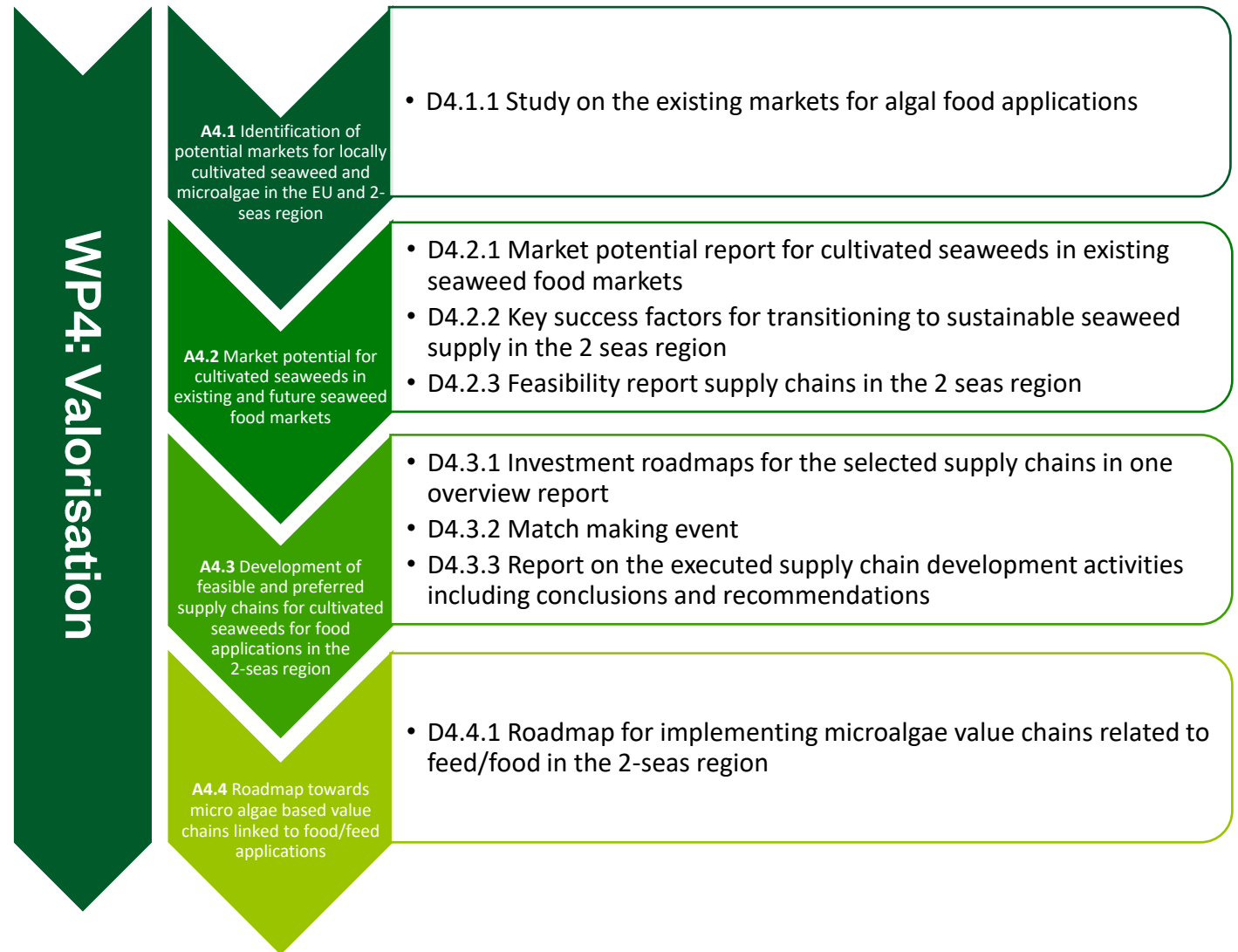
This report is part of the Interreg ValgOrize project for the European Union. The project aims at enhancing innovation in the algal sector, by creating an interdisciplinary platform for sustainable production of flavoursome, high quality algal foods that meet the requirements of the European market. The project comprises of 6 work packages:

- **Work Package 1:** Macroalgae cultivation; optimized macroalgal growth conditions (quality, reproducibility and reliability) for best food parameters.
- **Work Package 2:** Microalgae cultivation; optimization of cultivation methods for maximal productivity and yield of biochemicals and markers of taste.
- **Work Package 3:** Acceptance of the produced micro/macroalgal biomass and algae products for consumption; assessing algal safety, quality (as food product), optimal taste, product development, sustainable/zero waste.
- **Work package 4:** Valorisation; support and accelerate the development of a technically and commercially viable seaweed supply chain for food applications, and the development of a roadmap towards sustainable production of micro-algae for food applications.
- **Work Package 5:** Project management
- **Work package 6:** Communication

0.2 Work package 4

This report is part of Work Package 4: Valorisation; support and accelerate the development of a technically and commercially viable seaweed supply chain for food applications, and the development of a roadmap towards sustainable production of micro-algae for food applications. Within the work package, the results and insights as obtained in WP1, 2 and WP3 will be valorised. This specific report constitutes the required deliverable D4.2.2 'Key success factors for transitioning to sustainable seaweed supply in the 2 seas region' as part of activity A4.2 'Market potential report for cultivated seaweeds in existing and future seaweed food markets'.

North Sea Farmers are responsible for Work Package 4. Furthermore, Flanders Research Institute for Agriculture and Fisheries, Flemish Institute for Technological Research, University of Greenwich and Zeewaar are involved in the Work Package. And North Sea Farmers wants to thank all other partners and observer partners who contributed and shared their insights in various interviews for D4.2.1 and D4.2.2.



0.3 Introduction

The European seaweed supply is small compared to Asian producers: in 2018 European countries produced 300.000 tonnes of seaweed (wet weight). This is less than 1% of the global production of 32 million tonnes. Although Europe currently only make a small contribution to the world market, the potential is great and it is expected that the European seaweed market will rapidly expand over the coming years (See ValgOrize deliverable D4.2.1). In contrary to the global seaweed supply, in Europe 97% of seaweed comes from wild harvesting. The currently strong reliance on natural stocks in Europe may result in significant disturbance to the ecosystem if wild harvesting practices increase in order to meet future demand. In order to secure a stable and sustainable supply, it is important to transition to the cultivation of seaweed in Europe.

Scope and objective

The objective of this report is to determine what the drivers, restrains, opportunities, challenges and overall key success factors are for transitioning to locally cultivated seaweed being a sustainable, short supply chain instead of imports.

Research question

What are the key success factors for transitioning to sustainable seaweed supply in the 2 seas region?

0.4 Methodology

Information was gathered by combining qualitative and quantitative methods from various sources:



Desk Research

Sources on trends in seaweed and food markets



Experts interviews

42 interviews with professionals in the food sector



Community survey on market estimation

60 respondents from the ValgOrize network

0.5 Scope

	IN SCOPE	OUT OF SCOPE
TYPE	Seaweed	Micro-algae
APPLICATION	Food products, additives (hydrocolloids)	Feed, biostimulants, pharma, nutraceuticals, cosmetics, biofuels, bio-packaging
MARKET	Main focus: 2 seas region: United Kingdom, The Netherlands, Belgium, France secondary focus: other European countries	Markets outside of Europe

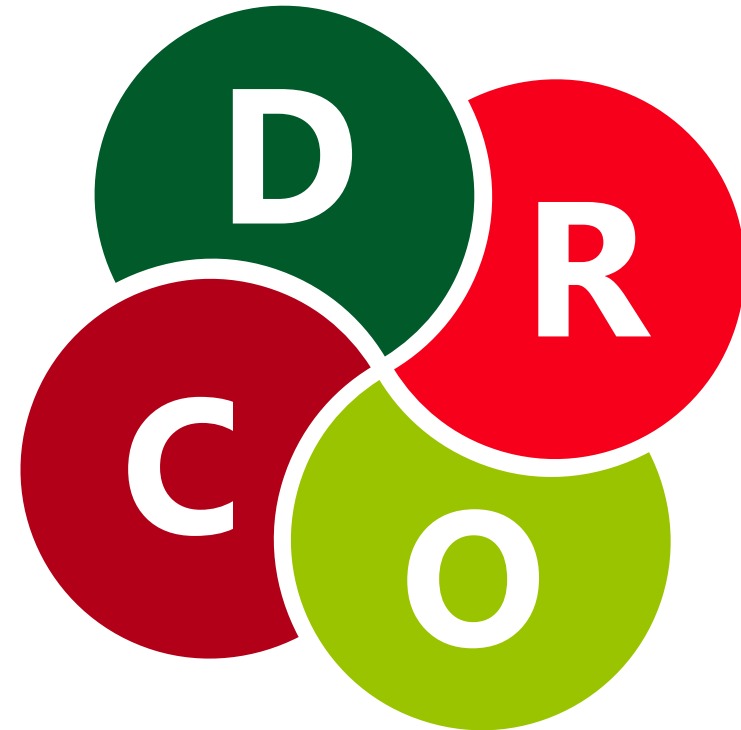


1. Key success factors

1.0 In this chapter

For accessing the key succes factors of transitioning to local cultivated seaweeds, we made use of the DROC analysis method. This method is oftend used in market researches to get a better understanding of the market. In this particular case, it helped to get an overview of the larger trends, movements and developments to which seaweed relates, and the specific opportunities and challenges working with seaweed.

The drivers, restrains, opportunities and challenges for transitioning to local, cultivated seaweeds for food in Europe are unfolded in this chapter.



Sources: 10, 20, 27

1.1 DROC analysis

Drivers

Underlying developments (e.g. trends and policy developments) that can accelerate growth for local cultivated seaweed

Restraints

Underlying developments (e.g. trends and policy developments) that can slow down growth for local cultivated seaweed

Opportunities

The possibilities to fulfill a consumer need with local cultivated seaweed

Challenges

The threats to fulfill a consumer need with local cultivated seaweed

1.2 Drivers

A window of opportunity is more attention for sustainable produced food and healthy food. This can be a driver for the European market for cultivated seaweeds.



Global changes

- Growing world population combined with scarcity of fertile agricultural land leads to a **shift towards alternative food**
- In Western countries consumers transition from animal based proteins to **plant based proteins**
- In Western countries lifestyle diseases like obesity become more common due to unhealthy diets and high life expectancy. This requires a need for more **consciousness about food and health** with consumers.



Governmental influence

- World wide and in the EU governments are stimulating more **sustainable food production**. In the EU this is captured in The Green Deal, a program with the goal of becoming a climate neutral continent in 2050. The agriculture needs to reduce its methane- and CO2-emission and use of chemical pesticides. More specifically the biodiversity strategy and Farm-to-Fork-strategy stimulate a more inclusive way of looking at land and sea and more sustainable agriculture.
- The high cost of medical care caused by lifestyle diseases is a reason for countries to **create awareness of the importance of a healthy diet**.



Consumer consciousness

- Consumers are becoming more **aware of the impact of food on their own health and on the planet**. This leads to a variety of trends in the food sector and growing markets for plant-based food, locally produced food, organic food, natural food and healthy food.
- Consumers call for **more transparency** about their food and technology makes it possible to provide food chain information. This leads to more awareness on where food comes from and how it is produced.



Convenience food

- Consumers spent less and less time in preparing food and they **ask for convenience food**. The result of this demand can be seen in the growing market for pre-cut, packaged and prepared food.
- The **food delivery market** is growing rapidly, bringing existing and new types of meals to consumers.
- Beside convenience food, consumers are open to try **new types of food** that are not standard on the menu.

1.3 Restraints

Brexit, food safety regulations and reputational issues can slow down the growth of the local cultivated seaweed sector



Brexit

- Brexit leaves UK and Europe in **great uncertainty** of how the European trade will look like after Brexit.
- For EU countries it can have **negative impact** on trading with UK which can slow down the market development for local cultivated seaweed. For UK, on the other hand, it can accelerate locally produced seaweed for **more self-sufficiency** in its food supply



Food safety regulations

- The novel food regulations make it difficult and time consuming for new food products to enter the market
- Food legislation for seaweed is under development, yet which leaves producers and buyers with uncertainty



Complexity of food additives

- The complexity of the food sector makes it difficult for consumers to determine what is healthy and unhealthy. This often results in very **simplified conclusions about good and bad food**.
- Consumers are for example **cautious with E-numbers** because these are perceived as unhealthy, nonetheless the actual ingredient of the E-number.
- **Food scandals** can get much media attention. This media attention is often a simplified story and can be harmful for the sector. This makes new food additives vulnerable for reputation issues.

1.4 Opportunities

The two largest opportunities for locally cultivated seaweed are seaweed as a healthy food component and seaweed production as a sustainable alternative for traditional agriculture



Healthy food or food alternative

- Consumers perceive **seaweed as healthy food** making this a very suitable ingredient to add to a healthy diet
- Consumers are looking for **plant-based alternatives** for meat, and functional ingredients like gelatine. The plant-based market is growing every year and consumers appreciate the growing variety in this market
- More consumer consciousness also leads to a **growing organic market**. Food with no chemical additives and with no use of pesticides is growing more market share changing from a niche to a more common part of the food market.



Growing markets for takeaway and food delivery

- Because seaweed is a new ingredient for most European consumers most of them first need to gain experience with eating seaweed. The restaurant industry is an obvious way to get to know the product before using seaweed in the kitchen themselves. The growing industry of **food delivery can be a gateway for seaweed to the plate of the consumer**.



Sustainable alternative way of agriculture

- The Green Deal of the EU shows a very clear need for more sustainable agriculture. Local cultivation of **seaweed provides a solution** for food production without land use, without pesticides and without the use of fresh water.
- The local cultivation of seaweed provides a solution for the food processing industry that wants to **shorten their supply chain** and use more locally produced ingredients. Also consumers have a preference for shorter supply chains and local foods because of sustainability and supports for the local economy.
- Buyers in the food processing industry **perceive European seaweed as high quality and safer** than alternatives from outside EU where there might be less regulations on ecological and social impact of seaweed farming
- Consumers are more aware of the impact of their food and are looking for alternatives with **more control over the origin of their food**. Covid-19 has accelerated this trend because of awareness to support local businesses that are struggling. The farm-to-fork initiatives have grown. These platforms could be an opportunity to sell local seaweed. Because **seaweed tells a story** not only to be a healthy ingredient but also to provide a solution for the food and climate challenges it is an attractive and inspiring product for these platforms to show their diversity and positive impact.

1.5 Challenges

The main challenges are consistency in volumes and increasing the consumers demand



Consistency in volumes and quality

- The food processing industry demands **consistency in both volume and quality**. Production processes are stringently and there is no room for variability in quality of the product. To sell to this market volume and quality need to be stable
- **Prices of local cultivated North sea seaweed are higher** than Asian competition. Other properties need to be able to compensate for this difference in price.



Buyers insecurities

- Potential **high levels of contaminants & iodine** cause food safety constraints
- **Negative publicity** for carrageenan* has led to confusion on what is an what is not safe to use. This led to suspicion among buyers and therefore reduced sales
- There is **little prove for health claims** and the level of sustainability of seaweed



Consumers not used to seaweed as food yet

- There is **no clear explicit consumer demand** for seaweed. This requires creativity in the marketing of the product on the consumer's side
- Consumers are **not sure about taste**. A study among Dutch consumers show that consumers associate seaweed with both good and bad taste. Consumers who actually have experienced the taste of seaweed mostly like it.
- **Consumers do not know how to use seaweed**. Seaweed is often consumed in restaurants or in takeaway food. Home cooked seaweed is not yet widespread
- Seaweed can be placed in multiple categories. Supermarkets often do not know where to best place seaweed and because of that **consumers do not know where to find seaweed**.

**Food additives like carrageenan and agar have come under the spotlight in recent years because of safety concerns. There have some studies published that indicate carrageenan may cause ulceration in the large intestine and ulcerative colitis, colorectal and liver cancer, inflammation, as well as fetal toxicity and birth defects. Carrageenan is also banned in baby food products, such as baby formula.*

Source: 6

1.8 In sum: Key takeaways



European consumer trends like the demand for healthy food and plantbased alternative proteins can increase demand for seaweed in food



Governmental programs as The Green Deal and national programs to stimulate more sustainable food production and healthy food can drive local seaweed cultivation



The main focus for growth should be in increasing the demand for local cultivated seaweed in the European market and increasing production volumes to meet this demand and to achieve cost efficiency



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2. Conclusion

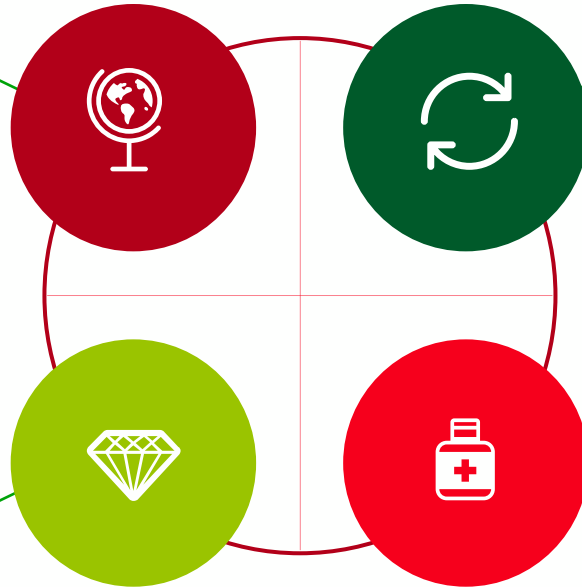
2.1 Key success factors

Sustainable food production

With the growing world population, climate change challenges and scarcity of fertile land for agriculture, governments are in search of solutions for sustainable food supply. The European Green Deal and more specifically the Common Agricultural Policy CAP aims to ensure that EU agriculture is socially, economically and environmentally sustainable. Local cultivated seaweed is a perfect answer to this need. Besides, it fulfills the consumers need to more local consumption and shorter supply chains.

High quality of European seaweed

European produced seaweed is appreciated for its high quality and the safe and controllable production. When it comes to the production, buyers value local produced seaweed because it is more traceable and controllable and there is more guarantees that it is produced in a sustainable way in terms of environment and social responsibility.



Changing diets in western Europe

Consumers are becoming more health conscious which results in the need for more healthy food. This is driven by two generations: Millennials are referred to as the most health-conscious generation, and they are willing to try new superfoods with health benefits. Next to that, baby boomers are health conscious because of the high life expectations and lifestyle diseases that come at higher age. In some European countries, governments have a strong focus on this topic with programs to stimulate healthy diets. Besides, the growing awareness of the impact of food on climate change and on animal welfare creates a shift to more plant-based proteins as alternative for animal proteins.

Perception of seaweed as healthy

Consumers perceive seaweed as a healthy ingredient. The supplement market has helped to establish seaweed as a healthy ingredient, as well as the stories about Asian cuisine as a healthy diet. Therefore, seaweed can be an answer to the consumers need for healthier and plant-based food.

2.2 Insights in how to unlock the potential of seaweed for food

Value chain collaboration

Unlock the full potential of local cultivated seaweed by further researching and showcasing the applicability of European species and collaborate within the seaweed value chain. Value chain collaboration and knowledge sharing is important in the development of a sustainable and reliable seaweed supply chain.

Consumer focus

Increase the demand for local cultivated seaweed by drawing attention to the benefits of seaweed as food. Respond to consumers food trends and consumer needs by marketing seaweed as a healthy, plant-based, local and sustainable product.

Provide consistent supply

Scale up to provide high volumes and consistency in quality and supply (opportunity for high quality certified seaweed in larger volumes). With higher production volumes, prices will decrease which is needed to compete with Asian alternatives.

Connect supply & demand

Make it easier for suppliers and buyers to connect. There is a demand for seaweed and local cultivated seaweed has advantages compared to Asian alternatives, but if local offer is not visible on the market, buyers will turn to Asian alternatives that are easy and cheap to purchase.



3. Appendices

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3.2 Sources – community survey

Community survey

- The community survey is shared with the seaweed network of all ValgOrize partners
- The fieldwork period was from 28/10/2020 – 28/12/2020
- A total of 63 participated in the survey, of which 14 seaweed producers, 20 seaweed buyers and 29 other professionals involved in the seaweed sector

Community survey - set-up

The goal of the community survey was to collect the information and knowledge from the European seaweed network. Depending on the role of the respondent in this network (seaweed producer, buyer or other), the respondents were asked different questions.

Survey set-up:

- Background information on respondent and organisation
- Seaweed production companies: Information on current production size
- Seaweed buyers: Current use and buy of seaweed
- Other groups than producers and buyers: Knowledge of current seaweed market
- Market growth estimation
- Trends

3.3 Sources - interviews

Interviews

In total we conducted 42 interviews with professionals in the food industry with a variety of roles and companies.

- The Vegetarian Butcher
- KFC
- Nestle
- Lloyd register foundation
- Givaudan
- LNV Landbouwattachee UK
- LNV landbouwattachee France
- New Now Next
- Unilever
- LNV landbouwattachee Belgium
- Schuttelaar BV
- And 31 other food professionals

Interview protocol expert interviews

The goal of the interviews was to gain information on what the potential is for local cultivated seaweed in the food processing industry. The questions were divided in these categories. For interviewees that did not work in the food processing industry directly, we adjusted some questions.

Interview set-up:

- Introduction & practical announcements
- Introduction of interviewee and organisation
- How does purchasing/new product design process go?
- Familiarity with and experience with seaweed
- Explanation of seaweed
- Potential for seaweed in organisation
- Potential for seaweed in the market in general
- Closing remarks