Study Tour of the South Korean Seaweed Industry in November 2024

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Acknowledgments

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Executive Summary

A delegation of 15 people from the Australian seaweed industry, Government and research institutions attended a study tour of the South Korean seaweed industry from 11 – 17 November 2024. The study tour was organised by the Australian Sustainable Seaweed Alliance to facilitate the exploration of all facets of the sector in a major seaweed-producing nation, build relationships, gain key learnings and share Australian perspectives and technological advancements. The study tour focused on visits to and discussions with South Korean farming experts, Government officials, bioproduct developers, technology specialists and research scientists. Delegates were able to visit several operational farms as well as processing facilities and research institutes. Delegates were particularly interested in assessing farming technologies for their potential use in Australia, and potential product markets for biomass grown in Australia. Very noteworthy were the cultural acceptance and social licence of the seaweed industry in South Korea and the strong collaborations between R&D institutions and industry. The South Korean seaweed industry also showed strong vertical integration and diversification through different species being grown and development of new products. The observations, discussions and networks resulting from the study tour have the potential to benefit both the Australian and South Korean seaweed industries.

Keywords: South Korea, seaweed, ASSA, study tour

Introduction

The Australian Seaweed Industry Blueprint (Kelly 2020) emphasised that the Australian seaweed industry could achieve $100 million gross value of production (GVP) by 2025 if critical industry development activities received funding. Kelly (2020) highlighted the need to establish a national peak industry association to drive this as well as to focus on species with high commercial potential. In 2021, the Australian Sustainable Seaweed Alliance (ASSA) was set up as the peak industry body tasked with liaising with Government, industry and R&D institutions to facilitate industry development. As such the seaweed industry is still very much in its infancy, with little-to-no commercial production to date. While dozens of seaweed farms have been established in Australia since the release of the Blueprint, a lack of knowledge of hatchery processes, and poor access to expertise are highlighted as the biggest challenges to achieving commercial production (Rule and Kelly 2023). A lack of vertical integration in the seaweed industry in Australia also means that farmers are required to manage all aspects of the supply chain from hatchery, grow-out, production, harvest and processing, and expertise in still lacking across all these facets. Learning from experts in other countries, with a thriving seaweed industry, can identify processes which can progress current farming practices, as well as present examples of functioning systems and lessons learnt to achieve them.

ASSA obtained funding of $8.1 million from the Australian Government’s Developing Australia's Seaweed Farming Grant in 2022. The funding was managed by the Fisheries Research and Development Corporation (FRDC) and was provided to support Australian seaweed industry development. The grant was particularly focussed on cultivation practices for the antimethanogenic red seaweed *Asparagopsis*, and associated hatchery practices. A portion of this funding was allocated to facilitating a study tour of a country with an established and thriving seaweed industry for stakeholders and ASSA members from Government, industry and R&D institutions South Korea was identified as a suitable destination for two reasons. First, South Korea has a long tradition of seaweed farming (Cai *et al.* 2021). Secondly, the total production of 1.7 million tonnes wet weight in 2022 (Seaweed Insights 2022) has a value in excess of US$900 million (Prasad 2024), which is similar to what the Australian Seaweed Industry Blueprint considers possible to achieve in Australia over the coming years (Kelly 2020). It is hoped that the information received as part of the delegation can help members progress their farming endeavours.

Objectives

The primary objective of the study tour was to support the development of a seaweed industry in Australia by

1. Gaining knowledge from viewing Korean seaweed R&D to commercial scale at sea and on land operations
2. Gaining knowledge from viewing seaweed supply chain activities from farm to market
3. Building and developing lasting relationships with Korean companies and R&D agencies
4. Disseminating the information captured by the delegation to the Australian seaweed industry

Method

Participants and Itinerary

The study tour of Wando and Jindo Counties in South Korea (Figure 1) took place from 10 – 17 November 2024. The itinerary and logistics were organised by Mr Lindsay Hermes of the Australian Sustainable Seaweed Alliance and Mrs Emma Malueg of Green Horizon.

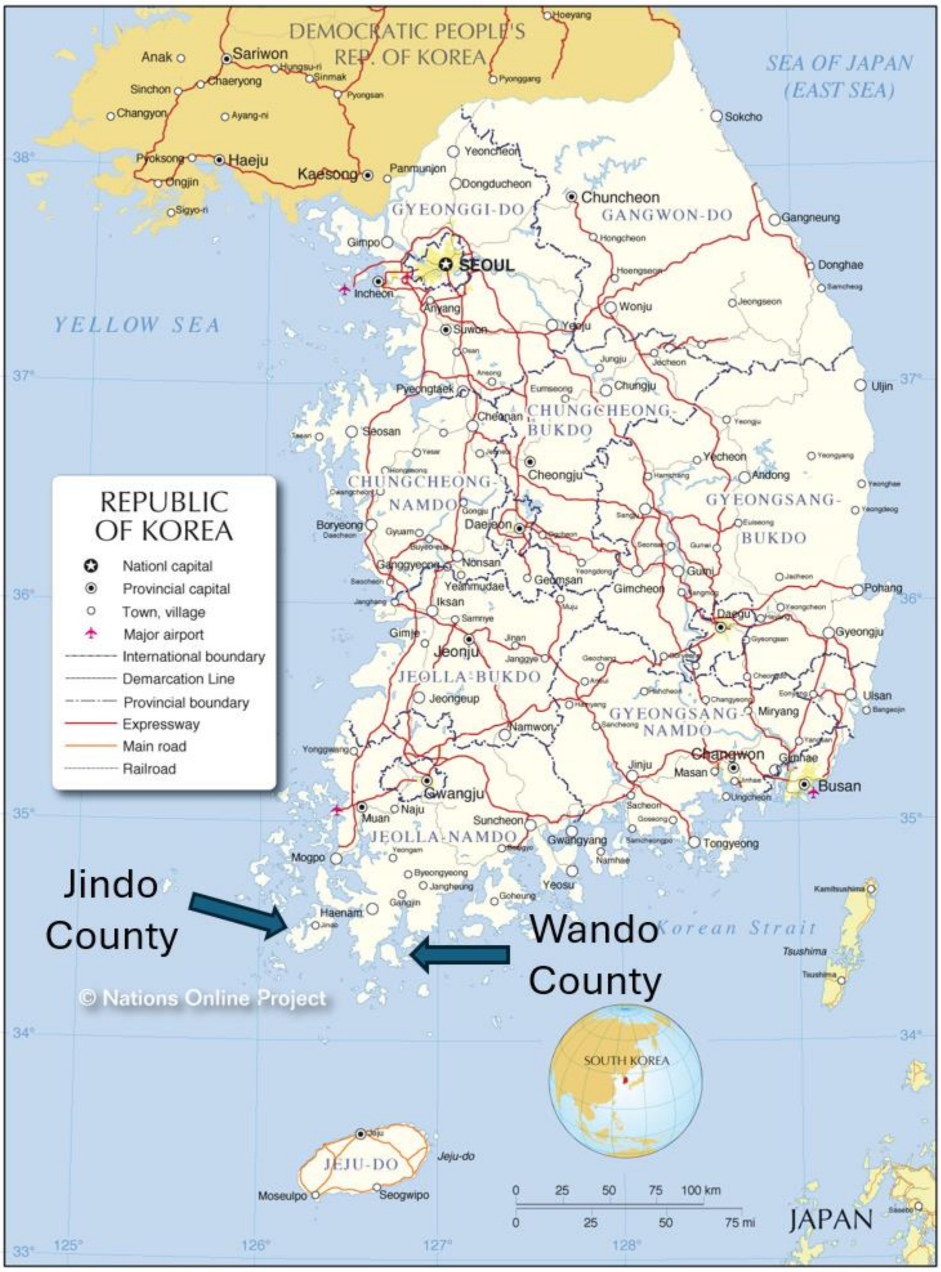


Figure 1. Map of South Korea showing the locations of Jindo and Wando County (modified from https://www.nationsonline.org/oneworld/map/korea-south-administrative-map.htm#google_vignette).

The tour support staff were:

No.	Name	Affiliation
1	Ms Emma Malueg	Green Horizon Communications Group
2	Mr Lindsay Hermes	Australian Sustainable Seaweed Alliance
3	Dr Jens Knauer	Australian Sustainable Seaweed Alliance

The attendees were ASSA Board and industry members, and representatives from the Australian Government and R&D institutions:

No.	Name	Affiliation
1	Mrs Jo Kelly	Australian Seaweed Institute
2	Dr Adam Main	CH4 Global
3	Dr Margaret Rule	Drift Consulting
4	Mr Josh Fielding	Fisheries Research and Development Corporation
5	Mr Chris de Cuyper	Fremantle Seaweed
6	Mr Alex Baker	FutureFeed
7	Prof Catriona Macleod	Institute for Marine and Antarctic Studies
8	Dr Mark Cyrus	James Cook University
9	Dr Nicholas Neveux	Pacific Bio
10	Dr Sasi Nayar	South Australian Research and Development Institute
11	Mrs Mary Parker	Tasmanian Oyster Company
12	Mr Bradley Clarke	TASSAL

The itinerary was as follows:

Sunday 10 November 2024

- Arrival in Sydney and check-in at the Rydges Sydney Airport Hotel.

Monday 11 November 2024

- Flight to Seoul and transfer to Ibis Ambassador Incheon Hotel.

Tuesday 12 November 2024

- Market briefing session with Mr Dane Richmond, Trade and Investment Commissioner, Australian Embassy, Seoul.
- Travel by bus to Jindo County.
- Checking in at Sol Beach Hotel and Resort, Jindo County.

Wednesday 13 November 2024

- Mrs In-Yung Sunwoo, Jeju Research Institute, Korea Institute of Ocean Science and Technology, to join the two-day visit of seaweed farms, processing centres and research institutions in Wando and Jindo County.
- Meeting with local Wando Government representatives at Wando County Office, talks with Fisheries Management Director.
- Tour of Sinji Aquaculture Farm including demonstration of the brown seaweed hijiki (*Sargassum fusiforme*) outplanting and boat tour.
- Lunch at Wando Sand Raffle restaurant specialising in seaweed products.

- Visit Jeonnam Marine Bioresearch Centre and meet Team Leader Jung Woo-seok, as well as the Wando Seaweed Centre to observe biotechnology developments and products.
- Visit Jeonnam Institute of Marine and Fisheries Science, Seed Research Institute to meet with Researcher Park Yong-Bin and Mrs EunHwa Kim of F&W.

Thursday 14 November 2024

- Visiting the MSC-certified Victory International seaweed farm in Jindo County.
- Farm and processing factory tour with Mrs Anita Lee, Senior Commercial Manager Oceania, Mr Matt Watson, Senior Fisheries Program Manager Asia Pacific and Mr Andy Yi, Fisheries Outreach Manager MSC Korea.

Friday 15 November 2024

- Travel by bus to Seoul and check-in at Sotetsu Fresa Inn Hotel, Myeong-dong.

Saturday 16 November 2024

- Free day in Seoul.
- Flight to Sydney.

Sunday 17 November 2024

- Arrival in Sydney and departure to place of residence.

Results

Observations Day 1: Tuesday 12 November 2024

Trade and Investment Commission, Australian Embassy, Seoul

The Trade and Investment Commissioner, Mr Dane Richmond (Figure 2), provided information on trade between Australia and South Korea. In 2023 South Korea accounted for 5.8% of Australia's total trade making it the fourth-largest trading partner with a total of A$70.9 billion worth of exchanges, and third-largest export market valued at A$43.6 billion. The major imports from South Korea are refined petroleum and cars, and Australia's major exports are beef, natural gas, iron ore and coal (DFAT 2025). Dane also provided invaluable insights into South Korean culture, with a focus on etiquette. For example, accepting business cards with both hands is a gesture indicating high respect for the other person. He also explained the history of the country, highlighting the rapid restoration and development of South Korea following the Korean War. As a small country with few natural resources but well-educated workforce, South Korea has placed emphasis on developing technological advances in all of their economic initiatives. However, one critical factor potentially affecting future economic prospects is the very low birth rate of 0.75 (McCurry 2024). Interestingly, Dane pointed out that due to the low birth rate seeing a pram or a toddler was a real noticeable event.

Figure 2. Trade and Investment Commissioner Dane Richmond (far left) and ASSA Board (from left to right Adam Main, Jo Kelly, Catriona Macleod, Alex Baker), Australian Embassy, Seoul.

Observations Day 2: Wednesday 13 November 2024

Wando Regional Government

The ASSA delegation was met by local Government officials in Wando County (Figure 3). A brief overview of the history and status of seaweed production in that region in particular was presented. Wando County is the largest producer of seaweed in South Korea with an approximate annual production of 870,000 tonnes wet weight (Ahuja 2024). This accounts for 50% of South Korea's total seaweed production (Song 2024). Particular emphasis was placed on using romanised Korean names for seaweed exports rather than the Japanese equivalent. For example, kelp is called kombu in Japanese and dasima in Korean, and laver is called nori in Japanese and gim in Korean. The use of Korean names is meant to differentiate their products and to create specific market opportunities.

Figure 3. Official welcome of the ASSA delegation to Wando County.

Sinji Aquaculture Farm

We visited the Sinji Aquaculture Farm specialising in the culture of the brown seaweed *Sargassum fusiforme* (tot/hijiki). This seaweed is commonly consumed as a fresh food, or pickle. Wild collected seaweed is sorted by hand (Figure 4) and tied to lines using a simple machine which wraps the plants in twine to secure them (Figure 5) for vegetative propagation. This informative session at the Sinji farm highlighted how substantial biomass can be produced through simple techniques, and similar methods can be replicated for many species in Australia to achieve relatively quick production. However, removing the reliance on wild collected stock is a focus of much research in Australia, so while the method observed here may be employed short-term, developing seeding technologies is still a priority.


Figure 4. Cleaning, sorting and preparing vegetative fragments for tying to ropes.

Figure 5. A simple machine for tying vegetative fragments to ropes by wrapping with twine.

After visiting the seeding facility, delegates were taken on a boat tour of the company's tot/hijiki farm. Seeded ropes with a length of 100m each (Figure 6) are deployed with only 10m separating individual ropes. This stocking density appeared high to the Australian industry delegates. The local farmer, Mr Bok, mentioned that there were 'areas of fast growth' and 'areas where growth was slow' and that the 100 ropes he manages will yield approximately 18 tonnes of hijiki after four months. This is usually undertaken twice per year for two annual harvests. There did not appear to be any R&D effort focused on optimising stocking density of ropes in different areas. Tot/hijiki is not considered suitable for consumption in many western countries due to its high levels of arsenic and, correspondingly, Food Standards Australia New Zealand have issued warnings about the inorganic arsenic content of hijiki seaweed (Winkel 2022) .

Figure 6. Local seaweed farmer, Mr Bok, lifting a freshly deployed seeded rope.

Wando Seaweed Center

Following the farm visit, the ASSA delegation visited the Wando Seaweed Center (Figure 7).

Figure 7. Wando Seaweed Center.

Given the economic importance of seaweed to Wando County, this Centre displays the various species of seaweed cultured in Wando as well as the product range (Figure 8). Traditionally, the majority of seaweed has been used for food; however, in recent years a whole new wellness industry centred on using seaweed-derived wellness and beauty products such as skincare cremes and cosmetics has emerged.

Figure 8. Display of locally cultured seaweed species (top) and range of seaweed-derived beauty products (bottom) at the Wando Seaweed Center.

Jeonnam Marine Bioresearch Centre

This institute focuses on developing novel products from seaweed using state-of-the-art analytical and processing equipment. Despite having been in use for years, the impeccable cleanliness and high levels of hygiene of the various rooms and equipment were noticeable (Figure 9). For proprietary reasons it was not possible to take photographs of the equipment. Apart from the cleanliness, the efficiency of product development was astonishing. The turnaround period from delivering a seaweed species to having a particular product developed averages a mere three months. There was significant interest in the facility, processes and technology by several members of the Australian delegation as there has been significant investments in the Marine Bioproducts CRC which aims to undertake similar activities in Australia.

Figure 9. The ASSA delegation visiting the Wando Product Development Center.

Jeollanam-do Ocean and Fisheries Science Institute, Fisheries Seed Research Institute

The Seed Research Institute focuses on R&D for many commercially relevant species, including gim/nori (*Pyropia* spp.), miyeok/wakame (*Undaria* spp.) and *Asparagopsis taxiformis*. Improving seed quality through optimising culture conditions, genetic selection and process development is a major focus of the facility. Research into *Undaria* breeding has allowed scientists to separate the seeds into males and females, which is a method of interest for development of the Australian kelp farming industry (Figure 10). The Seed Research Institute is also researching cultivation methods for *Pyropia* spp. which is a notoriously complicated genus of red seaweed, with hundreds of years of R&D undertaken to achieve modern commercial farming (Figure 10).

Figure 10. Seedling research for miyeok/wakame (*Undaria* spp.) (left) and gim/nori (*Pyropia* spp.) (right).

The hatchery recently started culturing *Asparagopsis taxiformis* sourced from Jeju Island off the southern coast of South Korea (Figure 11). Alex Baker, CEO of FutureFeed, referred to on-going talks with South Korean companies to potentially farm *A. taxiformis* in Wando County. An official Memorandum of Understanding between FutureFeed and F&W, a South Korean start-up company focused on the cultivation of *A. taxiformis*, was signed on 27 February 2025 (FutureFeed 2025). The culture of *A. taxiformis* will be a valuable addition to established seaweed culture in Wando. Traditional seaweed species are only cultured during winter, whereas *A. taxiformis* can be grown during the summer thereby extending the production season (FutureFeed 2025).

Figure 11. *Asparagopsis taxiformis* cultured at the Seed Research Institute in Wando County.

Observations Day 3: Thursday 14 November 2024

Victory International Seaweed Farm

Victory International is a vertically integrated seaweed company in Jindo County. The company holds a Marine Stewardship Council (MSC) certification, recognising its responsible and sustainable farming practices. As such, the company serves as an excellent example of a commercial operation, which has successfully achieved vertical integration, and manages all aspects of the seaweed supply chain to a high standard suitable for MSC certification.

The farm is comprised of blocks of 100m ropes separated by 10m (Figure 12). The species farmed is the red seaweed *Pyropia* spp., known as nori or gim, and is most commonly known as the seaweed wrapped around sushi or gimbap in South Korea.

Figure 12. Visiting Victory International's seaweed farm in Jindo County.

Pyropia spp. is a delicate, small, leafy species with a complex life history. Centuries of development in Korea and Japan have been dedicated to developing techniques for seeding and grow-out as well as understanding seasonal and spatial growth patterns. Farming occurs from November to April each year (Figure 13). Seaweed is grown and harvested in 21 - 45 days cycles (depending on growing season). Seaweed is cut off the lines and the approximately 20cm of remaining seaweed are returned to the ocean for further growing. Importantly, this negates the need to re-seed lines. Each 100m line produces approximately 25kg dry weight per harvest, amounting to a total of up to 140kg per line, per year.

Figure 13. Deployment of lines seeded with *Pyropia* spp. using specially designed boats and unique floating raft systems.

The delegates were particularly interested in the technique using rafts to manage biofouling of the seaweed lines, as this poses a significant problem to growers in Australia. Growers rotate the rafts every three days by flipping the net systems so that the floats are positioned below the seaweed lines. The floats raise the lines out of the water and expose the seaweed to air for 12 - 24 hours, killing all contaminant species without affecting *Pyropia* spp. (Figure 14).

Figure 14. Gim/nori is grown on rafts of thin lines (left) which are flipped to raise the seaweed out of the water (right) for biofouling control.

Our visit took place on a day of harvest. The seaweed was collected on barge-like harvest boats and transferred to the harbour (Figure 15). Each boat contained an amount of seaweed with an estimated value of US$100,000 (value-adding has the potential to increase that to US$1,000,000). Each load of seaweed was auctioned off and the seaweed was then packed in bulk bags for transport to the processing facility (Figure 16). There was a significant contingent of overseas workers observed at the harvest stage, perhaps reflecting potential workforce availability associated with the manual labour and comparatively low wages.

Figure 15. Harvest boat with seaweed estimated at US$100,000 in value.

Figure 16. Packing of seaweed into bulk bags for transport to the cleaning factory.

Victory International Processing Facility: Cleaning

The bulk bags were then trucked to a cleaning factory for cleaning. We could not observe the entire process but, in general, the seaweed is first transferred to huge cleaning tanks filled with filtered seawater. Each tank contains a set of rotating propellers, which slowly spin and wash the seaweed over a period of two to three days (Figure 17). Following the cleaning, the seaweed is forced through a pump which allows sand and contaminants to settle out and be removed, and also cuts the seaweed into smaller, uniform pieces for final processing into sheets (Figure 18). The resulting slurry of seaweed is then ready for final processing and value-adding.

Figure 17. Cleaning tank with propellers.

Figure 18. Seaweed cutting machine.

Victory International Processing Facility: Primary Processing

The first value-adding step to the raw seaweed is to produce nori sheets, *i.e.* the seaweed slurry is pressed and dried using low heat. The resultant thin sheets of seaweed are typically used for making sushi or gimbap (Figure 19). The nori sheets are packed in cardboard boxes and either shipped directly or transferred internally for secondary processing and value adding.

Figure 19. Nori sheets are produced by pressing and toasting the seaweed slurry. The sheets are then packed in cardboard boxes for storage.

Victory International Processing Facility: Secondary Processing

The second value-adding step is to feed the seaweed sheets through a machine that will roast them and add oil and salt. This produces gim, which is either sold directly or further processed into different food products (Figure 20).

Figure 20. Gim further processed into a seaweed snack.

Discussion

Cultural Differences

Seaweed consumption in South Korea is engrained in the culinary culture, with cultivation and consumption occurring for centuries. In contrast, seaweed consumption is not as socially accepted in Australia, with its incorporation into our diets only recently increasing as a result of diversification of the restaurant culture in this country. Every buffet in Korea, and every convenience store provides a suite of seaweed products, and Koreans eat seaweed with almost every meal of the day. While Australians are still a long way from this level of acceptance, enthusiasm for seaweed in increasing and this holds potential for the industry in the future.

Social Licence

As a result of the cultural acceptance of seaweed, there is strong support across the South Korean society for aquaculture in general and seaweed farming in particular. For example, the Sol Beach Hotel and Resort in Jindo County is located at the tip of a peninsula with spectacular views of the ocean. The presence of hundreds of ropes within sight of the Resort, and constant boat traffic for half a year during the production season, are not considered a nuisance but necessity to produce food and other products. In contrast, Australian producers encounter often fierce opposition to farm development from groups with different priorities (such as boating, fishing, keeping the 'unspoilt' sea view). There has been an increasing reduction in social acceptability for commercial scale aquaculture ventures in Australia, and South Korea may provide insights into how to ensure seaweed maintains its social licence even when farmed at scale

Cost of Production

The main seaweed species farmed in South Korea are miyeok/wakame (*Undaria* spp.), kombu (*Saccharina* spp.) and gim/nori (*Pyropia* spp.). These are produced at scale both for domestic consumption and export to global markets. The most common farming technique for seaweed cultivation in South Korea utilises a floating longline system of ropes and buoys to cultivate seaweeds vertically and horizontally. This proven system maximises productivity making the farms highly efficient. However, farming in South Korea still has a large component of manual labour as it requires considerable human effort to seed, deploy and maintain lines, and harvest and process the biomass. There still appeared to be considerable scope for automation especially with production-related processes and, to a lesser extent, with processing.

Given that the cost of production of seaweed in Australia is likely to be much higher than in South Korea, there may need to be a focus on developing value-add products. However, these typically take much longer to develop and reduce cashflow. In many cases, Australian researchers are looking at pharmaceuticals, bioactive extraction and pigment production to gain extra income streams from biomass produced for traditional markets. The implementation of farming automation technologies is also vital for Australian seaweed economic viability. The long history of seaweed R&D in South Korea has highlighted the potential scope for development in this area.

Zoning and Government Support

The seaweed industry in South Korea is mainly located in Wando and Jindo County. This concentration of primary production has logistical benefits in terms of resource allocation and supply chain connectivity. Moreover, many farmers operate within cooperatives increasing the pool of available knowledge and experience, and efficiency of equipment use. In contrast, the vast distances between individual farms in Australia prevent the sharing of equipment and farming knowledge is kept 'in-house'. Given the early stage of the seaweed industry in Australia, typically growers have to be involved with all aspects of the supply chain, stretching available expertise and resources and diverting focus.

The concentration of farming in a relatively small geographical area of South Korea brings with it the risk that diseases and/or freak weather events can have a substantial effect on production. This is particularly concerning in view of the seemingly unstoppable advance of global warming and climate change. However, maintaining the industry in one area allows to control biosecurity and implement location specific management strategies. This may also prove to be a useful approach for Australia, with Government effort in biosecurity being focussed in specific areas, rather than requiring independent State and bioregion management plans.

The South Korean Government supports the aquaculture industry, including seaweed, by providing R&D facilities such as in Wando. Regional Governments also concentrate on the development of new products and brand marketing with a focus on using Korean names for export products. Internationally, the various levels of Government in South Korea actively employ marketing strategies to showcase the benefits of seaweed. These efforts also extend to actively fostering international collaboration such as with Japan to improve laver production.

Research and Development

Governments at all levels have actively supported the aquaculture industry by providing hatcheries and research facilities. Seaweed research in South Korea has focused on strain selection, improvement of cultivation techniques from hatchery to harvest, and the development of value-adding technologies such as in the production of gim.

There has been a trend in South Korea to diversify by processing seaweed into beauty and wellness products as well as biodegradable and eco-friendly building materials (Hwang and Park 2020). Similarly, the potential of profiting of the carbon capture potential of seaweed (Song 2024) and the antimethanogenic effect of *A. taxiformis* (FutureFeed 2025) have added to the expansion of the industry. Importantly, the recent addition of *A. taxiformis* to the suite of species cultured will extend the production season to summer. This will increase the efficiency of the cooperatives taking this up as their equipment use is extended.

Conclusion

The seaweed industry in South Korea has benefitted from mechanisation and automation especially in the processing stages and product development. The production model is heavily skewed towards cooperatives, which ensure high supply chain connectivity and logistical efficiencies. Government support has focused on critical stages such as the hatchery, biosecurity, zoning and building international collaborations. There is interest in South Korea to engage with the Australian industry. ASSA, as the peak industry body, is ideally placed to maintain the connections via engagement with South Korean seaweed industry representatives at conferences and structured email connections.

Implications

A debriefing discussion involving all participants on 15 November 2025 listed the following issues as especially relevant in an Australian context:

Farming

The farming techniques as well as the processing technologies and practices appeared to be very relevant to several Australian operations and the delegation generally felt that it would be worth further engagement to evaluate their applicability to Australia.

The development of cooperatives as opposed to individual farms and companies seemed to offer the potential to increase production efficiencies in terms of equipment usage, supply of product and marketability/ market access (both in terms of timing and economic benefit).

The supportive interaction between Government, research institutions and seaweed growers in South Korea was noted as a particular highlight. The delegation was keen to consider whether a similar collaboration in Australia might advance the development of our seaweed industry.

There is potential for Australian seaweed to create potential markets in South Korea. New species could be presented in niche markets as innovative bioproducts and novel food alternatives. The pristine nature of Australian waters is causing growing interest in Australian seaweed as a clean, rich food product in overseas markets, and this should be leveraged in the future.

Social Licence

Social licence for seaweed farming was a key concern for all delegates in advance of the Korean visit, and as such the difference in social acceptability we saw in Korea was quite striking . As a result, the need to better understand social licence issues and how to address those was deemed a high priority as well as a follow-up online discussion to identify possible concerns.

Future Opportunities and Challenges

South Korean experts clearly demonstrated the benefit of diversification both in terms of species and product development. Consequently, the delegates agreed that there is a need to better understand the value and opportunity in our seaweed resource in Australia. As such it was proposed that the industry/ASSA prioritise R&D on product potential associated with the many endemic seaweed species. Whilst vertical integration, as demonstrated by Victory International, may be one way to maximise productivity. Collaboration can also bring benefits, and the delegates were keen to explore opportunities in this space whilst recognising the challenges within Australia, which is currently more focused on single-use production of seaweed such as with *A. taxiformis*.

Collaborations between R&D institutions and industry have worked very well in South Korea. While the same approach has been taken in Australia, there is a need to continue funding this. Similarly, South Korea has demonstrated the value of national and international collaboration, and with economic similarities, and willingness to share knowledge, it was felt that they could be a great ongoing development partner for Australia. For example, South Korea could transfer its experience and technological advances to Australia. Cultivation space on and in the ocean is much more limited in South Korea as compared to Australia. The benefit to South Korea would also be exposure to new species and opportunities for value-adding by developing new products. Australia's high cost of production creates a need to develop automation, and these technological developments may also be useful for farming in South Korea. Growers in Australia must increase scale if they are to achieve economic viability, and collaboration between both countries has the potential to be mutually beneficial.

Recommendations

The following recommendations are made:

1. To add the current report to the 'Seaweed Central' portal accessible via ASSA's website (https://www.seaweedalliance.org.au/)
2. To conduct an online workshop to pass on verbally the learnings and benefits of the study tour to the Australian seaweed industry, Government and R&D representatives
3. To accept the invite for ASSA to participate in a collaborative program of European and Asian industry and R&D representatives in November 2025 in South Korea. This program is organised by Seaweedlink (https://www.seaweedlink.com/) to explore international collaborative opportunities. The South Korean industry is considered a best practice example, particularly in vertical integration, which could help the emerging seaweed industry in Australia to avoid repeating early mistakes.
4. For ASSA, on behalf of the Australian industry, to explore the option of partnering with South Korean suppliers to adopt modular vessel designs and seaweed drying technology suitable for Australian conditions.
5. For ASSA, in conjunction with Government agencies, to advocate for consistency in policies at State and Federal level, and to focus on how policy and governance frameworks can better support innovation.
6. For ASSA to develop a business plan for centralised hatcheries to streamline production and support small farms by providing clean seedstock. While the initial focus should be on *Asparagopsis* spp., diversification of the industry will be essential to make it viable.
7. In addition to the 'Seaweed Central' portal to develop a comprehensive toolkit that includes fact sheets and infographics about seaweed's environmental and economic benefits, templates for media releases and presentations tailored to promote sustainability and innovation in the seaweed industry, background information on talking points such as social license, economic impact, and international collaboration, ensuring consistent messaging across the sector. The toolkit should provide customisable assets that members can use to engage stakeholders, such as videos/animations and printable materials. Conduct a training session or webinar for members to familiarise them with the toolkit and its applications, ensuring they can effectively advocate for the industry.

Extension and Adoption

Social Media

Throughout the study tour, updates on the places visited were posted by various participants to raise awareness of the initiative throughout the sector. Some examples are attached:

Jo Kelly • 2nd
Helping transition to a sustainable future | Climate & Sustain...
4mo •

+ Follow ···

Have just returned from a fantastic week in South Korea learning about their huge and successful #seaweed industry. Lots of learnings and inspiration for building a successful industry in Australia. ...more

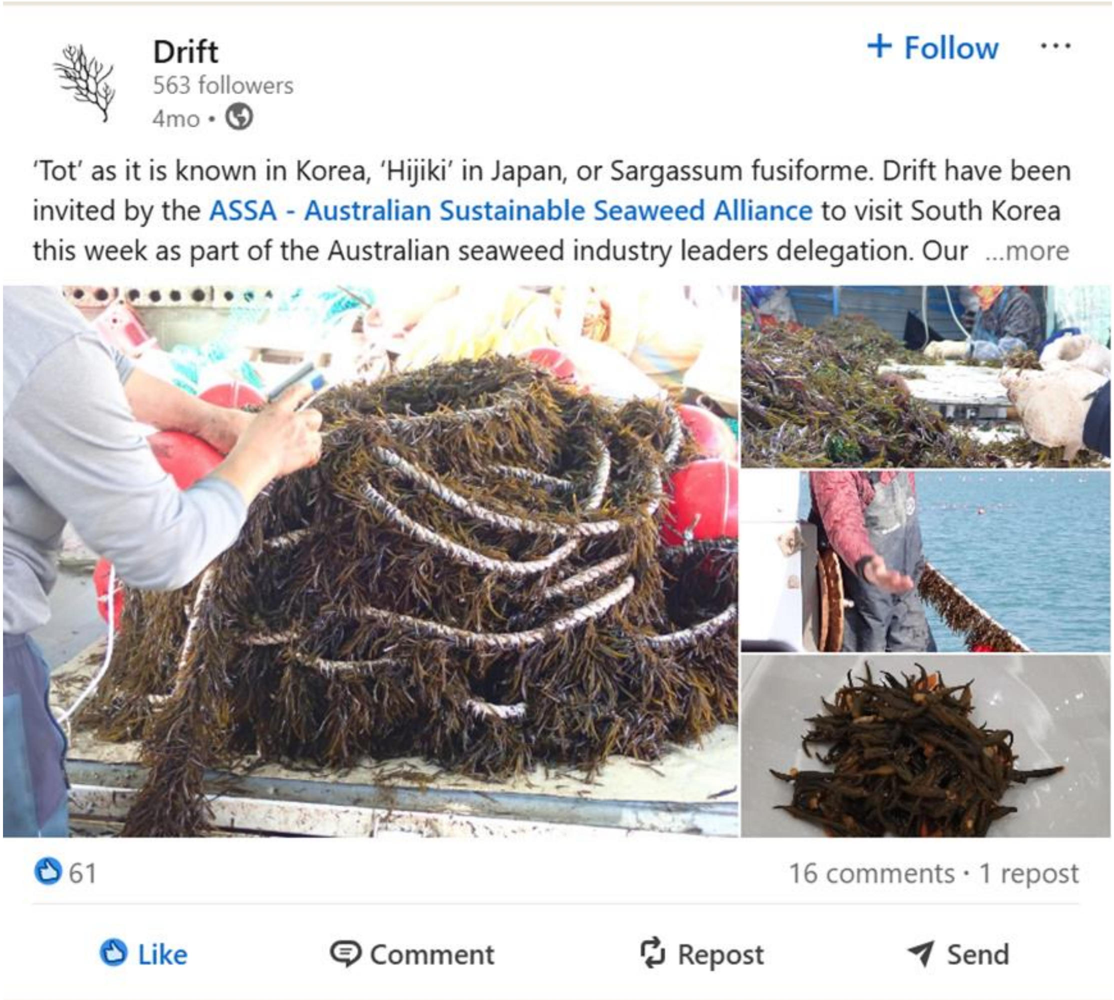
118 · 3 comments · 2 reposts

Catriona Macleod • 1st
Professor - Institute for Marine and Antarctic Studies (IMAS) at University of...
4mo •

···

So impressed with everything I have seen this week in South Korea. I am here as part of an Australian industry, research and government delegation from ASSA - Australian Sustainable Seaweed Alliance with the aim of learning as ...more

81 · 6 comments · 1 repost



Social Licence

A meeting on issues affecting social licence of the emerging seaweed industry took place on 19 December 2024. ASSA's website was identified as the ideal vehicle to provide information supporting the development of seaweed aquaculture in Australia and to address FAQs. In agreement with Recommendation 7 (see above) it was proposed that the importance of seaweed for food security and its potential to produce biodegradable materials, industrial products, ecosystem restoration and climate change mitigation needs to be more clearly communicated. It was again pointed out that ASSA could also help to develop educational tools and engage in public education and that ASSA should look to secure funding to support this. Importantly, one of the Competitive Bid projects (FRDC Project No 2023-196) funded by ASSA's National Hatchery Network has developed a 'Seaweed Central' portal (see Recommendations) which, once accessible on ASSA's website, will include a lot of the information emphasised to be necessary to increase societal understanding and acceptance of seaweed culture. Importantly, the portal will be constantly updated and new information added as it becomes available.

References

Ahuja SK. 2024. S Korea' Wando County: emerging as a global leader in Blue Carbon innovation. https://www.asiancommunitynews.com/s-korea-wando-county-emerging-as-a-global-leader-in-blue-carbon-innovation/; accessed 14 March 2025.

Cai J, Lovatelli A, Aguilar-Manjarrez J, Cornish L, Dabbadie L, Desrochers A, Diffey S, Garrido Gamarro E, Geehan J, Hurtado A, Lucente D, Mair G, Miao W, Potin P, Przybyla C, Reantaso M, Roubach R, Tauati M, Yuan X. 2021. Seaweeds and microalgae: an overview for unlocking their potential in global aquaculture development. FAO Fisheries and Aquaculture Circular No. 1229. Rome, FAO, 48 pp.

Department of Foreign Affairs and Trade (DFAT). 2025. Republic of Korea (South Korea). https://www.dfat.gov.au/geo/republic-of-korea/republic-of-korea-country-brief#trade-investment; accessed 01 April 2025.

FutureFeed 2025. Ocean growing trials of Asparagopsis underway in South Korea. https://www.future-feed.com/updates/southkorea; accessed 14 March 2025.

Hwang EK, Park CS. 2020. Seaweed cultivation and utilization of Korea. *Algae* 35: 107 – 121.

Kelly JL. 2020. Australian Seaweed Industry Blueprint – A Blueprint for Growth. AgriFutures Publication No. 20-072, Project No. PRJ-012324, Canberra, 44 pp.

Kelly JL, Rule MB. 2023. National Hatcher y Network Implementation Plan. FRDC Project 2022-132, Canberra, 18 pp.

McCurry J. 2024. South Korea birthrate rises for first time in nine years amid surge in marriages. https://www.theguardian.com/world/2025/feb/26/south-korea-birthrate-rises-marriages-surge; accessed 01 April 2025.

Prasad V. 2024. Strengthening the Seaweed Value Chain- Successes of the Republic of Korea in the Global Seaweed Market. https://collaboration.worldbank.org/content/sites/collaboration-for-development/en/groups/aquainvest-platform/calendar.event.html/strengthening_theseaweedvaluechain-successeso-Dha1.html; accessed 14 March 2025.

Rule MB, Kelly JL. 2023. *Asparagopsis* R&D Review. FRDC Project 2022-132, Canberra, 64 pp.

Rule MB, Lane J, Martins AP, Cyrus MD, Nayar S, Hoang T, Mihaila A, Nardelli AE, Tran H, Sjölund M, Stålemark COM, Nunn H, Knauer J. 2025. Hatchery and cultivation manual for the red seaweed *Asparagopsis* spp. FRDC Projects 2022-208, 2023-079, 2023-081, Canberra (in preparation).

Seaweed Insights. 2022. Global production overview. https://seaweedinsights.com/global-production/; accessed 12 March 2025.

Song A. 2024. South Korean seaweed hub Wando draws global attention for carbon capture potential. http://koreabizwire.com/south-korean-seaweed-hub-wando-draws-global-attention-for-carbon-capture-potential/296547; accessed 14 March 2025.

Winkel C. 2022. Development of a seaweed food safety program: to meet the requirements of Food Standards Australia New Zealand and third-party hazard analysis and critical control points certification. AgriFutures Australia Project No PRJ-012985 , Wagga Wagga, NSW, 32 pp.

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