

Seaweed: an under-explored ocean resource:

How can seaweed complement and reinvigorate the cultural food heritages of Wales and Japan sustainably?

This essay will explore the cultural food heritage of Japan and Wales. It will attempt to compare and contrast the different ways in which these heritages have developed and are still practised today. Food heritage and heritage foods are two different concepts. However, the terms are often used interchangeably. Using a definition by (Bessiere and Tibere¹) Mohammad Almansouri, Ruud Ververk, Vincenzo Fogliano and Pieternel A. Luning define food heritage as ‘the set of material and immaterial elements of food cultures that are considered as a shared legacy or common good²’. UNESCO argues that the importance of intangible cultural heritage lies in ‘the wealth of knowledge and skills that is transmitted through it from one generation to the next³’. Heritage foods are traditional local foods that are prepared with local ingredients. They are derived from local recipes that have been handed down through countless generations⁴. Recipes that are treasured by local communities and often practised daily. Heritage foods are intrinsically linked to a community’s identity.

Every human being has to eat to satisfy their nutritional needs. However, as Michael Di Giovine and Ronda L. Brulotte suggest ‘how we eat, and what we eat, and when we eat, and with whom we eat, all uniquely vary from place to place, group to group, time to time - thanks to longstanding geographic, economic, social, and cosmological differences throughout the world’⁵. On the surface, Wales and Japan appear to be nations with very different cultural food traditions. They both possess rich food heritages that have helped to shape and define their traditions and identities. More importantly, they are both concerned with ensuring that their food heritages continue to develop sustainably to ensure they remain relevant and can furnish the needs of future generations.

Japan is an island nation comprising four main islands and over three thousand smaller islands⁶. Like Wales, it is a mountainous country, but unlike Wales it has approximately 60 active volcanoes. Consequently, Japan is threatened by volcanic eruptions, earthquakes and flooding. Japan has four seasons and a ‘climate that ranges from subarctic in the north to subtropical in the south’⁷. Wales is a small country, located to the west of England; it is one of the four nations that

¹ Jacinthe Bessiere and Laurence Tibere, ‘Innovation et patrimonialisation alimentaire: Quels rapports a la tradition’, *Le Mangeur*, 2010, pp.1-10.

² Mohammad Almansouri, Ruud Verkerk, Vincenzo Fogliano, Pieternel A. Luning, ‘Exploration of heritage food concept’. *Trends in Food Science and Technology*, 111 (2021) pp. 790 - 797 (p. 791), <<https://www.sciencedirect.com.ezproxy.uwtsd.ac.uk/science/article/pii/S0924224421000054>> [Accessed 18 April 2025].

³ UNESCO, *What is Intangible Cultural Heritage?*, <<https://ich.unesco.org/en/what-is-intangible-heritage-00003>> [Accessed 20 April 2025].

⁴ Mohammad Almansouri, Ruud Verkerk, Vincenzo Fogliano, Pieternel A. Luning, ‘Exploration of heritage food concepts’ p. 791

⁵ Ronda L. Brulotte and Michael A. Di Giovine, ‘Introduction: Food and Foodways as Cultural Heritage’, in *Edible Identities: Food as Cultural Heritage*, ed. By Ronda L. Brulotte and Michael A. Di Giovine, (Burlington: Ashgate, 1988). pp. 67 -76 (p.67).

⁶ Japanese Ministry of Land, Infrastructure, Transport and Tourism, *Land and Climate of Japan*, <https://www.mlit.go.jp/river/basic_info/english/land.html> [Accessed 1 May 2025].

⁷ Japan Meteorology Agency, *General Information on Climate of Japan*, <<https://www.data.jma.go.jp/cpd/longfcst/en/tourist.html>> [Accessed 3 May 2025].

comprise the United Kingdom. Wales has less coastline than Japan. The climate is maritime and the weather is generally mild, wet and windy⁸.

Ronda Brulotte and Michael Di Giovine suggested that food 'binds people together through space and time'⁹. Food becomes powerful when it is inscribed as heritage. This was recognised by Japan in their successful bid to gain UNESCO cultural heritage for "Washoku", their traditional dietary foods and the practices involved in preparing and consuming them¹⁰. Craig Voltaire explains that 'washoku literally means "Japanese food" (wa=Japanese; shoku=food), implying that the recognition from UNESCO was given to the food of the Japanese nation as a whole¹¹'. As Voltaire points out, although the French gastronomic meal and "traditional Mexican cuisine" were also recognised, it was unusual for UNESCO to grant food heritage status to the culinary traditions and food of a single nation¹². As Laura Driscoll argues 'Wales is not a country recognised famously for its food heritage¹³', nevertheless traditional Welsh recipes are becoming increasingly recognised throughout the world.

This essay focuses on one of the most iconic heritage foods that is associated with Japan and Wales, seaweed and explores the link between seaweed and sustainability. According to UNESCO 'the way we live is not sustainable: humans are depleting the planet's resources. Climate change is affecting humans and all species, damaging ecosystems and leading to unprecedented environmental degradation¹⁴'. Marie-Therese Albert¹⁵ argued that the notion of 'sustainable development has been deemed as 'the most important guiding principle for the 21st century¹⁶'. Seaweed is a zero input crop that does not use fertilisers, pesticides or freshwater¹⁷. It improves the ecosystem by acting as a carbon sink and can be farmed sustainably in the ocean. The whole crop can be used. Finer grades of seaweed are used for food and lesser

⁸ Welsh Government, *Facts about Wales*, <<https://www.wales.com/about/welcome-wales/facts-and-information-about-wales>> [Accessed 1 May 2025].

⁹ Ronda L. Brulotte and Michael A. Di Giovine 'Introduction: Food and Foodways as Cultural Heritage', in *Edible Identities: Food as Cultural Heritage*, ed. By Ronda L. Brulotte and Michael A. Di Giovine, (Burlington: Ashgate, 1988). Pp. 67 -76 (p.67).

¹⁰ Embassy of Japan in the UK, "Washoku, traditional dietary cultures of the Japanese", *Inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity*, <<https://www.uk.emb-japan.go.jp/en/webmagazine/2013/12/food.html>> [Accessed 15 March 2025].

¹¹ Craig Voltaire, 'Japan's Washoku as Intangible Heritage: The Role of National Food Traditions in UNESCO's Cultural Heritage Scheme', *International Journal of Cultural Property*, 25 (4) (2018) pp. 491-513 (p. 491) <<https://www.proquest.com/docview/2216730941>> [Accessed 23rd April 2025].

¹² Craig Voltaire. 'Japan's Washoku as Intangible Heritage: The Role of National Food Traditions in UNESCO's Representative List of the Intangible Cultural Heritage Scheme', p. 49.

¹³ Laura Cait Driscoll, *A Sense of Place: How Museums in Wales Represent Going Back To Our Roots And Sharing Our History Through Food*, (Unpublished MA Dissertation, University of Wales Trinity Saint David, 2023).

¹⁴ UNESCO, *Education for sustainable development*, <<https://www.unesco.org/en/sustainable-development/education>> [Accessed 20 April 2025].

¹⁵ Marie-Therese Albert, 'Mission and vision of sustainability discourses in heritage studies' in *Perceptions of sustainability in heritage studies* ed. By Marie-Therese Albert, pp.11-20, (Berlin: De Gruyter, 2015) pp. 11-20.

¹⁶ Georgios Alexopolous, Suzanne Kapelari and Theano Moussouri, 'Food heritage as a catalyst for environmental sustainability: reflections on the cultural value imbued by citizens to food and its role in supporting scientific debate about food security', in *Routledge Handbook of Sustainable Heritage*, (London: Routledge, 2022) <<https://discovery.ucl.ac.uk/id/eprint/10179786>> [Accessed 9 May 2025], (p.4).

¹⁷ Car y Mor, *Our Mission*, <<https://www.carymor.wales/>> [Accessed 16 April 2025].

grades turned into organic fertilisers or utilised as a plastic substitute¹⁸. Seaweed fertilisers were traditionally used in Japan and Wales to enrich the land organically. Using seaweed for plastic is a new invention. Câr y Môr, a Welsh ocean farm, claims they are connecting ‘sea, soil and table’¹⁹ by working with a company that is turning their seaweed into food containers. Using the whole product in the wider food industry is significant as it places seaweed in the ‘heritage climate-change nexus’²⁰ showing that it has the potential to play an important part in the wider food industry.

This essay will also explore the links between seaweed and health and how seaweed has traditionally been combined with other heritage foods to maintain access to high quality nutrition. Some of the topical debates that are circulating in food heritage literature will also be discussed, as many of them affect the sustainability of Japanese and Welsh heritage products. These topics include: the link between heritage food and identity, the move to protect heritage foods, food security, the impact of climate change on the environment and economic pressure from cheap, standardised foods marketed by multinational food corporations.

Seaweed is the common name for marine plants that are found in the world’s oceans, rivers and lakes. The archipelago of Japan is home to over 2,000 varieties of seaweed. Approximately 100 varieties are edible (although only between 8 and 22 species are currently eaten). Kaori O’Connor describes these seaweeds as being at the ‘heart of what the Japanese call wa-shoku - our way of eating’²¹. In the past the Japanese and the Welsh ate seasonally, farming, hunting and foraging for local foods, including seaweeds, and cooking them in one pot over an open fire. According to The Wales Biodiversity Partnership, ‘seaweeds dominate the rocky shores around Wales and extend into the subtidal where light levels allow growth’²². Wales is home to approximately 450 different varieties of seaweeds²³. Although most of these varieties are edible, very few are currently used in Welsh cuisine. However, one variety, laver, eclipses all of the others and is recognised as one of the most iconic traditional Welsh foods.

The Welsh word laverbread is often used to describe both the raw ingredient and the cooked product. In England laverbread is often referred to in recipe books as black butter, suggesting that it could be spread on bread. Seaweed is a versatile ingredient, it can be eaten on its own, combined with other traditional foods, such as rice and grains, or used as a seasoning. Seaweed contains essential vitamins and minerals and is valued for its essential health-giving properties. It is nutritious and healthy and can contribute towards the provision of food security. An issue that sovereign nations are becoming increasingly concerned about. The World Food Programme maintains that ‘food security exists when people have access to enough safe and nutritious food for normal growth and development’²⁴.

Wales is the only country in the world with a ‘Well-being of Future Generations Act.’ One of the goals of this Act is to develop strategies to help future Welsh citizens live long and healthy

¹⁸ Câr y Môr, *Our Story*, <<https://www.carymor.wales/about-us>> [Accessed 16 April 2025].

¹⁹ Instagram, Câr y Môr <https://www.instagram.com/car_y_mor/> [Accessed 3 May 2025].

²⁰ Georgios Alexopolous, Suzanne Kapelari and Theano Moussouri, ‘Food heritage as a catalyst for environmental sustainability: reflections on the cultural value imbued by citizens to food and it’s role in supporting scientific debate about food security’, p.6.

²¹ Kaori O’Connor, *Seaweed: a Global History*, (London: Reaktion Books, 2017).

²² Wales Biodiversity Partnership, *Seaweeds and Algae*, 2025 <<https://www.biodiversitywales.org.uk/Seaweeds-and-Algae>> [Accessed 24 April 2025].

²³ Amgueddfa Cymru, *Spotting Seaweeds in Wales*, <<https://museum.wales/media/51467/08SG-Spotting-Seaweeds-in-Wales-reds-and-greens.pdf>> [Accessed 24 April 2025].

²⁴ Paul Anthem, UN World Food Programme, *Food security - what it means and why it matters*, <<https://www.wfp.org/stories/food-security-what-it-means-and-why-it-matters>> [Accessed 24 April 2025].

lives²⁵. On the whole, Japanese people are healthy and long-lived. They have the highest life expectancy rates in the world, due to their diets. Most Japanese people eat about 5.3 grams of seaweed daily. Unlike the Japanese, the Welsh do not eat a portion of seaweed every day²⁶. Laverbread is usually consumed as part of the traditional Welsh breakfast. A meal that is time-consuming to cook, which is probably why it is not cooked in most Welsh homes on a daily basis. However, that is beginning to change as Welsh people are not only learning more about the health benefits of seaweed but are starting to rediscover how include it in their diets.

Japan and Wales began to protect their heritage foods with Geographical Indicator Status (GI)²⁷ in the 21st century. Welsh GI products include: laverbread, Welsh leeks and Welsh heather honey. Japanese examples include Kyoto heritage vegetables and Kobe beef. The GI Scheme 'protects the name, authenticity and characteristics of regional products'²⁸. GI protected foods are grown or bred in landscapes that have: specific soils, microclimates, local varieties or breeds and possess historical knowledge of traditional cultivation techniques. All of these factors give GI foods distinctive tastes marking them as unique. Protection implies that these are quality foods that cannot be replicated in any other soils or climates, even with the use of modern technology²⁹. An issue that is debated by critics who regard the idea of framing food with historical narratives as protectionist, creating food monopolies. Scholars have argued that GI status regulations could become too restrictive and lead to the 'so-called Disneyization of food cultures'³⁰. GI foods can be grown sustainably in their local areas, but is it sustainable to export them across the globe? Exportation uses food miles, which increases their carbon footprint. Is this sustainable when other countries could produce similar products? Products that may taste slightly different, but in a world faced with the need to reduce global warming and the carbon footprint does that really matter?

Ensuring that heritage foods can be farmed sustainably, whilst at the same time reinvigorating food heritage, is a goal of the first Welsh regenerative seaweed and shellfish farm, Câr y Môr. Using regenerative farming to sustainably restore the health of the seas and soils, Câr y Môr is demonstrating that ocean farming can bring positive benefits to Welsh coastal communities³¹. Japanese ocean farms share the same ideals. Sustainability according to the United Nations is 'the idea that something (e.g. agriculture, fishing, or even preparation of food) is done in a way that is not wasteful of our natural resources and can be continued into the future

²⁵ Future Generations Commissioner for Wales, *A Journey To A Healthier Wales*, <<https://futuregenerations.wales/discover/about-future-generations-commissioner/future-generations-act-2015/a-healthier-wales-2/>> [Accessed 24 April 2025].

²⁶ Emma M. Brown, Philip J. Allsopp, Pamela J. Magee, Chris IR Gill, Sonja Niteki, Connal R. Strain, Emeir M. McSorley, 'Seaweed and Human Health' *Nutrition Reviews* 72 (3) (2014) pp. 205-216 (p. 205) <<https://academic.oup.com/nutritionreviews/article/72/3/205/1853561?login=true>> [Accessed 24 March 2025].

²⁷ Please note there are several categories of protection for protected foods in Wales . For more information see Welsh Government, *Protected Produce*, 2025, <<https://www.wales.com/visit/food-and-drink/welsh-products-protected-status>> [Accessed 28 April 2025].

²⁸ United Kingdom Government, *Iconic Welsh Leeks to be protected*, 2022 <<https://www.gov.uk/government/news/iconic-welsh-leeks-to-be-protected>> [Accessed 25 April 2025].

²⁹ Katharina Gugerell, Uchiyama Yuta, Pia R. Kieninger, Marianne Penker, Shuichiro Kajima, Ryo Kohssaka, 'Do historical production practices and culinary heritages really matter? Food with protected geographical indications in Japan and Austria', *Journal of Ethnic Foods*, 4 (2) (2017), pp. 118-125 (p.119). <<https://www.sciencedirect.com.ezproxy.uwtsd.ac.uk/science/article/pii/S2352618117300392?via=ihub>> [Accessed 23 March 2025].

³⁰ Katharina Gugerell, Uchiyama Yuta, Pia R. Kieninger, Marianne Penker, Shuichiro Kajima, Ryo Kohssaka, 'Do historical production practices and culinary heritages really matter? Food with protected geographical indications in Japan and Austria' p.119.

³¹ Câr y Môr, Our Story <<https://www.carymor.wales/about-us>> [Accessed 15 April 2025].

without being detrimental to our environment or health'³². According to the World Wildlife Fund, seaweed has positive benefits for ocean ecosystems. 'It acts as an underwater forest that absorbs carbon, nitrogen and phosphorus, making it a valuable tool to fight climate change and a water purifier, whilst creating new habitat for a diversity of marine life'³³. Aquaculture, 'the cultivation of aquatic organisms in controlled aquatic environments for any commercial, recreational or public purpose'³⁴, is not as new in Japan as it is in Wales. Japanese scientists are currently conducting a series of aquaculture projects to 'improve the sustainability of aquaculture and boost production even against the strong current of climate change'³⁵. The Welsh government recently began to recognise the importance of developing a sustainable aquacultural industry off the Welsh coastline. To facilitate this, Project Madoc a feasibility study, was commissioned in 2024, to assess 'the economic viability, environmental impact and social acceptability of developing a sustainable and competitive industry for Wales, based on the cultivation and downstream processing of selected species of native seaweed'³⁶. This project will add value to the ongoing research projects into the potential uses of seaweed that are currently underway in Welsh Universities³⁷. The project will also build on and learn from the challenges and achievements of Câr y Môr. Started in 2019, Câr y Môr is a Community Benefit Society, supporting a community of over 500 'fishermen, gatherers, sea and land farmers, educators, investors, supporters and customers'³⁸. Câr y Môr is actively rejuvenating the local community. Fishermen who lost their livelihoods due to overfishing and environmental issues are becoming ocean farmers, shops are selling seaweeds, shellfish and restaurants are using local seaweeds, shellfish and fish in their cuisines.

Seaweeds have been gathered and harvested by coastal communities for centuries. Japanese archaeologists discovered seaweed residue in pots used by early hunter gatherers, the Jomons, who lived around 12,700 years ago³⁹. Historians, (using evidence from wooden tablets and other written records) suggest that a variety of seaweeds were consumed in Japan from the 7th century onwards. Seaweed heritage is ingrained in Japanese culture as seaweeds were depicted in poems and artworks⁴⁰. Seaweed was used as currency to pay taxes and as offerings at shrines: a tradition that continues to this day in Japan, perhaps influenced by the idea that seaweeds were eaten by their ancestors. Scottish archaeologists have found evidence of seaweed consumption on the Orkneys leading scholars to suggest that it was eaten, not only in

³² United Nations, *Sustainable Gastronomy Day 18 June*, <<https://www.un.org/en/observances/sustainable-gastronomy-day>> [Accessed 26 April 2025].

³³ World Wildlife Fund, *Farmed Seaweed*, <<https://www.worldwildlife.org/industries/farmed-seaweed>> [Accessed 20 April 2025].

³⁴ National Oceanic and Atmospheric Administration, *What is aquaculture?* <<https://www.noaa.gov/stories/what-is-aquaculture>> [Accessed 8 May 2025].

³⁵ Joel Tansy, 'Japan looks to save seafood and seaweed farming from warming oceans', *The Japan Times*, 23 February, 2025, <<https://www.japantimes.co.jp/environment/2025/02/23/sustainability/japan-sustainable-aquaculture-projects/>> [Accessed 20 April 2025].

³⁶ Project Madoc, *How viable is an industry based on cultivated seaweed for Wales?* <<https://projectmadoc.cymru/home/>> [Accessed 7 May 2025].

³⁷ Note, Swansea University has an Algal Research Group and Bangor University is investigating many seaweed projects. Swansea University, *Algal Research*, <<https://www.swansea.ac.uk/bioscience/research-and-impact/algal/>> [Accessed 5 May 2025]. Bangor University, *Novel Ingredients from Seaweed Extracts (NISE)* <<http://gwymon-seaweed.bangor.ac.uk/about.php.en>> [Accessed 5 May 2025].

³⁸ Câr y Môr, *Our Story* <<https://www.carymor.wales/about-us>> [Accessed 13 March 2025].

³⁹ Kaori O'Connor, *Seaweed: A Global History*, p.23.

⁴⁰ Tokyo Restaurants Guide, *The Abundant World of Seaweed*, <<https://restaurants-guide.tokyo/column/the-abundant-world-of-seaweed/>> [Accessed 24 April 2025].

Orkney, but throughout Europe⁴¹. Gerald of Wales recorded an instance of Welsh people eating laver in 12th century Pembrokeshire⁴². In contrast to the Japanese, the Welsh traditionally focused on collecting and cooking laver. Sugar kelp and dulse were also consumed, but they were not as popular as laver. Described as Welshman's caviar by the actor, Richard Burton⁴³, and mentioned by the author Dylan Thomas in *Under Milk Wood*⁴⁴, laverbread is one of the keys to Welsh identity.

Porphyra umbilicalis is the Latin name for the seaweed that the Welsh call laver and the Japanese call nori⁴⁵. It grows in the seas that surround both nations. Traditionally it was hard to cultivate causing Japanese production to falter in the late 1940s. The problem was solved by a British scientist, Kathleen Drew-Baker. She studied samples of porphyra from Ynys Môn, which allowed her to decode the life cycle of laver, revealing that nori reproduces from spores. A significant breakthrough that enabled a Japanese scientist, Segawa Sokichi, to revitalise nori farming. Traditional Japanese techniques of collecting and growing seaweed spores on ropes or nets suspended in water, were modernised and moved offshore⁴⁶. Spore nurseries were established. Modern nori cultivation techniques led to a plentiful supply of the seaweed, allowing chefs to change the traditional sushi wrap from fermented fish to nori. In Japan, Kathleen Drew-Baker is revered as 'Mother of the Sea'⁴⁷. A memorial has been erected in her honour and her work is celebrated in an annual festival.

Sushi making is an excellent example of Japanese intangible heritage as families often gather together to prepare their preferred sushi dishes for family and national celebrations. Sushi represents good fortune and prosperity, making it an ideal food for sharing at New Year. Welsh chefs are adding a Welsh twist to their sushi dishes by adding traditional Welsh ingredients, such as lamb⁴⁸. Laverbread is regarded as a delicacy in Wales, but it does not share the same symbolic importance as the Welsh leek. However, a Pembrokeshire seaweed company, inspired by Japan, is promoting the 14th of April as 'National Laverbread Day'⁴⁹.

How is food transformed into intangible heritage products? Seaweed is known to be a traditional ingredient in Japanese and Welsh cuisine. Seaweed recipes have been discovered in Japanese and Welsh old cookbooks. These recipes appear to be authentic but they may not

⁴¹ Sarah Campbell, 'University of Glasgow: Study reveals secrets of seaweed consumption' *The Herald*, 17 October 2023 <<https://www.heraldscotland.com/news/23861451.university-glasgow-study-reveals-secrets-seaweed-consumption/>> [Accessed 24 April 2025].

⁴² National Laverbread Day Newsletter, *The Story of Laver Seaweed in Wales*, <<https://www.laverbreadday.co.uk/history>> [Accessed 18 April 2025].

⁴³ Angeles Rodenas, 'The 'Welsh caviar': should we all start eating laver?', *The Guardian*, Tuesday 13 July 2021, <<https://www.theguardian.com/environment/2021/jul/13/welsh-caviar-should-we-all-start-eating-laver>> [Accessed 8 May 2025].

⁴⁴ Dylan Thomas, *Under Milk Wood*, (London: J.M. Dent, 1977).

⁴⁵ Please note that this essay uses both nori and laver where it seems appropriate, e.g. nori when referring to Japan and laver when referring to Wales.

⁴⁶ Bureau of Economic Geology, EarthDate, *Farming the Seas*, 24 April, 2021 <<https://www.earthdate.org/episodes/farming-the-seas>> [Accessed 24 April 2025].

⁴⁷ Joe Shervin, *Mother of the Sea' - How Kathleen Drew-Baker saved sushi*, university of Manchester, 4 March 2019 <<https://www.mub.eps.manchester.ac.uk/science-engineering/2019/03/04/mother-of-the-sea-how-kathleen-drew-baker-saved-sushi/>> [Accessed 16 April 2025]

⁴⁸ Mari Jones, 'Forget sushi, now you can indulge in Welsh-inspired 'sushi'. *Wales Online*, 17 Feb 2016, <<https://www.walesonline.co.uk/whats-on/food-drink-news/forget-sushi-now-you-can-10904687>> [Accessed 24 April 2025].

⁴⁹ National Laverbread Day Newsletter, 'We Hereby Declare April 14th National Laverbread Day!' <<https://www.laverbreadday.co.uk/>> [Accessed 2 May 2025].

appeal to the palates of the current generation. As Almansouri suggests authenticity is not static, it evolves⁵⁰. Welsh chefs and cookbook writers are keen to persuade people to eat include more seaweed recipes in their diets. Their challenge is to introduce new recipes that can be regarded as authentic. One of the effective ways of persuading people to eat more seaweed is to integrate seaweed into foods and drinks that are known and enjoyed: such as cheeses, alcoholic beverages and breads. Chefs in Wales are trying to raise seaweed's status from a breakfast staple to a food that can be enjoyed in different ways at lunch or dinner. Japanese chefs have an advantage as their clientele are attuned to eating seaweed at all of their meals. The Welsh seafood industry is hoping to change the public's perception of seaweed by introducing new culinary seaweed products. New seaweed based foods on the Welsh market include: seaweed crackers, to pair with traditional Welsh cheeses, seaweed wraps and seaweed seasoning which is gaining a reputation as a salt substitute. A Welsh distillery has also started to offer a seaweed gin⁵¹: a gin that is currently being exported to Japan. A Welsh company that has GI status for its sea salt product, is marketing a salt that has umami flavours, from the incorporation of dried mushrooms and seaweeds⁵². This suggests that the company is learning from traditional Japanese food recipes and reinventing them for Welsh palates. Japan is also aware of the need to diversify and offer new products. Examples of new products being developed and marketed by Japanese companies include seaweed crisps, seaweed salad mixes and sauces⁵³.

Seaweeds contain vitamins, minerals, and soluble dietary fibres that are considered important in maintaining good health. They also contain bioactive compounds that are not found in terrestrial plants. These properties are regarded by the Japanese as 'preventative agents against lifestyle-related diseases⁵⁴'. Scientists across the world are researching the effects of chemicals found in seaweeds on cancers and cardiovascular diseases.⁵⁵ There is a growing need in western societies to discover foods that can help to combat current health concerns including: obesity, diabetes and cardiovascular diseases. Japan has one of the lowest rates of obesity in the world but the Japanese share some of the other health concerns of the west. They are concerned about the effects of western cuisine on their diets, as statistics have shown that between 1950 and 1975 the younger generation started to eat more meat, milk and potatoes. This increased incidents of some cancers⁵⁶. Learning from the past is an important concept in heritage as forgotten knowledge can inform present research. In Japan seaweed was traditionally used to treat thyroid disease, to increase vitality and to improve the immune system as it was known to contain iodine. A certain amount of iodine is needed to make the thyroid hormone, but a high intake could have a toxic effect. Seaweed was also used to treat inflammatory diseases

⁵⁰ Almansouri, Verkerk, Fogliano, Luning, 'Exploration of heritage food concept', p.792.

⁵¹ The Gower Gin Company, *Gower Sea Star Gin*, <<https://www.thegowergincompany.wales/>> [Accessed 4 May 2025]. Personal communication with a representative of The Gower Gin Company at The Taste of Wales Event at The National Botanic Gardens Wales, on 03/05/2025

⁵² Halen Mon, *Umami*, <<https://www.halenmon.com/product-category/flavours/umamisalt/>> [Accessed 8 May 2025].

⁵³ Japan Centre, *Seaweed*, <<https://www.japancentre.com/en/categories/1693-seaweed>> [Accessed 2 May 2025].

⁵⁴ Utako Murai, Kazumsa Yamagishi, Roe Kishida, Hiroyasu Iso, *Impact of seaweed intake on health*. September 9 2020, Available at: <<https://research-ebsco-com.ezproxy.uwtsd.ac.uk/c/onvpsy/viewer/pdf/3mrpqarhqb?route=details>> [Accessed 2 May 2025].

⁵⁵ Emma M Brown, Philip J. Allsopp, Pamela J. Magee, Chris I R Gill, Sonja Nitecki, Connah R Strain, Emeir McSorley, *Seaweed and Human Health*, p. 205.

⁵⁶ Yasugo Kagawa, 'Impact of westernization on the nutrition of Japanese: changes in physique, cancer, longevity and centenarians'. *Preventive Medicine* 7 (2) (1978) pp 205 -217 (p. 205) <<https://www.sciencedirect.com/science/article/abs/pii/0091743578902463>> [Accessed 4 May 2025].

including joint pain, rheumatism and arthritis⁵⁷. Laverbread was used to improve the health problems of Welsh mine workers in the 19th century, which doctors thought were caused by malnutrition and lack of sunlight. When laverbread was added to mine workers' diets there was a marked improvement in their health and 'laverbread became part of their identity'⁵⁸.

Past generations in both Japan and Wales realised that seaweeds need to be combined with other ingredients that contain other vital proteins, vitamins, minerals, carbohydrates and fats to provide citizens with a balanced diet. In Japan seaweeds are eaten in combination with other traditional foods and drinks that also promote good health. These foods and drinks include : green tea, soy, shellfish and fish⁵⁹. Another key ingredient in Japanese cuisine is rice.

Rice is cherished as a heritage food in Japan today, but that was not always the case. Penelope Francks suggests that rice was introduced to Japan from the Asian mainland around 300-400 BCE and by the seventeenth century was widely grown where conditions allowed⁶⁰. Until modern times, rice was grown in rural areas but it was regarded as a high status crop, grown to pay taxes and eaten largely in urban areas by the samurai and merchant classes. The lower classes ate other grains as they were easier to cultivate than rice. It could be argued that rice is as important in terms of heritage foods to Japan as oats, rye, barley and wheat are to Wales: heritage grains that have been used for centuries to bake a traditional Welsh food, bara (bread). Carwyn Graves suggests that 'the profusion of bread-words in Welsh alone speaks volumes for the central place this foodstuff has in the country's cuisine and consciousness⁶¹'. The Welsh cultivated wheat, barley, oats and rye as described in a poem by David Thomas in 1750. Different countries grew the grains that were suited to their terrain and microclimates. This gave rise to a variety of not only breads, but methods of baking them. In 2015 a traditional variety of Welsh wheat called (Hen Gymro), was grown again and milled and baked by members of the local community in Ceredigion. Heritage Bread, that uses a traditional Welsh low gluten flour, a new heritage food, or perhaps it should be described as an old heritage food, as the community went back to basics to discover and learn how to grow it sustainably in the same way as previous generations. This bread has health benefits for people with gluten intolerance and promotes good gut health. Bakers are using this flour throughout Ceredigion and some of them may also be including seaweed into their doughs. The Pembrokeshire Beach Company's website displays a recipe for Laverbread Sourdough⁶² and a bread that pairs seaweed with another G.I. food, Welsh heather honey. This idea is not new as seaweed has been used in wheat bread recipes in the past. However, it showcases the idea that heritage foods are evolving over time. In Japan rice was served as an accompaniment to seaweeds and in Wales laverbread could be spread on bread or eaten with it.

Seaweeds have an affinity with shellfish and fish. Japanese and Welsh traditional and contemporary cookery books contain several recipes for fish and shellfish. Written records

⁵⁷ Leonel Pereira, 'Seaweed and the traditional medicine', *8th Edition of International Conference on Traditional Medicine, Ethnomedicine, and Natural Therapies* <<https://traditionalmedicineconference.com/program/scientific-program/2023/seaweed-and-the-traditional-medicine>> [Accessed 2 May 2025].

⁵⁸ Neil Prior, BBC, *Laverbread: seaweed-loving chef's bid to promote delicacy*, 14 April 2023, <<https://www.bbc.com/news/uk-wales-65200431>> [Accessed 28 March 2025].

⁵⁹ Hiroshi Yatsuya, Shoichiro Tsugane, 'What constitutes healthiness of Washoku or Japanese Diet?; Nutrition and Health (including climate and ecological aspects)' *European Journal of Clinical Nutrition* 75 (6) (2014) pp. 863-864 (p.863) <<https://research-ebsco-com.ezproxy.uwtsd.ac.uk/c/onvpsy/viewer/pdf/fcnvdwjuuff>> [Accessed 24 April 2025].

⁶⁰ Penelope Francks, 'Rice and the Path of Economic Development in Japan', in *Rice: Global Networks and New Histories* ed. By Francesca Bray, Peter A. Coclanis, Edda L. Fields-Black, and Dagmar Schafer (Cambridge: Cambridge University Press, 2015) pp. 318-334. P.318.

⁶¹ Carwyn Graves, *Welsh Food Stories*, (Cardiff: Calon Press, 2022) p.22.

⁶² The Pembrokeshire Beach Company, *Laverbread Sourdough* <<https://beachfood.co.uk/blogs/recipes/laverbread-sourdough>> [Accessed 20 April 2025].

support the view that shellfish were propagated in Japan in the 8th century⁶³. Scholars have suggested that “seafood eating culture” includes the wisdom and the knowledge that has been handed down from generation to generation⁶⁴. The Japanese believe that consuming seafoods and fish with seaweeds improves health. Graves points out that the Welsh were renowned for their partiality to cockles and mussels⁶⁵. On the northern coasts of Wales wild mussels are still farmed in the traditional way. However, traditional mussel farming cannot satisfy the market demand for mussels. In order to satisfy the 21st century market demand for mussels, ocean farms in both nations are employing a more sustainable method and farming mussels offshore on the Japanese longline system.

Cockles were a traditional accompaniment to laverbread in Welsh breakfasts. They were primarily gathered from their coastal beds by women, and sold in local markets and door to door. Cockles need high quality water to maintain a steady, healthy, sustainable population. In some Welsh coastal areas cockles started declining in the late 20th century due (it is thought) to pollution, possibly the discharge from sewage plants⁶⁶. Sewage discharge into the oceans and rivers is a current hot topic in British politics as it is harming biodiversity. Japan has a similar problem, as the Japanese government began discharging tainted water from ‘the wrecked Fukushima Daiichi nuclear power plant’⁶⁷ into the Pacific Ocean in 2023. Unfortunately, this had a negative effect on seafood and fish exports as it led to a ban by some Asian countries.

Seaweeds have been combined with vegetables to make nourishing meals in both Japan and Wales since humans learned to cook. Both countries have a rich tradition of growing heritage vegetables. Greg de St. Maurice suggests that ‘No place in Japan is associated with cultural heritage more than Kyoto’⁶⁸. The Japanese believe their heritage cuisine was born in Kyoto’s kitchens. After the Second World War, multinational food companies, incentivised by economic factors, started sacrificing the flavour of vegetables by standardising them. At the same time Japan started to import more foods from abroad. Unfortunately, these factors caused Kyoto’s traditional urban agriculture to decline, resulting in the loss of several traditional varieties of vegetables. The Japanese Prefecture responded by offering support and encouragement to city farmers through the introduction of branding schemes. This allowed Kyoto’s city farmers to rediscover and grow more traditional Kyoto varieties than had been cultivated before the Meiji era. Farmers growing Kyo Vegetables are restricted to heritage varieties but they are also encouraged

⁶³ Hisashi Kurokura, ‘The importance of seaweeds and shellfishes in Japan: Present status and history’, *Bull. Fish. Res. Agen.* (Supplement No 1), (2004) <https://www.fra.go.jp/home/kenkyushokai/book/bulletin/files/bull-b1_02.pdf> [Accessed 2 May 2025].

⁶⁴ Japan Seafood Export Promotion Association, *Japanese food culture, interwoven with the fishery* <https://japan-aquatic-products-export-council.jp/pdf/20190730p_eng.pdf> [Accessed 2 May 2025].

⁶⁵ Carwyn Graves, p. 70.

⁶⁶ Swansea University, *Cleaner Water Linked With Smaller Cockles That Die Younger, Research on Burry Inlet Reveals* 2022, <<https://www.swansea.ac.uk/press-office/news-events/news/2022/09/cleaner-water-linked-with-smaller-cockles-that-die-younger-research-on-burry-inlet-reveals.php>> [Accessed 2 May 2025].

⁶⁷ Justin McCurry and Helen Davidson, ‘China bans Japanese seafood after Fukushima wastewater release’, *The Guardian*, 24 April, 2023 <<https://www.theguardian.com/environment/2023/aug/24/japan-begins-releasing-fukushima-wastewater-into-pacific-ocean>> [Accessed 4 May 2025].

⁶⁸ Greg. De St. Maurice, ‘Edible Authenticities: Heirloom Vegetables and Culinary Heritage in Kyoto, Japan’ in *Edible Identities: Food as cultural Heritage*, ed. By Ronda L. Brulotte and Michael A. Di Giovine, (Burlington: Ashgate, 1988). Pp. 67 -76 (p.67).

to introduce new varieties that could extend the brand. The Prefecture also supports local seed banks to ensure that Kyoto vegetables retain authenticity⁶⁹.

Eating more vegetables to improve health and mitigate climate change is a common topic in the Welsh media. Vegetarianism and veganism are rising trends in the population. There is one vegetable that has always been regarded as synonymous with Wales, the leek! Traditionally worn on St. David's Day, immortalised by William Shakespeare and paired with potatoes in the traditional soup, cawl cennin, the leek is regarded as a symbol of Wales throughout the world. Carwyn Graves describes the leek as a vegetable 'that came to epitomise a country and its cuisine'⁷⁰. Wild Welsh leeks have been discovered growing near the sites of ancient field boundaries on Anglesey, suggesting that they were used in ancient Welsh kitchens⁷¹. As mentioned in an earlier paragraph Welsh leeks have been awarded GI status. These leeks differ from their English counterparts as they have a long dark green flag and a distinctive taste. However, like Kyoto vegetables they need quality seeds to ensure their authenticity. Wales has a different approach to saving and conserving their nation's vegetable seeds. Seed cooperatives have been set up by Welsh gardeners who wish to ensure that Welsh seeds retain their authenticity and have been sourced responsibly. A good case study would be The Wales Seed Bank as it collects open pollinated Welsh seeds that are uniquely suited to the Welsh soils and climate⁷².

On reflection, In a world faced with the challenges of a rising population⁷³ and the 'increased frequency of climate-induced natural disasters (floods, cyclones, mud slides, heat waves, droughts)'⁷⁴ safeguarding food heritage and ensuring it remains a sustainable resource is challenging for both nations. Georgios Alexopoulos, Suzanne Kapelari and Theano Moussouri suggest that 'food heritage seems to constitute an interesting interface between environmental and cultural sustainability'⁷⁵. Sturla Henriksen, Special Ocean Advisor to UN Global Compact, described seaweed as 'a solution to some of our most pressing climate issues'⁷⁶. This essay has attempted to show that Japan and Wales regard seaweed as a sustainable food resource that is revitalising their food heritages and their local economies. Citing a quotation from (Bell and Valentine⁷⁷), Alexopollus suggests that 'food is packed with 'social, cultural and symbolic

⁶⁹ Norie Tamara, *The Third Way of Seed Governance : The Potential of Seed Commoning in Japan*, Available at <https://link.springer.com/chapter/10.1007/978-3-030-89405-4_12> [Accessed 28 March 2025].

⁷⁰ Carwyn Graves, p.195.

⁷¹ Carwyn Graves, p. 200.

⁷² Wales Seed Hub, *About Us*, <<https://www.seedhub.wales/>> [Accessed 1 May 2025].

⁷³ United Nations, *Peace, dignity and equality on a healthy planet*, <<https://www.un.org/en/global-issues/population>> [Accessed 7 May 2025].

⁷⁴ Vimbainashe Prisca Dembedza, Prosper Chopera, Jacob Mapara, Lesley Macheka. 'Impact of climate change-induced natural disasters on intangible cultural heritage related to foods: a review', *Journal of Ethnic Foods*, 9 (2002), pp 1-12. (p.1).

⁷⁵ Georgios Alexopolous, Suzanne Kapelari and Theano Moussouri, 'Food heritage as a catalyst for environmental sustainability: reflections on the cultural value imbued by citizens to food and it's role in supporting scientific debate about food security', (p.6).

⁷⁶ The Seaweed Alliance, *Project Madoc: A seaweed industry in the making?* <https://projectmadoc.cymru/wp-content/uploads/2024/02/Part-Three-Project-Madoc_-Environmental-Impact-Assessment.docx.pdf>. [Accessed 7 May 2025].

⁷⁷ David Bell and Gill Valentine, *Consuming geographies: We are where we eat*, (London: Routledge, 1997).

meanings'⁷⁸ seaweed on its own, does not define either the Japanese or the Welsh cuisines, despite it possessing deep cultural meanings for both cuisines. When it is prepared, cooked and served with other traditional ingredients it has played and continues to play a central role in Japanese and Welsh food heritages. As Clare Sammels suggests 'one meal does not define a cuisine: cuisines are culinary structures that make meals make sense'⁷⁹. Nothing is new, food fashions come and go, intangible food heritage has its roots in the past but it is also concerned with ensuring heritage foods can be enjoyed and provide nutritional nourishment for future generations. Sushi is regarded as synonymous with Japan, just as Laverbread is with Wales.

⁷⁸ Georgios Alexopolous, Suzanne Kapelari and Theano Moussouri, 'Food heritage as a catalyst for environmental sustainability: reflections on the cultural value imbued by citizens to food and it's role in supporting scientific debate about food security', (p. 7).

⁷⁹ Clare A. Sammels, 'Haute Traditional Cuisines: How UNESCO's List of Intangible Heritage Links the Cosmopolitan to the Local', in *Edible Identities: Food as Cultural Heritage* ed. By Ronda L. Brulotte and Michael A. Di Giovine (Burlington: Ashgate, 2024) pp. 141-158. (p. 142).

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