



Abalone: New Zealand’s Shining Example of Aquaculture Excellence

Marine scientist Andrea Alfaro may be one of the few people who knows what it is like to be studied by sea life, rather than the other way around. Alfaro is one of only two official ‘aquanauts’ in New Zealand, having lived, slept and eaten underwater for six days.



Andrea Alfaro, Professor of Marine Ecology and Aquaculture at AUT (Auckland University of Technology)

Her time studying sponges in the Aquarius II research habitat – “like a bus about 20m underwater off the Florida Keys” – officially cemented her love for the sea.

“You wake up and you’re looking out the porthole at the fish and you feel like you are in an aquarium – but they are on the outside looking in at you. Those animals are at home, and I am not. It is potentially a dangerous place but a place you are privileged to be in.”

Respect for the sea

As well as discovering the novelties of being under pressure for prolonged periods (“You can’t whistle, and you lose your sense of taste. And you get really giggly because of the high nitrogen in your body”) the experience gave her great respect for the sea and the seafood that comes out of it.

Alfaro’s interest in the ocean started in her native Chile before her family moved to the United States, where she later studied at the Virginia Institute of Marine Sciences. Then her partner, a geologist, got a job at the University of Auckland. “We came for three years about 20 years ago, and now have a Kiwi daughter who is 13,” she says. “We like living here. And there

are amazing underwater habitats here worth protecting and investigating.”

Alfaro had studied mussels in the US, and a new PhD and large body of research on New Zealand’s green-lipped mussels soon earned her the nickname the ‘Mussel Lady’. “It stuck,” she laughs.

An innovative approach

Now more formally known as Professor of Marine Ecology and Aquaculture at AUT (Auckland University of Technology), her role leading the Aquaculture Biotechnology Research Group has her overseeing research

across a range of shellfish and fin fish, from salmon to the lesser-known geoduck. “In New Zealand what you have is very much applied science. It’s an area I love. In terms of aquaculture biotech we’re very innovative. While we’re small by world standards, a lot of the work we do is truly groundbreaking.”

One shining example is the research being undertaken on New Zealand’s unique abalone, or pāua, with its distinctive iridescent blue shell.

“Pāua is a growing industry in New Zealand. We have the mandate of reaching \$1bn return from aquaculture by 2025, and this is one of the species that could significantly increase in market share and value.”

A showcase symposium

Key to making that happen will be hosting the 11th International Abalone Symposium in Auckland in 2021, following

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a successful bid led by Alfaro and her colleague Ali Seyfoddin. Expected to attract around 250 of the world’s pre-eminent abalone researchers, farms and fisheries, it will be the first time the event is held in New Zealand and only the second time in the Southern Hemisphere.

Alfaro is now working with Tourism New Zealand’s Business Events team to further market the event to international delegates.

“It’s really exciting, it’s going to showcase New Zealand and something that is very iconic. Our endemic species, Haliotis iris, is really sought after in China. At weddings and banquets in China you tend to have abalone from New Zealand as a status symbol. I imagine this event will be quite heavily attended by the Chinese as abalone is an important species for them in terms of production and consumption.

“We have a big shell export market as well. In places like South Korea where they do a lot of inlay, most of the things you see with that blue colour is New Zealand pāua shell.

“So it’s a huge opportunity for New Zealand. Attendees will be looking to create markets, make connections, initiate research collaborations, and learn from us.”

New Zealand’s reputation as a premium producer of abalone and an innovator in the industry was a major factor in winning the symposium, Alfaro notes.

Clean, green – and high-tech

“New Zealand is not a mass-produced, high-volume industry. Our focus has been on quality, health, plus that New Zealand clean and green sustainable reputation, so we are way ahead of other products in the world.

“In global abalone production there has been a series of health threats, including pathogens that have decimated the Chinese and Australian markets, and even wild populations. We haven’t had any of that. We are ahead of the game in terms of immunology research, we’re high-tech in terms of protection and creating a buffer for our industry.

“We have developed probiotics for our species that increase their growth by 20%. When you are talking about a species that takes four to six years to get to cocktail size, that’s essentially a year of growth that you can save. We’ve also developed an encapsulated feed – a coating that increases the palatability of the probiotic and is stable in sea water. It doesn’t disintegrate until it gets to the gut of the animal, and you get 100% consumption and zero waste from the food. If you don’t have waste you don’t get bacterial growth. We are now looking for funding to take that to commercial level.”

The Disneyland of pāua

Moana New Zealand’s Blue Abalone operation in Bream Bay, Northland, will be one of the sites hosting field trips around the symposium. “It is the Disneyland of pāua, it is an amazing facility,” Alfaro says. “You have three storeys high of tanks laden with trays of abalone.” Other trips will likely include fishery sites in Kaikoura and a new pāua farm Ocean Beach in Bluff.

Alfaro remains wowed by New Zealand’s fantastic waters, and hopes visitors might also explore their magic. “The Bay of Islands is magnificent, as is Ahipara, the wild kelp forests in the South Island... basically all of New Zealand underwater-

wise has unique flora and fauna. You go underwater and you get that sense that you are in another world.”

Alfaro is now keen to add more New Zealand flavour to the conference programme, including a cook-off between top chefs cooking the country’s beautiful seafood, and an experience involving traditional Māori carving of pāua shell.

“New Zealand is already a place most people want to visit, so adding those other elements that are special to us will attract even more people.”

Intellectual Capitals, September 25, 2019

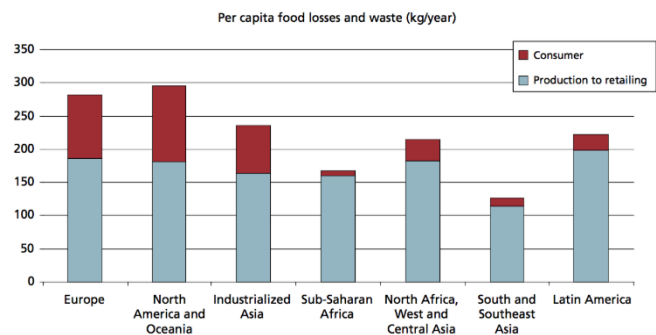
South Korea Once Recycled 2% of Its Food Waste. Now It Recycles 95%.

*By Douglas Broom,
Contributor at The World Economic Forum*



A man walks past separated dustbin for the recycling of waste materials at a rest stop of an expressway in southern Seoul. Photo: Jung Yeon-Je/AFP/Getty Images

The world wastes more than 1.3 billion tons of food each year. The planet’s 1 billion hungry people could be fed on less than a quarter of the food wasted in the U.S. and Europe.



Food and Agriculture Organization of the United Nations

In a recent report, the World Economic Forum identified cutting food waste by up to 20 million tons as one of 12 measures that could help transform global food systems by 2030. And South Korea stands out — taking the lead by recycling 95% of its food waste.

But it wasn’t always this way.

The mouth-watering array of side dishes that accompany a traditional South Korean meal — called “banchan” — are often

left unfinished, contributing to one of the world's highest rates of food waste. South Koreans each generate more than 130 kg of food waste each year. By comparison, per capita food waste in Europe and North America is 95 to 115 kg a year, according to the Food and Agricultural Organization of the United Nations.

But the South Korean government has taken radical action to ensure that the mountain of wasted food was recycled.

What Changed?

As far back as 2005, dumping food in landfills was banned, and in 2013 the government introduced compulsory food waste recycling using special biodegradable bags. An average four-person family pays \$6 a month for the bags, a fee that helps encourage home composting. The bag charges also meet 60% of the cost of running the scheme, which has increased the amount of food waste recycled from 2% in 1995 to 95% today. The government has approved the use of recycled food waste as fertilizer, although some becomes animal feed.

Technology has also played a leading part in the success of the scheme. In the country's capital, Seoul, 6,000 automated bins equipped with scales and radio frequency identification weigh food waste as it is deposited and charge residents using an ID card. The pay-as-you-recycle machines have reduced food waste in the city by 47,000 tons in six years, according to city officials.

Residents are urged to reduce the weight of the waste they deposit by removing moisture first. Not only does this cut the charges they pay — food waste is around 80% moisture — but it also saved the city \$8.4 million in collection charges over the same period.

Waste collected using the biodegradable bag scheme is squeezed at the processing plant to remove moisture, which is used to create biogas and bio oil. Dry waste is turned into fertilizer that is, in turn, helping to drive the country's burgeoning urban farm movement.

Urban Farms

The number of urban farms or community gardens in Seoul has increased sixfold in the past seven years. They now total 170 hectares — roughly the size of 240 football fields. Most are sandwiched between apartment blocks or on top of schools and municipal buildings. One is even located in the basement of an apartment block. It is used to grow mushrooms.

The city government provides between 80% and 100% of the start-up costs. As well as providing food, proponents of the scheme say urban farms bring people together as a community in areas where residents are often isolated from one another. The city authorities are planning to install food waste composters to support urban farms.

Which brings us back to banchan. In the long term, some people argue South Koreans will need to change their eating habits if they are really going to make a dent in their food waste.

Kim Mi-hwa, chair of the Korea Zero Waste Movement Network, told Huffington Post: "There's a limit to how much food waste fertilizer can actually be used. This means there has to be a change in our dining habits, such as shifting to a one-plate culinary culture like other countries, or at least reducing the amount of banchan that we lay out."

This piece previously appeared on the World Economic Forum.

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About the Author



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Douglas Broom is a contributor to the World Economic Forum's Agenda blog and a senior writer at Formative Content.

Agricultural 'Ambassadors' set to Head Off to Thailand, India

By Emerson Lim



Thirty agricultural students and people involved in the business will soon head to Thailand and India as "Young Agricultural Ambassadors" to help Taiwan build closer ties with those countries.

The 30 ambassadors, chosen

from 117 candidates, recently completed a three-day training program and were given a send-off ceremony at the Ministry of Foreign Affairs (MOFA) on August 2, 2019 before departing for Thailand and India in mid-August in separate groups.

The MOFA, which co-sponsors the program with the Council of Agriculture (COA), would not give their exact dates of departure.

It said participants will tour agricultural establishments and farms and visit academic institutions, industry players and agricultural officials during their trips, but further details of their activities were not available.

The participants have different motivations for taking part in the agricultural ambassador program.

Chang Wei-jan, a member of the group heading to India and an Air Force pilot who got involved in the agricultural business after retiring, told Central News Agency (CNA) he is looking for new partnerships with India and hoping to build substantive exchanges between the two sides in the field.

Lin Ni-jung, a university student who is headed to Thailand said she was hoping to build mutual understanding between Taiwan and Thailand at a time when Taiwan is promoting an Agriculture 4.0 initiative while Thailand is pushing its

Royal Projects.

The delegation also hopes to touch on the issues of climate change and eco-friendly farming, Lin said.

The Young Agricultural Ambassadors program, open to people aged 18-40, was launched in 2017 in line with the New Southbound Policy initiated by the Tsai Ing-wen administration to strengthen ties with Southeast and South Asia and reduce Taiwan's economic dependence on China.

Deputy Foreign Minister Hsu

Szu-chien, COA deputy chief Chen Junne-jih and the deputy executive director of the Thailand Trade and Economic Office in Taipei, Phubadi La-or-ngern, attended the send-off ceremony on August 2, 2019.

Hsu encouraged the "ambassadors" to learn from the countries they are visiting to spur innovation and opportunities.

This is the third year of the Young Agricultural Ambassadors program. In the previous two years, four groups of 15 young Taiwanese (two groups per year)

visited Indonesia, the Philippines, Vietnam, and Malaysia.

Chen cited the accomplishments of the first two batches of Young Agricultural Ambassadors.

Five of the first group have since been named among Taiwan's "Top 100 Young Farmers," and many members of the second group signed cooperation agreements in Vietnam or forged alliances among themselves that successfully expanded their businesses, he said.

Central News Agency (CNA)

A Systems Approach to Global Agriculture Could Solve Food Insecurity

By Michael Ferrari, Managing Partner at Atlas Research Innovations

When we look across the spectrum of challenges facing humanity, as well as at some of the largest potential commercial opportunities, we need not look any further than the dining table. Meeting the nutritional needs of a growing population that is on pace to reach 10 billion by 2050 will not be easy.

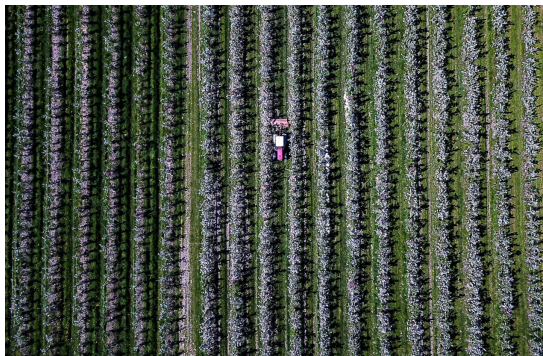
Nutrition Security, Not Food Security

Fragility of supply chains, emerging diseases, weather disruptions, contagion risk, lack of water — these are only a handful of the many challenges facing the global agricultural value chain and food security.

To address these issues, the dialogue around food security in the 21st century will need to embrace a systems approach to agriculture that incorporates individual agents, as well as all the interactions within the system toward a holistic concept of nutrition security, not food security.

Over the last two decades, I've worked closely with just about every sector across the agricultural value chain: suppliers, producers, traders, consumer goods corps, co-ops, distributors, breeders, chemical manufacturers and many others. It is hard to think of another sector that reaches across as many subsectors as the food and beverage complex.

Large-scale centralized agriculture, which leads to regional monoculture, simply does not work over time. As my former Mars colleague Howard Shapiro has shown over the years, many of the calories that feed the world today are simply empty: calories with no nutritional benefit. Diminishing crop biodiversity accelerates agricultural disease, depletion of soil nutrients and productivity capacity, stress on water tables (particularly where deep-rooted varieties are dominant) and systemic crop risk, as well as the inhibition of food choices.



A tractor drives through an apple orchard. There are many challenges facing the global agricultural value chain in terms of achieving nutrition security.

Photo: Axel Heimken / AFP/ Getty Images

Decentralization Is Essential

A more decentralized approach toward the agriculture value chain will help ensure that the supply meets growing demand requirements, while encouraging equitable participation among suppliers, regardless of geography.

A systems approach will not only promote agricultural biodiversity and market participation, but will also enhance nutritional — and quite possibly societal — security. The global agriculture industry needs to adopt a decentralized approach built upon a systems foundation to evolve and meet

societal needs in the coming decades.

Technology Only Gets You So Far

In recent years, the food industry has seen a rise in technology companies that look to the laboratory for new ways to feed the planet while minimizing environmental impact.

To take one example, synthetic biology has made great progress in R&D, potentially bringing to market commercially viable substitute protein products that satisfy the demands of the carnivore, without the ethical, environmental and economic issues commonly associated with traditional livestock production.

Another example with a potential upside can be seen in the burgeoning indoor or controlled-environment agriculture sector. Here we have also seen a rise in supply-side activity, both in the traditional startup community, as well as in the corporate venture space.

These and the many other "alternative agriculture" tools and technologies are certainly welcome pieces to the puzzle and will have a growing place in the portfolio of tools needed to address the industry's decentralization.

However, at least in the short term, in aggregate, the suite

of new market entrants still occupies a niche with respect to the global industrial agriculture stage.

One Way Out: Physical Resource Theory

As a result of the complex nature of global food, the application of Physical Resource Theory (PRT) as a means to assess what can be grown, at what rates, under what environmental conditions and, above all, with commercially and socioeconomically equitable outcomes is an appropriate platform on which to build a tangible transition to Food 2.0.

PRT takes the engineer's "first principles" approach to food, assessing the conversion of biological and physical resources into products.

Taking this one step further, PRT extends the analysis and understanding of the role of food products into the broader economic setting: the global food and beverage commercial value chain. The focus on the system of interactions, as opposed to solely emphasizing maximizing output from the individual components, leads to a more robust and adaptable system when disruptions arise.

The biophysics and economics of resource production cannot be divorced from one another. A complex systems/PRT framework more effectively weaves together considerations related to crop potential and market potential and will lead to more robust planning and sustainable solutions.

The Analogy of a Cell

When we analyze global agriculture, we can do so in the same manner that the biologist examines the behavior of the cell. In a cell, there is a collection of processes dealing with energetics, transfer, competition and cooperation, each agent performing a function that spills over and affects its neighbor.

Somehow all of this machinery comes together to result in a functioning cell embedded within a larger operating system. So by definition, the cell as a whole is more than the sum of its parts, and the emergent behaviors that have evolved allow the larger-scale systems to perform efficiently.

Taking the industrial biological metaphor from micro to macro, the same concepts can be constructed into a model that can guide the evolution of systematic benefits to global agriculture.

Competition is, of course, encouraged, but this can and should be balanced with cooperation incentives as a means to "open-source" benefits to the larger system. We have seen this approach work in software, genomics, computational and data sciences, and it is starting to take hold in energy and transportation. Agriculture should be next.

Diversity Builds Strength

Driven by economics, the waste from one industry becomes the feedstock for another. Diversity leads to not only system strength, but also system resilience. This interplay among agents actually becomes an indirect form of systemic risk management in the face of disruptions where the catalyst could be climate, disease, geopolitics, sanctions or any number of other external forces.

To be clear, all of this already occurs to some degree, but a more comprehensive and concentrated effort among market agents is needed for systemic PRT to scale.

So here are the takeaways going forward.

From the buyer's perspective, decentralizing supply-side origins help to spread the risk and minimize raw material constraints in the event of disruption due to external forces, including climate, exchange rates and tariffs.

Given that threats to future supply continuity will increase due to weather changes, origin expansion will lead to a more resilient and flexible supply chain to meet growing demand.

Finally, viewing market expectations through a systems lens will allow for a better understanding of how the many facets of the global agricultural economy spill into other sectors. Any risk management approaches need to take account of these interdependencies, regardless of operating sector.

The favorable transition from physical/biophysical/economic theory to practice will result in a higher quality of life for consumers (nutrition security), sustainable business models for market agents (commercial security) and biosystem resilience and productivity (natural security).

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Michael Ferrari is the managing partner at Atlas Research Innovations, providing clients with basic and applied bespoke research services towards a variety of scientific,

technical and economic domains.

What's Behind the Food Self-Sufficiency 'Crisis'?

By Kazuhito Yamashita

The agriculture ministry has announced that Japan's calorie-based food sufficiency rate in fiscal 2018 has fallen to a record low 37 percent. The rate is calculated by dividing domestic food production by the amount of food consumed, including imports.

Given today's style of food consumption, characterized by the habit of eating to satiation while wasting massive volumes of leftover food, it is only natural that the rate is low since the denominator is large.

If the modest style of food consumption that was prevalent 40 years ago was used as a premise, the rate would rise greatly even with today's level of output. Depending on the size of the denominator, the rate goes either up or down.

Some people point out that the food self-sufficiency rate would rise to more than 60 percent if it was calculated on the basis of the monetary value of food instead of the calorie basis, because that would give greater weight to low-calorie products such as vegetables and fruit. But as long as consumption is used as the denominator, the same problem would arise.

Since 2000, the government has sought to raise the nation's food self-sufficiency rate as a policy goal, setting the

target rate originally at 45 percent, then 50 percent in 2010 under the Democratic Party of Japan-led administration and then setting it back to 45 percent in 2015.

The rate, however, keeps falling instead of rising. Under normal circumstances, the ministry or the agency and its senior officials in charge would have to take responsibility if a policy target approved by the Cabinet was not achieved after so much time was spent on it.

But the Agriculture, Forestry and Fisheries Ministry does not seem ready to take the blame or be even ashamed of its failure to achieve the target. On the contrary, the ministry would be in trouble if the food self-sufficiency rate went up because that would weaken the grounds for taking measures to protect domestic agriculture.

People would feel uneasy if they are told that the nation depends on imports to supply more than 60 percent of the food it consumes, and would support measures to shore up the prices of farm products and increase subsidies to boost agriculture output. The concept of food self-sufficiency is the agriculture ministry's most successful propaganda to increase protection for domestic farming.

What would happen to Japan's food self-sufficiency rate if a military conflict took place in areas surrounding the nation, disrupting sea lanes and blocking imports, causing a food crisis and leaving people to die of hunger? Because imports have been stopped, domestic food production would equal consumption, thus pushing up the self-sufficiency to 100 percent.

Indeed, if the concept of food self-sufficiency rate is meaningful, have Japan's agricultural policymakers taken any action to improve the rate? No. They have done exactly the opposite.

The policy of reducing rice production acreage was intended to raise prices by cutting the output of rice to 7.5 million tons, even though the nation has the capacity to produce up to about 12 million tons. Without the policy, the output of rice would increase and raise the food self-sufficiency rate. If the domestically grown rice was exported, the self-sufficiency rate would top 100 percent because the output would exceed domestic consumption.

Japanese consumers have been forced to shoulder the burden of higher food prices resulting from agricultural protection.

Maintaining high domestic prices requires high import tariffs. If farmers were protected in the form of direct payments from the government's coffers, as is done in the United States and the European Union, their income would not be affected even if food prices decreased. However, JA agricultural cooperatives would be in trouble because the fall in farm product prices would reduce their sales commission revenue. In short, Japan's agricultural policymakers have pushed for maintaining the high prices of farm products for the sake of JA agricultural cooperatives, thus lowering the nation's food self-sufficiency rate.

Food security is an issue concerning how high an output of edible farm products is needed at minimum to ensure people's subsistence when the nation is unable to buy food from overseas.



A farmer walks through a rice field in Shirakawago, Gifu Prefecture. The government has limited rice production to 7.5 million tons even though the nation can produce about 12 million tons. | GETTY IMAGES

When food cannot be imported from abroad, there can be no consumption of beef, pork or cheese to the point of satiation.

What is most needed to supply food to people when imports are suspended are agricultural resources such as land. Right after World War II, warehouses of the Agriculture and Forestry Ministry had enough food stockpiled to keep the residents of Tokyo fed for just three days. In addition, the rice harvest in 1945 was very poor.

People coped with hunger by turning elementary school playgrounds into fields to grow sweet potatoes. To prepare for a food crisis today, plans to increase production by

converting golf courses and athletic fields into farmlands would need to be put in place. However, the government has never even considered such a plan.

Similar problems are emerging in the rest of the world. It is argued that global food output must increase by 60 percent by 2050 because it's estimated that the population will rise by 2.2 billion — from 7.4 billion today to 9.6 billion. Such arguments are made by the United Nations Food and Agriculture Organization and industrial sectors that supply agricultural materials such as fertilizers and agrochemicals.

However, the world's population expanded much greater — by 3 billion — over the past 35 years. The global output of rice and wheat has increased by 3.4 times since 1961 — a pace that exceeds the 2.4 times increase in the world's population.

If a steady and gradual population increase will cause a food crisis by 2050, then world food prices are sure to increase year by year. However, grain prices have steadily declined in real terms over the past 150 years. In the two decades from 1985 to 2005, prices were at roughly half the level of 1960.

A 60 percent increase in food output by 2050 would need only a 1.4 percent increase annually. Assuming that food production will continue to increase at the average annual rate of growth between 2000 and 2016, the output of rice is projected to expand 59 percent, wheat 79 percent, soybeans 404 percent and corn 262 percent, by 2050.

The U.S. Agriculture Department has changed its stance and now says that thanks to economic development, supply increases and real-term decline in food prices, the proportion of the world population facing food insecurity will decline from 21.1 percent in 2018 to 10.4 percent in 2028.

Food is indispensable for sustaining people's lives and health. By fanning a sense of insecurity over food supply, people and organizations involved in agriculture have tried to expand the protection of resources for farming. When they talk about food insecurity or a food crisis, we need to make a cool-headed judgment.

Kazuhiro Yamashita is research director of Canon Institute for Global Studies and a senior fellow of the Research Institute of Economy, Trade and Industry.

Japan Times

Plant-based Cuisine: Modernizing Japan's Vegetarian Traditions

By Momoko Nakamura



Mountain-to-table: Rice, pickles and tempura wild plants form the foundation of this plant-based meal from Ehime Prefecture. | MOMOKO NAKAMURA



The communal power of food: Strangers share a plant-based meal at a farm outside of Tokyo. | MOMOKO NAKAMURA



'I will have this meal': A pair of chopsticks sit horizontally in front of brown rice onigiri (rice balls) and a homemade pickled plum with miso. | MOMOKO NAKAMURA

“Vegan,” “vegetarian,” “organic” and “superfood” are just a few of the key phrases used to smithereens in recent years.

These yokomoji (Western words) are also a popular marketing tool in Japan, an effective way to associate brands with health and wellness and, to a lesser extent, environmental and ethical responsibility.

From the trendiness of these words alone, one may assume that such products and services will be gone tomorrow, together with the feverish demand for tapioca milk tea drinks. But what if these words are a modern-day variation on, or a natural evolution of, the Japanese table? Vegan, vegetarian, organic and superfood concepts, are, in fact, rooted in how Japanese people have approached eating for centuries.

From fermented products to shōjin ryōri (traditional vegetarian Buddhist cuisine), Japan has a unique food history. “Plant-based” cooking — a vegetable-centric everyday lifestyle, focused on what we eat, how it is prepared and understanding where ingredients are sourced — may be a more appropriate phrase. Plant-based eating is a health and wellness decision, as well as a pivot toward environmental and ethical responsibility, but one that emphasizes an important part of Japanese food culture.

The Japanese table has been historically very much plant-based. When Japanese people evolved from nomadic hunters and gatherers to settled farmers, a food culture centered around wild and farmed plants developed. The microseasonal calendar was introduced to Japan some 2,000 years ago and, over time, it was meticulously edited to reflect Japan's unique climate and culture.

The traditional Japanese microseasonal calendar breaks down the four standard seasons of spring, summer, autumn and winter into 24 subseasons (nijūshi sekki), which break down further into 72 microseasons (shichijūni kō). Each microseason's poetic title tells a tale of how each slowly but surely evolves into the next — “Peach Blossoms Smile” and “Frogs Begin to Sing” are just two of these 72 microseasons. Plant-based farmers who till their land without the use of pesticides, herbicides or fertilizers listen for markers of the microseasonal calendar and make small adjustments based on the unique qualities of the year.

Japanese eaters often yearn for ingredients that are in season, and often only available for a short period of time.

In Japanese, there is more than just the word shun (seasonal). There's also nagori, which refers to ingredients that have passed their prime but are still available, offering flavor profiles and textures reminiscent of the previous season, and hashiri, which are ingredients not yet at their prime but offer exciting previews of what's ahead.

When Buddhism was introduced to Japan from China around the sixth century, so was the concept of shōjin ryōri, which evolved around Japan's terroir and continued to be refined through the Kamakura Period (1185-1333). Shōjin ryōri is a simple vegan menu based on the concept of ichijū sansai (one soup and three sides — often vegetables, sea vegetables, mushrooms, nuts, seeds or beans). This approach also takes into consideration five colors (white, green, yellow, black, red); five flavors (sweet, salty, bitter, acidic, spicy); and five cooking methods (raw, steamed, grilled, deep-fried, braised). Qualities from these various fives are selected to effectively complement the microseason.

During this time, rice was known as the shushoku (main dish), and it's said that during the Edo Period (1603-1868) the average person ate four to five gō of rice per day — about 1,650 grams of cooked rice, or 12 bowls today. The Japanese table today often consists of rice as well as a separate “main” of fish or meat, relegating the grain to simply the carbohydrate category.

While the average Japanese table of today is by no means shōjin ryōri, the what, how and why behind Japanese cookery stems very much from its teachings. In Japan, chopsticks are placed horizontally on the table, between the diner and the meal. Once itadakimasu (“I will have this meal”) is said, picking up chopsticks serves as a visual reminder that we are crossing the line between humankind and Mother Earth's generous bounty before us.

There are other signs that interest in plant-based eating is on the rise in Japan. In 2013, washoku was inscribed on UNESCO's Intangible Cultural Heritage list. In 2019, NHK dubbed Gunma Prefecture the “Vegetable Kingdom,” highlighting Gunma's abundant produce and vegan-friendly restaurants. And the nationwide Vegan Gourmet Festival is already in its ninth year.

As inbound tourism rises in Japan — with over 30 million foreign visitors in 2018, a number that's expected to rise

to 40 million by 2020 with the upcoming Olympics — there is no better time to celebrate the origins of the Japanese table, all the while showcasing dishes and restaurants that accommodate varying food restrictions and eating traditions.

But what's even nicer is to be able to remind our visitors, as well as ourselves, traditional Japanese cuisine is, in fact, plant-based.

Momoko Nakamura, aka Rice Girl, is on

a mission to promote and conserve rice culture and traditional Japanese natural farming. Her book, "Plant-based Tokyo," is currently available in bookstores nationwide, as well as online.

Japan Times

Japan Food Producers Eye Disaster Preparation Market

By JIJI



The characters for "water" and "food" are written on muddy ground in Marumori, Miyagi Prefecture, after a nearby river overflowed during Typhoon Hagibis. | KYODO

In a country where natural disasters such as earthquakes and typhoons are commonplace, food producers are increasingly calling on consumers to keep an emergency stockpile containing products that they regularly eat.

These companies are promoting the idea that each household should keep a rolling stockpile as a way of constantly updating disaster food supplies, in which old food stock is regularly replaced with new items while consuming the older food before its best-before dates.

Keeping a rolling stockpile is said to increase people's awareness of disaster prevention and also has a stress-reducing effect that comes from a sense of security for being well prepared.

The agriculture ministry recommends the rolling stockpile method to prepare for natural disasters and suggests keeping a stockpile of at least three days' worth of food and water. Food producers are eager to offer products that can become part of customers' rolling stockpile. By having customers regularly purchase their products, these companies hope to build a long-term relationship with them.

Nissin Food Products Co. sells a stock set for disasters through its website at ¥14,300. The set includes the company's mainstay Cup Noodle products as well as a portable gas stove, a gas cartridge, a cooking pot and water.

With an additional three-month subscription fee of ¥2,160, nine replacement Cup Noodle and other instant noodle and rice products of the customer's choice will be delivered every three months.

"We want to deliver our customers a feeling of security that they can eat the same familiar instant noodles even at times of disaster," said Nissin Food President Noritaka Ando.

Asahi Group Foods Ltd. sells a set of nine freeze-dried rice porridge, risotto and other meals that can be stored at room temperature and be consumed by pouring hot water on them, together with an evacuation manual, for ¥5,000 online.

Demand for the product tends to grow after a natural disaster has occurred, a company official said, adding that it is also popular as a gift.

TableMark Co. sells microwavable vacuum-packed rice products that can also be boiled at times of emergency.

Japan Times

Bangladesh Close to Releasing Golden Rice

Visiting Nobel Laureate Sir Richard John Roberts made the announcement at a regional seminar in Dhaka after he held an impromptu meeting with the ministers of agriculture and environment on October 27, 2019.

Bangladesh will take a decision on the release of the world's first Vitamin-A enriched rice variety by November 15, 2019.

Vitamin A enriched rice, popularly known as Golden Rice, has been in the regulatory approval process since November 2017 and the Ministry of Agriculture has long been pushing the Environment Ministry for its seal of approval.

Golden Rice is rich with beta carotene, also known as pro-vitamin A, a substance human bodies can convert to Vitamin A. Both Bangladesh and the Philippines have readied for release of the world's first Vitamin-A enriched rice varieties, heralding a new era in the fight against Vitamin A deficiency (VAD).

According to the World Health Organization's global VAD database, one in every five pre-school children in Bangladesh is vitamin A-deficient. Among pregnant women, 23.7% suffer from VAD.

The International Rice Research Institute (IRRI) says VAD is the main cause of preventable blindness in children, and globally, some 6.7 million children die every year and another 350,000 go blind because they are vitamin A deficient.

Once released, Golden Rice will be the culmination of a long-touted partial remedy for VAD.

Coming to Dhaka to deliver a keynote speech at a 'Regional Seminar on GMO Crops: Policy and Practices in South Asia' at North-South University on Sunday, the 1993 Medicine Nobel winner Sir Richard Roberts enquired about the Golden Rice release development with the organizers. That immediately prompted Agriculture Minister Dr Mohammad Abdur Razzaque, who was also present at the seminar, to call up his cabinet colleague Environment Minister Md Shahab Uddin and set up an impromptu

meeting.

Several hours later, as Sir Richard Roberts returned to the seminar venue after holding his meeting with the ministers, he spoke at the concluding session and informed that a final decision on Golden Rice will be taken by November 15, 2019.

“If Golden Rice is approved here (in Bangladesh) that will be a big message for the whole world, where 3,000 children die each day owing to VAD,” said the English biochemist and molecular biologist credited for developing the mechanism of gene splicing, an important source of protein diversity.

Current Status

Golden Rice is a transgenic variety, as a gene from maize has been infused into rice paddy for beta carotene expression. That is why a biosafety approval is a prerequisite for varietal release in Bangladesh. To complete the biosafety review process, Bangladesh Rice Research Institute (BRRI) lodged an application with the National Technical Committee on Crop Biotechnology (NTCCB) at the Ministry of Agriculture on November 26, 2017. It then forwarded the application to the National Committee on Biosafety (NCB) at the Ministry of Environment on December 4, 2017.

Rice does not contain beta carotene. Therefore, dependence on rice as the predominant food source generally leads to Vitamin A deficiency, most severely affecting small children and pregnant women.

Consumption of only 150 grams of Golden Rice a day is expected to supply half of the recommended daily intake (RDA) of Vitamin A for an adult. People in Bangladesh depend on rice for 70% of their daily calorie intake.

Policy Colloquium



Golden rice IRRI

Speaking as a panellist at the Policy Colloquium session at the seminar organized by the South Asian Institute of Policy and Governance (SIPG) of North South University, Professor Dr Zeba Islam Seraj said there should be a specialized cell within the environment ministry to deal with the GMO (genetically modified organism) events. Otherwise, the issue of advancing the frontier science and release of future biotech products would suffer, feared Dr Zeba, who heads the Department of Biochemistry and

Molecular Biology at DU.

Anwar Faruque, an ex-agriculture secretary, emphasized on investing more in research and development of agrobiotechnology, while Lal Teer Seed Limited's Managing Director Mahbub Anam shared some of the private sector's experiences about research and development.

Another panellist and Executive Editor of Dhaka Tribune Reaz Ahmad said most of the anti-GMO campaigns are not founded on any scientific basis.

“These arguments are placed mostly out of ignorance,” Reaz Ahmad said, emphasizing the need for spreading science education among the masses.

Former director general of Bangladesh Rice Research Institute (BRRI) Dr Jibon Krishna Biswas, and Dr Krishna Prasad Pant, a Fellow of the South Asian Network for Development and Environmental Economics (SANDEE) also spoke as panellists at the colloquium, moderated by SIPG Director Prof Sk. Tawfique M Haque.

Earlier, research scientists, university faculties and experts presented presentations in the business session of the seminar with NSU Trustee Board Member M A Kashem and Vice-Chancellor Professor Atiqul Islam speaking as guests at the closing session.

Dhaka Tribune

Expanding Food Trade in Central Asia through Modernizing Sanitary and Phytosanitary Measures

By Lilia Burunciuc

Agriculture and livestock exports present huge opportunities for countries in Central Asia.

Kazakhstan, already one of the world's largest wheat exporters, selling over 9 million tons annually, has the potential to become a global beef and mutton exporting powerhouse. Uzbekistan also has a large crop production base and has steadily grown its agricultural exports since 2017. The Kyrgyz Republic and Tajikistan boast rapidly growing dairy and beef sectors, which increasingly target export markets within and outside Central Asia.

However, countries in the region face significant problems related to sanitary (animals) and phytosanitary (plants) standards, which currently do not meet the quality-control requirements of many countries.

Outdated legislation, poor laboratory capacity, and lack of coordination between border controls are among the reasons that create vulnerability to transboundary pests and diseases and constrain the potential of Central Asian nations to expand agricultural food trade..

Rising incomes and more demanding consumer preferences in target export markets are making product quality and safety a key determinant of export success. This is not just the case for OECD markets, but also for the markets in emerging Asian economies such as China, Vietnam, and Thailand. In these countries, the number of quality-conscious and increasingly wealthy middle-class consumers is growing every day.

In light of this, countries around the world are investing in infrastructure that assures better quality and safety of their

agricultural products. For example, investments made by Uruguay to improve its animal health led to more than tripling of its share of China's beef import, from 5 percent to 50 percent in just eight years.

Many other countries report similarly positive results after improving the sanitary and phytosanitary standards of their exports.

In Central Asia, improving the implementation of sanitary and phytosanitary standards can also hugely benefit food trade and support the region's export market expansion. Regional cooperation in this area can help unlock the countries' potential even more, enhancing efficiency and lowering costs.

Co-ordinating consumer protection standards

To grow their agricultural and meat exports, Central Asian countries need to establish world-class plant- and animal-product safety standards. By working together, countries could achieve significant results. At the World Bank, we see several areas for potential regional cooperation in agriculture and livestock.

Such cooperation could start with countries exchanging information about their plans for modernizing national plant- and animal-product safety standards and protocols, so that reforms could be synchronized. Making national standards more compatible with global practices —World Trade Organization standards, for example — would also help.

At the same time, we recognize that introducing new standards for products and processes, and increasing the focus of food oversight programs on quality and safety, will be costly and time-consuming. Cross-country coordination could help reduce this cost.

Preventing animal diseases

Animal diseases do not respect borders. They can spread quickly from one country to another, creating food safety and health emergencies, and causing staggering economic losses.

For example, the current African Swine Fever outbreak in China is expected to reduce the country's pig population by a third in 2019. The fever has also spread rapidly to Mongolia, Cambodia, Vietnam and Hong Kong, devastating their pork industries and destroying the livelihoods of many of these countries' poorest people.

Better national veterinary services and regional cooperation might have reduced the fallout from this outbreak.

The best way to keep local outbreaks of African Swine Fever, Avian Influenza, Foot and Mouth Disease and other diseases from mushrooming into devastating cross-border problems is coordinated regional investment in disease detection and eradication efforts.

Countries could also work together to strengthen their food safety laboratories. The goal is consistent testing and analysis based on best global practices in animal health and disease prevention.

Sharing commercial corridors and export logistics

Modern crop- and meat-product logistical facilities, rail hubs, and dedicated infrastructure at border crossings between



Central Asian nations could also help increase their exports to China. Co-investing in this infrastructure would save time and money. As would synchronizing procedures for moving commodities and products across Central Asian countries' regional borders and into China.

Central Asia's future as a supplier of agri-products and livestock will depend on how food producers and processors in the region respond to the increased quality and safety demands of consumers, and on how well countries coordinate with each other.

At the World Bank, we will continue to support the efforts of Central Asian countries to improve standards and expand agricultural food trade, with the overall goal of boosting economic growth and citizens' standards of living.

World Bank Blogs

About the Author



Lilia Burunciuc
World Bank Regional Director for Central Asia

Lilia Burunciuc is the Regional Director for Central Asia at the World Bank. Since joining the World Bank in 1996, she held a range of increasingly challenging positions: Manager in Operations Policy and Country Services; Country Manager for Macedonia; Country Program Coordinator for Southern Africa and Central Asia; Senior Country Officer for Ukraine and Belarus.

Prior to joining the Bank, Ms. Burunciuc was a Deputy Governor of the National Bank of Moldova (central bank). In that capacity she worked on the establishment of a regulatory framework for the foreign exchange market, reform of banking supervision and bank restructuring.

She has a master of public administration degree from George Washington University (USA) and a degree (master level) in Economics, Management and Planning from the Technical University of Moldova.

A 200-year-old Practice is Helping Bangladeshi Farmers Adapt to Climate Change

By Nasirra Ahsan

Sitting comfortably in an airplane, the various rivers crisscrossing the Barisal region in southern Bangladesh offer a beautiful sight to behold.

For locals, however, these rivers are both a blessing and a curse.

Barisal and its neighboring districts are highly prone to



Sheikh Abdul Hamid practices floating bed agriculture which has been present in the Barisal region of Bangladesh for 200 years.



Begum Monowara and her husband Sheikh Abdul Hamid, have set up thriving floating garden beds in Kamargram village, Bagherhat district in Bangladesh. The couple are seen as pioneers in this field and their produce is sought after by the local community.



In Tarabunia village, Pirojpur district, more and more farmers have turned to the “sarjan” method of farming to cultivate a variety of produce from vegetables to seasonal fruits. This is in response to the rapidly changing climate.

climate hazards, like extreme flooding and rising salinity in soil and water.

This causes waterlogging and disrupts traditional farming practices, hampering crop production.

Also, inadequate research about these climate-constrained areas, compounded by low usage of new technologies, has stalled agricultural productivity.

But farmers in several districts of Bangladesh have found ways to fight back against climate change.

To that end, the National Agriculture Technology Program (NATP 2), a World Bank-supported project, which aims to improve productivity and food security, has helped farmers adopt new farming practices more resilient to climate change.

Fifty-seven districts have implemented the project, targeting smallholder farmers, who make up 80 percent of the country’s rural population.

NATP 2 also introduced agricultural innovation funds for researchers, farmers, and rural agro-entrepreneurs to help integrate new technologies into farming for a more diversified agriculture and better access to markets.

This past September, we visited Bagerhat district to witness some of this innovative work.

We met farmers living in wetlands who are suffering from an almost yearlong water congestion caused by faulty drainage, which has severely restricted the amount of land they can farm.

To cope, farmers have adopted a 200-year-old agriculture practice which has given them hope not merely to survive but thrive in an area vulnerable to natural disasters and climate change threats.

One such practice called floating bed agriculture consists of building agriculture beds with water hyacinth and other plants. Sheikh Abdul Hamid has been farming most of his life and started investing in floating beds about five years ago.

Thanks to a loan and guidance from the Social Development Foundation, a not-for-profit organization set up by the government, and by Department of Agricultural Extension, he created several floating beds that now generate a handsome monthly income.

Sheikh Abdul Hamid now grows a variety of crops such as cucumber, gourds, tomatoes, eggplants, and many more. His success has encouraged his neighbors to invest in floating beds and produce a similar variety of produce.

Altogether, NATP 2 is working with over 1 million smallholders, of whom more than a third are women, and has established 30 commodity and marketing centers which have sold

6,137 tons of produce thus far.

Back to our site visit.

We hopped on an open trawler and navigated the Madhumati river – getting drenched in the rain – to reach Pakuria, a remote village of Nazirpur Upazilla.

Here, the vast expanse of floating beds was a treat for sore eyes.

We met Bipul Mondal, a carpenter by day and farmer by night. He is a proud owner of 24 floating beds and expects to get a bumper crop by the end of the harvest season in October.

“Without the guidance of the local team, I would have been unaware of the crops to grow on the floating beds and how to best construct them,” he said.

NATP 2 has made it a priority to train farmers and teach them skills during on-farm demonstrations. The project seeks to increase yields by 14 to 100 percent for a few commodities.

In Tarabunia village in Nazirpur Upazilla, we observed the “Sorjan” farming practice, which consists of raising the soil and creating deep trenches. The ‘raised beds’ lie at a level above the reach of tidal surges and are thus protected from any natural calamities. The trenches serve as pools to farm fish and ducks.

Suravi Boral, 30, has been using Sorjan to farm mangoes, litchi, malta, and plums. She and her husband, Monmoto Edbor, have been exclusively growing fruits on the Sorjans, which yield bumper crops and get a better price than Taman and boro crops in the markets.

Without training and new technology support, this would have been only a dream, they say.

However, as the project draws to a close, several challenges remain.

First, connectivity to markets remains a challenge for farmers located in remote regions as the quality of fresh produce deteriorates before reaching consumers.

Second, while access to financing through loans is easily available, poor farmers often shy away from them for fear of incurring debt.

Forty-seven percent of the country’s labor force engage in agriculture production, and climate change threatens not only the lives of small farmers but also poses a severe risk to the country’s food security.

Adopting innovative, sustainable, and inclusive agriculture practices will be critical to the development of Bangladesh.

World Bank Blogs



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Nasirra Ahsan is a Communications Consultant with the World Bank in Bangladesh. She did her master's in economics from Queen Mary, University of London and her bachelor's in business administration

from North South University, Dhaka. Nasirra has several years of experience in economic research and communications outreach. Previously, she provided support to the Public Financial Management unit and the South Asian Food and Nutrition Security Initiative for the World Bank.

Taiwan to Invest big in Agricultural Resilience

By Huang Tzu-ti

An annual budget of NT\$10 billion will be allocated to boost production and climate resilience

Taiwan announced on October 2, 2019 it would step up investment in promoting resilient agriculture, in order to mitigate the impact of climate change.

The government will set aside an annual budget of NT\$10 billion (US\$322 million) to implement policies that assist the agricultural industry adapt to extreme weather events. Efforts will also be made to conserve biodiversity, said Council of Agriculture (COA) Minister Chen Chi-chung, adding “before it’s too late.”

According to Chen, Taiwan is vulnerable to the effects of climate change, as the country could suffer from loss of land due to rising sea levels. The island nation has experienced increased



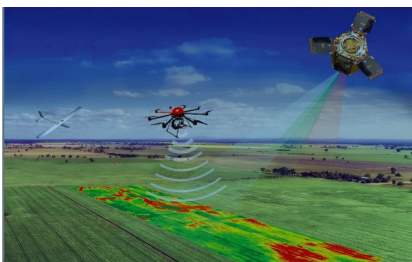
agricultural damage as a result of unusual weather, estimated at an accumulated NT\$13.5 billion over the past five years, reported Central News Agency (CAN).

Measures to be taken include enhancing crop cultivation technologies and utilization of organic fertilizer. The government will also incorporate technology to promote smart agriculture and bolster agricultural facilities, Chen pledged.

In addition, the objective of sustainable farming will be achieved through sound land use that takes into account climate variables. Other policies to be introduced include ramped up disaster prevention and crop insurance mechanisms, as well as the establishment of hazard warning systems for the agricultural sector, wrote the report.

Taiwan News

Turkey taps Space Tech to Boost Agriculture in Southeast



Drones and satellites are being used to capture images of agricultural areas for application of the project.

Turkey still has a long way to reach the stars but remains committed to improving local satellite and space technology. The space directorate of a state-run body found grounds for cooperation with a development organization in the country’s southeast to ensure agricultural development using space technologies. The “Precision Agriculture and Expansion of Sustainable Practices” project, run by the space department of the Scientific and Technological Research Council of Turkey (TÜBİTAK) and the

Southeastern Anatolia Project (GAP) Regional Development Directorate, is helping farmers increase efficiency. With more technological assistance, Turkey plans to save at least 25% in fertilizer use, the highest cost for farmers.

Turkey recently set up a space agency and concentrated efforts on research and development in space technologies. It has also successfully built communication satellites. Now it uses its experience in precision agriculture, which is also called satellite farming or site-specific crop management. Precision agriculture is an agricultural concept based on observing, measuring and responding to inter and intra-field variability in crops. The project primarily aims to make the right amount of agricultural input at the right time to reach the best efficiency levels, particularly in fertilizer use.

The GAP, one of the world’s largest and most comprehensive sustainable development projects, has so far boosted Turkey’s agricultural production and significantly contributed to exports. The \$32-billion GAP, launched in the 1980s, is one of the world’s largest and most comprehensive

sustainable development projects. It focuses on efficient irrigation methods and a water infrastructure development scheme, among many other things. It has seen a gradual increase in investments each year.

In the absence of development, the region's resources were underused or misused and for decades, regional growth was stunted. A campaign of violence by the terrorist group PKK and negligence on the part of authorities are blamed for lack of growth. The regional development project seeks to change the fate of the southeast by extending it a much-needed lifeline.

The Turkish government put the project on the list of its priorities in 2007 and launched a GAP Action Plan covering five years, from 2008 to 2012. The plan aimed to complete basic infrastructure work, particularly in irrigation, at least partially, and launch primary programs and sub-projects for economic and social development to accelerate overall regional development. In the first step of the TÜBİTAK-GAP cooperation, with the assistance of a top state-run defense company and Turkey's Göktürk 2 satellite as well as European Union and NASA satellites, images of the region were recorded. Defense Industry Directorate of the state also took aerial photos of Harran Plain at the heart of GAP with hyperspectral cameras. Simultaneously with aerial data collection, authorities collected data on the ground in different phases of

wheat, corn and cotton cultivation.

The project also brought forth the development of the first locally-made precision farming software. The software uses a 99% precision in detecting produce texture in satellite images and helped detection of anomalies, classification of crops, their health and development.

As part of the project, an interface was created for farmers to be delivered an analysis of crops and fields by agriculture counselors tasked with helping farmers. The software also helped the integration of soil studies and fertility maps. The next phase was fertilization practices and authorities aim to make at least 25% saving in fertilizer use. Now, an automated fertilization system with multiple variables is being used in the region after analysis of images from produce fertility maps and images taken by unmanned aerial vehicles (UAVs).

The project provides analysis and research on a wide variety of issues regarding better agriculture. Employing satellite and UAV images, it provides produce texture maps, variability in fertilizer use, crop forecast, detection of plants harmful to crops, etc. The project will also help research and development for precision farming tools to be used in other regions of the country and help food security with a more limited use of fertilizers.

Daily Sabah

What would a 'Climate Diet' look like in Australia?



Switching to more plant foods is considered paramount for planetary and human health. Photograph: Alamy



A diet incorporating low-food-chain animals such as mussels and other mollusks can be almost as environmentally beneficial as veganism. Photograph: Karen Robinson/The Observer



Desert quandong, an edible plant native to Australia. Photograph: Auscape/ UIG via Getty Images

Eating less meat and dairy, and more plants and native food, could significantly affect our carbon footprint – and health

Millions of people around the world are hitting the streets this year in support of students who are demanding an end to fossil fuels. But we can also strike with our forks: global food production contributes around a quarter of greenhouse gas emissions.

Australia was recently flagged as one of the countries with the greatest potential to reduce diet-related greenhouse gas emissions.

The Intergovernmental Panel on Climate Change (IPCC) declared that it is crucial for all sectors to rally against global heating, and targets to slow it down simply can't be achieved without addressing food production and land management.

Environmental degradation also goes hand-in-hand with the global pandemic of chronic diseases including obesity,

diabetes, cancer and heart disease. This double whammy includes other factors associated with industrial monocrops, such as pesticides and fertiliser.

So tweaking dietary habits is a win-win for people and the planet. But just what would a climate-friendly diet look like? Meat would feature less

Meat and dairy are two primary contenders, according to the IPCC – cattle production is a major source of methane emissions and deforestation. This is particularly relevant for Australians who relish their steaks and sausages – they are the world's second biggest meat eaters.

Given that more than one in 10 people – and rising – is vegetarian some of us are eating an awful lot of animal flesh. In fact, Australian meat consumption has grown from 93kg to nearly 95kg per person each year – that's equivalent to everyone eating a very large steak every day.

“The mass production of meat is the single biggest cause of land clearing around the world, if not directly for the animals themselves then indirectly for the monocultures such as corn or soy that feed them,” says economist Dr Gillian Hewitson from the University of Sydney.

Sustainability expert Dr Michalis Hadjidakou, from Deakin University, Melbourne, agrees that reducing meat is a good start, but acknowledges radical shifts to vegan or vegetarian diets are difficult for many. For those who struggle, he suggests cutting back on beef and lamb, meats with the biggest environmental footprint.

Other more sustainable options include kangaroo meat – which is harvested wild under strict quotas and is becoming increasingly popular. Wild rabbit is another eco-friendly option that is making its way back onto Australian menus.

Insects such as mealworms and crickets are also climate-friendly alternatives, for those who can stomach them. If not, other viable non-meat protein sources abound, including legumes, nuts, seeds (think quinoa, chia), wholegrains, eggs – and even nutty-flavoured hemp.

Vegetarians might need to rethink too

New research is making it harder to gloss over dairy’s impact, suggesting that swapping out bacon for haloumi is not much gentler on the planet.

The study models country-specific dietary changes that could alleviate our climate, water and health crises.

Overall, it confirms that bovine, sheep and goat meats have by far the highest environmental impact. But eating certain animal products once a day has a smaller footprint than lacto-ovo vegetarian diets that exclude meats but include dairy foods.

The small footprint of this “low-food-chain” diet, in which insects, forage fish and mollusks replaced a large chunk of terrestrial and aquatic animals, was second only to vegan diets.

Plants would feature more

In any event, switching to more plant foods is considered paramount for planetary and human health – especially as most Australians don’t eat enough of them.

Plant foods are staples of traditional diets, and the much-researched Mediterranean diet – rich in vegetables, fruit, legumes, nuts, seeds, wholegrains and extra virgin olive oil – delivers multiple health benefits with its kaleidoscope of nutrients and fibre. As a bonus, Australians can grow pretty much anything that thrives in Mediterranean regions – even in our own backyards – and research has shown this diet is both viable and easy for Australians to adopt.

A wider variety of plants would be eaten

Possibly some of the most sustainable – and nutritious – foods could be growing wild in our backyards or footpaths: edible weeds. Most cities even have guided foraging tours to help residents find them. Gardening expert Kate Wall, for instance, runs regular weed workshops in Brisbane that explore which weeds are edible and what can be done with them. “We have a forage and together we create a three-course meal with drinks, all based on weeds,” she says.

Over tens of thousands of years, the keen eyes of

Indigenous Australians have unearthed this large island’s abundance of nutritious, edible native plants that are adapted to our parched climate. From bush tomatoes and desert limes to Kakadu plums, quandong and ribberries, there are potentially thousands of species to be widely adopted.

Eating seasonal foods grown locally and avoiding imported foods can be another way to support the environment. There are, however, some contingencies depending on how it’s grown – for instance, indoor farms that rely on artificial sunlight may be hyper-local, but they’re not very energy efficient. Locally grown foods also tend to be fresher than transported and stored produce – and more nutritious, possibly making them even more important than eating organic, according to experts.

We’d eat less overall

Quality is more important than quantity, says Dr Mario Herrero Acosta, chief research scientist at CSIRO, and IPCC contributor.

Eating less will help maintain a healthy weight and put less pressure on Earth’s resources. The same goes for buying less: about a third of all food produced is never eaten, wasting precious land, water and energy used to produce it. If it were a country, the amount of greenhouse gases emitted by food waste would be just behind the US and China.

The simplest thing that Acosta thinks people could do right away, therefore, is to “eat and buy mindfully, meaning to eat less discretionary foods and ensure the minimum goes to waste”.

Junk food would be binned

Cutting back on junk foods and drinks – highly processed products teeming with sugar, salt and unhealthy fats – would make a big difference, says nutritionist Dr Rosemary Stanton. Tackling these “discretionary” items that are unnecessary for a healthy diet is not only critical for human but also planetary health. Hadjidakou calculated that producing junk food contributes to more than a third of Australia’s food-related environmental impact, in terms of their water and land use, energy consumption and greenhouse gas emissions.

This also applies to processed vegan foods, adds Stanton, so simply going vegan without considering other health and environmental factors is not a sustainable solution. And although tinned lentils and vegetables are healthier options and considerably more sustainable to grow, cooking them in their whole form would avoid the environmental resources needed to package them.

And home cooking would make a comeback

Australia has become a “takeaway nation”. While we love watching celebrity chefs cook, increasingly Australians shun our own stoves in favour ordering in or going out. In just 10 years, the money Australians spent on eating out doubled to a whopping \$3.5 billion.

Reviving home cooking in Australia would promote good health while lowering the destructive impacts of industrial food production and packaging.

This is not just for the privileged. While poorer people tend to eat more takeaway and processed food, research shows that a healthy, plant-based diet is not only affordable, but cheaper than the typical Australian diet.

About CACCI

The Confederation of Asia-Pacific Chambers of Commerce and Industry (CACCI) is a regional grouping of apex national chambers of commerce and industry, business associations and business enterprises in Asia and the Western Pacific.

It is a non-governmental organization serving as a forum for promoting the vital role of businessmen in the region, increasing regional business interaction, and enhancing regional economic growth. Since its establishment in 1996, CACCI has grown into a network of national chamber of commerce with a total now of 29 primary Members from 27 Asian countries and independent economies. It cuts across national boundaries to link businessmen and promote economic growth throughout the Asia-Pacific region. CACCI is a non-governmental organization (NGO) granted consultative status, Roster category, under the United Nations.

It is a member of the Conference on NGOs (CoNGO), an association of NGOs with UN consultative status.

Among the benefits of membership in CACCI are the following:

1. Policy Advocacy - CACCI aims to play a strong policy advocacy role in order to establish a business environment conducive to creating better opportunities for CACCI members.

2. Wide scope for networking - Participation in the various projects of CACCI will provide members the opportunity to expand their reach in Asia-Pacific by establishing contacts with the business communities of the region.

3. Participation in CACCI Annual Conferences and Training Programs - Members are invited to participate in the annual Conferences and various training programs which CACCI regularly conducts either on its own or in cooperation with other international organizations and member chambers.

4. Interaction in Products and Service Councils - Membership in CACCI allows participation in the activities of the various Product and Service Councils (PSCs) of the organization. PSCs are business groupings organized along product or service lines with a primary objective of promoting business cooperation, personal contacts, and technology transfer.

5. Access to CACCI publications - CACCI publishes the CACCI Profile, its monthly newsletter, and the CACCI Journal of Commerce and Industry, a bi-annual publication which features papers, speeches, and other articles pertaining to issues affecting the regional economy.

For more information, please visit www.cacci.biz



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