



Under-utilised Plants as Future Food – Transforming Food Systems to Enhance Food Security

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SYNOPSIS

Under-utilised plants have great potential to be the “future food” that transforms food systems to make them more resilient to climate change and supply chain disruptions. What would it take to mainstream them?

COMMENTARY

The recently published report of the [Eat-Lancet Commission](#) demonstrates ongoing [global efforts](#) to transform food systems. Such transformation has two goals: First, to move away from high-carbon, high-waste, climate-vulnerable and high-emission agriculture. Second, to ensure future agriculture is environmentally friendly, climate-resilient, secures farmer livelihoods, and meets consumer expectations. A key approach has been to change diets by providing alternatives.

To that end, a new strategy to utilise “Future Food” has emerged. This involves processing under-utilised plants into food, as well as mainstreaming [novel food](#) such as [cultured meat](#) (e.g., [chicken](#)), fermentation products, insects, algae, and processed plant-based protein.

In doing so, this is expected to enhance food resilience through increased diversity and to address long-term challenges such as sustainability, food security, climate change, and population growth. While the latter has gained much traction from investors and governments alike, it is the former that has potential for growth.

Under-utilised Plants as Future Food

Recent events in several countries show that under-utilised plants as future food may at last be emerging from the shadows before they go mainstream. While [novel](#)

[foods](#) have received much publicity in recent years, under-utilised species of plants and even un-utilised plants are seeing the light of day.

In Singapore, the [Singapore Food Festival](#), held on 14 September 2025, at Science Park, featured both cultured meat and an under-utilised grain called “adlai rice”. At Food Ingredients Asia, in Bangkok on 18 September 2025, a [special session](#) dedicated to food innovations showcased a variety of cultured novel proteins and under-utilised plants. These two commercial events were preceded by a Korean government-sponsored gathering, the Global Eco-Innovation Forum in Jeju, South Korea, 2-3 September 2025, which discussed food innovations in the context of saving the environment and promoting startup companies.

Several under-utilised crops that have recently been commercialised and made available to urban consumers are Duckweed (*Wolffia spp.*), Tiger nut (*Cyperus esculentus*) and Adlai rice (*Coix lacryma-jobi*). The beginnings of modern production and supply chains augur well for future mainstreaming into retail outlets. The search for more under-utilised crops of the future is being further led by many international agricultural research centres, such as the [Crops for the Future Research Centre](#) and the [World Vegetable Centre](#).

Under-utilised Plants in Southeast Asia

Southeast Asia is home to many under-utilised plants that show promise for futuristic food systems. These have good nutritional, ecological and cultural value, as well as being climate adaptive.

[Seaweeds](#), for example, have long been consumed in Sabah as salads, with the puree used to make fish sausages, noodles, and bakery products. In Indonesia, many coastal communities use [sea grape](#) species and other red seaweeds for food, seasonings and traditional medicine. Relatedly, sea grapes (*Caulerpa lentillifera*) are produced in Nha Trang, Vietnam, with key companies like [Tri Tin Company](#) pioneering the cultivation and processing of this valuable seaweed in the region, and exporting to markets such as Japan, the Philippines, and China.

Wild leafy greens are used by many local communities to supplement diets, but they have not been widely cultivated or commercialised. A case in point is the [Paku fern](#), which is popular in Sarawak, Malaysia, because of its unique nutritional properties. [Roots and tubers](#), such as yams, in rainfed regions of Southeast Asia are also the main source of carbohydrates for energy in areas where rice cannot be grown. Likewise, many legume species have been consumed for their protein value.

Many such plants are being rediscovered, but their cultivation requires scaling up and commercialisation. Plants such as Foxtail millet (*Setaria italica*), Drumstick / Moringa (*Moringa oleifera*), Winged bean (*Psophocarpus tetragonolobus*), Bambara nut (*Vigna subterranea*) and Rice bean (*Vigna umbellata*) have enormous potential as alternative sources of food. However, only a fraction of the plant biodiversity in Southeast Asian has been exploited.

Promoting Under-utilised Plants as Future Food in Southeast Asia

Under-utilised plants possess many of the attributes desirable for future food systems, in particular, their adaptation to local environments, climate resilience, nutrition quality, and ease of growing.

ASEAN can provide policy integration and regional coordination by encouraging the inclusion of proven, under-utilised plants in ASEAN food security and climate adaptation policies, guidelines, and mechanisms, such as the [ASEAN Climate Resilience Network](#). Additionally, the ASEAN role can lead to the development of a coordinated plan to identify priority research gaps and commercialisation pathways.

Moreover, ASEAN, through its related agricultural research and crops sector mechanisms, has a catalytic role to direct funding into R&D on the agronomy, nutrition, and market potential of under-utilised plants. This may encourage ASEAN Member States to consider setting up regional hubs on under-utilised plants to promote innovation in plant improvement and secure private-sector investments.

Finally, ASEAN, through the upcoming [Food, Agriculture and Forestry Sectoral Plan, 2026-2030](#) (FAF-SP 2026-2030), can potentially play a larger role in the region's food security. Under the FAF-SP 2026-2030, exploitation of under-utilised plants may be accelerated through joint activities such as technical capacity building, farmer training on cultivation and sustainable practices, market and value chain development, consumer awareness building, and national incentives to increase the availability of under-utilised plants in food supply chains. As these plants have high potential for climate adaptation, efforts should also be made to explore climate financing to support the development of a market sector for these plants.

Conclusion

Asian food systems are in a state of transition, with old and new systems coexisting. While some “future foods” are already being produced, sold, and eaten today, they are not being scaled up, made affordable, or under-utilised plants made widely available.

As discussed earlier, under-utilised plants offer the potential to future-proof food systems in Southeast Asia. This is because they confer climate resilience, reduce malnutrition, improve local food security, and reduce the overall environmental impact of agriculture.

Looking ahead, to bring more under-utilised plants into regular commercial use, it would be important to improve: i) yield; ii) crop uniformity; iii) pest/disease resistance through breeding and agronomic improvement; iv) seed availability; v) logistics; and vi) post-harvest handling by developing seed systems and supply chains.

Related initiatives include: i) performing product innovation to meet consumer preferences; ii) providing policy support such as subsidies; iii) including under-utilised plants in nutrition programmes; iv) providing research funding; v) offering marketing and consumer education on the nutritional value, unique tastes, as well as cultural

heritage of under-utilised plants; and vi) pro-actively ensuring sustainable harvesting and farming practices.

More than at any other time, the volatile and uncertain food system environment necessitates that alternatives be made available. Under-utilised plants as future food is one such alternative.

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