

# TIR

THAILAND INVESTMENT REVIEW

## MAKING FUTURE FOOD IN THAILAND

Farm and Food  
Innovations





# BOI NET APPLICATION

January – December 2020













**Total Investment**  
**1,717 Projects**  
**US\$ 15,342.76 Million**

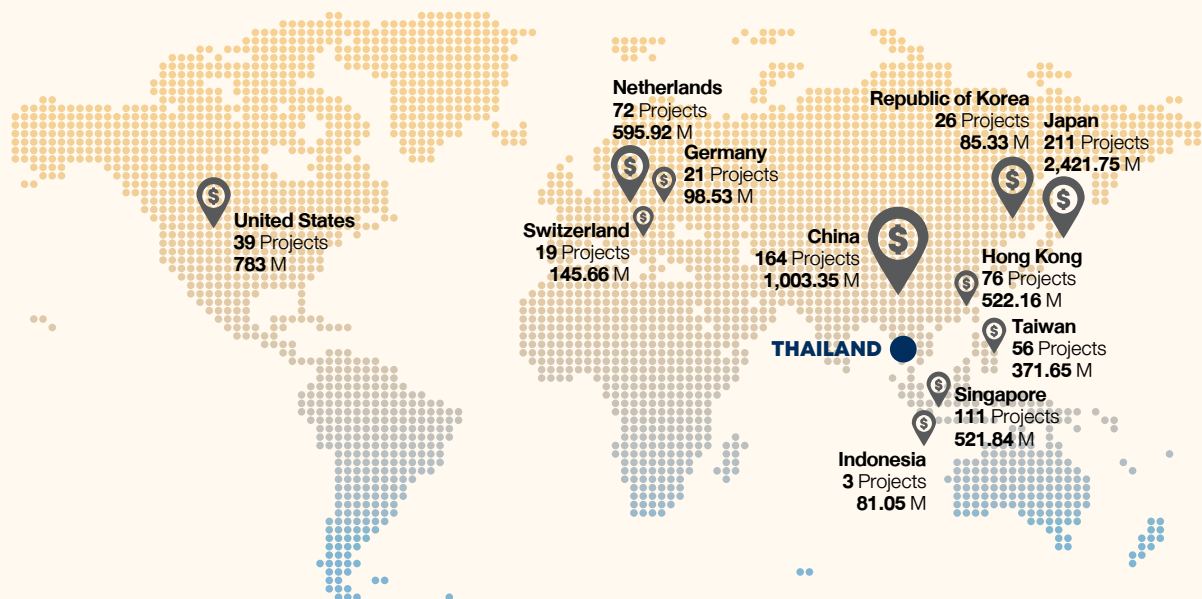


**Total Foreign Investment**  
**907 Projects**  
**US\$ 7,371.24 Million**

## FOREIGN INVESTMENT BY TARGET SECTORS

First S-Curve		New S-Curve	
	<b>Electronics</b> 127 Projects   1,356.41 M		<b>Biotechnology</b> 6 Projects   683.26 M
	<b>Agriculture &amp; Food Processing</b> 53 Projects   389.03 M		<b>Digital</b> 105 Projects   29.59 M
	<b>Automotive</b> 87 Projects   1,055.68 M		<b>Aerospace</b> 3 Projects   7.94 M
	<b>Petrochemicals &amp; Chemicals</b> 61 Projects   1,081.60 M		<b>Medical</b> 32 Project   159.31 M
	<b>Tourism</b> 5 Projects   151.34 M		<b>Automation &amp; Robotics</b> 8 Projects   18.34 M

## FOREIGN INVESTMENT BY MAJOR ECONOMIES



**Unit: US\$ (US\$ = 31.36 as of 31 March 2021)**

**Note:** Investment projects with foreign equity participation from more than one country are reported in the figures for both countries. Statistics on net applications are adjusted whenever applications are returned to applicants due to insufficient information. For more details, please visit [www.boi.go.th](http://www.boi.go.th)

# CONTENT



04

## Cover Story

Making Future Food in Thailand



10

## Industry Focus

Exports Remain Resilient in the Midst of the Pandemic



14

## Highlights

Comprehensive Food-Tech Incubation Network



15

## Executive Talk

Food of Thailand for a Future World



18

## Company Interview

EnerGaia



21

## Thai Economy At A Glance





# MAKING FUTURE FOOD IN THAILAND

Thailand's farm and food industry has been constantly incorporating new innovations in an effort to meet the increasingly sophisticated demands of a global market that is becoming swamped with virtually endless options. Staying ahead of the game in this hugely competitive environment requires access to a wide diversity of raw materials on vast agricultural plantations and a well-developed supply chain. Leveraging advancements in digitalization and utilizing deep technology such as 3D printing, AI and big data, the Thai agri-food industry is also producing foods that align with mainstream intelligence technology as well as addressing environmental concerns.

Indeed, the accelerating shift of consumer demand for innovative foods such as alternative proteins, medical food, functional food and 3D food printing has created an unprecedented change in the Thai food industry, with the recent emergence of aspiring startups. Attuned to global trends and technology, these startups are playing a key role in cementing top-of-mind awareness of Thailand's food brands among consumers.

The Thai food development industry also places priority on progressing with a greater focus on safety standards and transparency in each step of production. Notably, the Thai government recently launch a blockchain system which serves a portal for consumers to trace and track each process.

In the global market, Thai food entrepreneurs have showcased their strengths with exports performing

well in 2020, even when global demand subsided in light of the pandemic. As consumers looked for quality food products with a long shelf life during periods of restrictive outdoor activity, Thai frozen and processed fruits and vegetables, beans and soup powders proved popular, placing them among products that held up in the global market.

## Food for Future Development

The global popularity of Thai tourism and culture alongside the quality of its food and farm products have contributed to "made-in-Thailand" products resonating uniqueness and quality in the global market. With a skilled workforce and an agricultural sector derived from a culture deeply rooted in agricultural wisdoms and the well-established supply chain,

Thailand has successfully developed its food industry to become the world's 11th largest food exporter in 2019, placing it second only to China in Asia.

The Thai government is currently implementing a medium-term plan to develop the Thai food industry extensively with the goal of adding economic value to local food and farm products for local economic development as well as establishing Thailand among the world's top ten largest food exporters. Thailand's effort will also fulfill its role in helping address food insecurity in some countries as exposed by the COVID-19 pandemic.

Thailand's vibrant food industry accounts for one-fourth of the country's industrial gross domestic product and uses more than four-fifth of the local raw materials for production. The people's strength and the country's endowment of

vast agricultural plantations, the diversity of agricultural products, a well-established agri-food industry, and a geographic location at the center of the ASEAN region have underscored Thailand's strong position in the global food supply chain.

The Thai government has identified "Future Food" as an industry that will become a key economic driving engine, as a combination of a passionate new generation of food producers, digitalization and food technology has elevated Thailand's place to a global level in this exciting new industry.

The government's food development plan focuses on four areas: building new entrepreneurs, scaling innovations, utilizing online marketing platforms and improving the ease of doing business.

Government agencies are supporting Thai farmers by promoting their adoption of Agri-tech, such as automation & robotics, AI, IoT and plant factories, to increase their productivity and overcome problems such as weather uncertainty and high operating costs.

The Thai government's policy to streamline its digital databases and the operations of all of its agencies, as directed by an act enacted in 2019, will further enhance Thailand's standing as one of the most promising locations for investment in the food industry.

### Mentoring Food Warriors

The Thai government envisages Thailand becoming a key global player in the "Future Food" market—a new genre of food that is both functional and novel, often involving R&D and technology-enabled production processes and services.<sup>1</sup> As the food industry can be driven

by ideas on which—with the right mentors and investment—a plausible business model can be built, Thailand has seen the development of many new homegrown entrepreneurs rolling out food innovations that utilize the latest food tech and Agri-tech in startups that cater to multiple consumer demands.

"SPACE-F"<sup>2</sup>, Thailand's first global food tech startup incubator and accelerator, is now running Batch-II acceleration. Run by the National Innovation Agency, Mahidol University and Thai multinational food conglomerates, SPACE-F aims to serve as a platform on which promising entrepreneurs can receive mentorship and guidance from corporations, venture capital firms, corporate venture capital firms, and agencies that will empower them to scale up their food tech startups to succeed on the global scale.

Since the start of the program in 2019, four food tech startups, out of a total of 34 participants, have received funding to scale up their business ventures. Among the local innovations showcased

in SPACE-F were sesame milk, protein from duckweed, protein from crickets, a biodegradable fruit coating solution and a sensor system for food production quality control.

Reflecting their interest in food tech startups, local multinational food companies have also teamed up with startup funds to invest in food tech startups worldwide.

### BOI Promoting Agri-Food Technology

The Thailand Board of Investment<sup>3</sup> has introduced tax incentives throughout the supply chain of the agri-food businesses, with a special focus on technology in the form of R&D, productivity enhancement, Agri-tech, high-technology quality testing, plant factories and sustainability certification.

The incentives offered include:

- 8-year CIT exemption for the manufacture of medical food and food supplements



1 <https://www.bangkokpost.com/business/1390222/nfis-direction-for-thailands-future-food-industry>

2 <https://www.space-f.co>

3 <https://www.boi.go.th/index.php?page=index>



- 8-year CIT exemption for adoption of advanced technology such as fruit ripeness sensor, radio frequency pest control and nuclear magnetic resonance in grading, packaging and storage of plants, vegetables, fruits or flowers

- 8-year CIT exemption for the manufacture of biomolecule and bioactive substance using microorganism, plant cells or animal cells

- 8-year CIT exemption for seed industry and improvement of plant, animal or microorganism breeding using biotechnology

- 5-year CIT exemption for manufacture of oil or fat from plants or animals (except soybean)

- 5-year CIT exemption for the manufacture of food, beverage and seasoning ingredients, excluding alcoholic beverages, caffeinated drinks, bakery products and candies

- 5-year CIT exemption for the adoption of smart farming systems such as the use of sensors, drones, or greenhouses

- 5-year CIT exemption for investment in plant factories

- 5-year CIT exemption for the manufacture of animal feeds which comply with food safety standards such as ISO 22000

# Pandemic-Driven Changes in Food Consumption



## Opportunity for the Thai Food Industry



# Thailand's Roadmap for the Food Industry

(Effective until 2027)

Achieve  
**GDP of 45.8 billion US\$**  
(50% increase  
from 30 billion US\$  
in 2020)

Be ranked  
among **the top ten  
global food  
exporters**  
(up from  
13<sup>th</sup> in 2020)

## Targets



## Focus Areas

### Businesses

New Entrepreneurs,  
Industrial-Scale Farming,  
Foods Startups,  
Organic Food Technology



### Innovations

Future Food,  
Functional Food,  
Novel Food, Packaging



### Marketing Platforms

Big Data Management,  
Online Tools, Food Expos



### Food Standards

Traceability, Food Safety Plus,  
Reduced Environmental  
Footprints



Source: The Ministry of Industry  
\*1US\$ = 31THB as of 31 March 2021



# BOI's Incentives for the Agri-food Industry

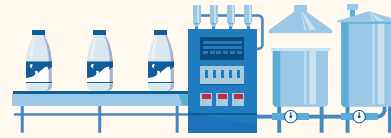
## 1 Manufacture of Medical Food and Food Supplements



**8-year  
CIT  
Exemption**

## 6 Manufacture of Food, Beverage and Seasoning Ingredients

excluding alcoholic beverages, caffeinated drinks, bakery products and candies



**5-year  
CIT  
Exemption**

## 2 Adoption of Advanced Technology

such as fruit ripeness sensor, radio frequency pest control and nuclear magnetic resonance in grading, packaging and storage of plants, vegetables, fruits or flowers



**8-year  
CIT  
Exemption**

## 7 Adoption of Smart Farming Systems

such as the use of sensors, drones, or greenhouses



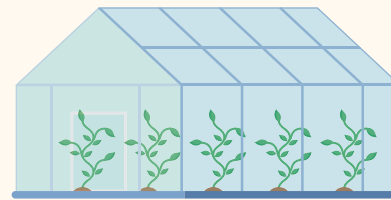
**5-year  
CIT  
Exemption**

## 3 Manufacture of Biomolecule And Bioactive Substance Using Microorganism, Plant Cells or Animal Cells



**8-year  
CIT  
Exemption**

## 8 Investment in Plant Factories



**5-year  
CIT  
Exemption**

## 4 Seed Industry and Improvement of Plant, Animal or Microorganism Breeding Using Biotechnology



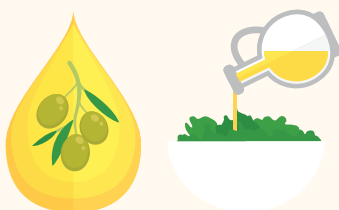
**8-year  
CIT  
Exemption**

## 9 Manufacture of Animal Feeds Which Comply with Food Safety Standards such as Iso 22000



**5-year  
CIT  
Exemption**

## 5 Manufacture of Oil or Fat From Plants or Animals (Except Soybean)



**5-year  
CIT  
Exemption**



# EXPORTS REMAIN RESILIENT IN THE MIDST OF THE PANDEMIC

Thailand's food exporters have found opportunities in the midst of the current crisis brought on by the COVID-19 pandemic. As consumers worldwide visit supermarkets and dine in restaurants less often, they are buying more processed and canned foods to cook at home as well as more ready-to-eat foods.



Photo by Dose Juice on Unsplash

Thailand recorded a healthy growth in the export of processed foods such as fruits and vegetables and canned seafood, which is in part attributed to economic recovery in those buying countries. The trend has highlighted the strength and diversity of Thailand's food supply chain, which is serving the country's goal of producing foods to cater to the growing demand among global consumers for nutritious and functional foods that serve their specific needs.

## Healthy Food Exports

While the pandemic has adversely affected world trade, Thailand has recorded healthy growth in

the exports of foods and products that are associated with the new normal, such as smart electronics, furniture and decorative items as well as medical devices.

Official data from the Ministry of Commerce's show that Thailand's total export volume contracted by 6% in 2020, with the market share in global food export products standing at 2.3%. Against the backdrop of the pandemic, fresh, frozen and dried fruits grew by 14%; canned and processed fruits by 2%; soup powder by 30%; frozen poultry by 15%; processed fruits by 8%; seasoning sauces by 8%; canned and processed seafood by 5%; non-alcoholic

beverages by 2%; and pet foods by 19%. Data from the Thai Food Processors' Association showed that exports of ready-to-eat food grew 6% by volume in 2020. Asian markets, including China, Malaysia, Hong Kong, Singapore, Russia, and the CLMV group of countries (Cambodia, Laos, Myanmar and Vietnam) were among the key importers of Thai food products in 2020.

Thailand's food export performance in 2020 has been in line with the government's development plan for the industry, which focuses on high valued food products or the so-called "Food for the Future" due to its potential for generating higher outputs and broader impacts on the country's industrial supply chain.

The government's development targets include establishing Thailand among the global top ten food exporters by 2027. Thailand was ranked in 13<sup>th</sup> place in 2020 and 11<sup>th</sup> place in 2019, with the US, the Netherlands, Brazil, Germany and China ranked the top five largest food exporters.

Two-thirds of the outputs from Thailand's US\$ 100 billion food market are sold locally, while the country's food exports are fairly evenly divided between processed and raw foods.

Based on the forecast for world economic growth of 5.5%, Thailand's Ministry of Commerce projects an increase in Thai food exports of 7%, with the export of frozen seafood expected to grow by 2% in 2021.

### Transparency Reassured

The Thai government has applied blockchain technology that enables the traceability of locally produced food products. By scanning QR codes and trace manufacturing lots in the government's database through the [www.TraceThai.com](http://www.TraceThai.com) website, buyers of Thai food products can trace the origin and track the journey of the products from harvesting and manufacturing to processing and along the transportation process as well as viewing any organic certificates that have been issued. This initiative will further enhance the credibility and transparency of Thai food products among consumers in terms of safety, environmental and other social issues.

Through cooperation with agencies at the provincial level and its overseas representative office, the Thai government expects to sign in at least 150 agricultural

groups for the blockchain project. Furthermore, the Thai government's ongoing process of streamlining the digital databases of government agencies will better facilitate Thailand's food and farm product development.

Placing top priority on gaining the trust of global consumers in exported Thai food products, the Thai government has also introduced the "Thailand Delivers with Safety" campaign to step up monitoring of the measures implemented by local food producers and logistics service providers to prevent against COVID-19 virus contamination of frozen foods and other food products.

With Thai foods having become well-recognized globally for their high safety and quality standards through compliance with GMP, HACPP and GAP, the country's food producers are joining a "quality plus" campaign which is intended to encourage all food producers to improve their quality assurance standards.

### Future in Hand

The global mainstreaming of plant-based meat is happening not only within the vegan and vegetarian communities, but also

among consumers who are increasingly focusing on health impacts and solutions to climate change. Plant-based meat also offers a more affordable protein alternative.

This global shift, which is highlighted by the entry of plant-based meat in major global food chains, points to a favorable future for Thailand as not only a major producer of agricultural products such as beans, fruits, vegetables, herbs, cassava, corn and rice but also a promising producer of future food.

Tapping into this new trend, food startups and corporations in Thailand have rolled out plant-based meat produced from various materials such as mushroom, jackfruit, rice, coconut and beetroot, as well as beans, to serve both local and global markets.

A study by the National Science Technology and Innovation Policy Office (STI) showed that the food industry is among the second largest industrial sectors investing in R&D, after the auto industry. The R&D activities in the food industry cover a wide range of areas including automated production processes, packaging development, consumer behavior and new product development, with a value of US\$ 530 million in 2018. Many enterprises are now establishing R&D centers, either on their own premises or in science parks.

According to Food Innopolis, approximately 25% of Thai food researchers have expertise in grains, cereals and legumes, followed by 17% in functional food; 13% in vegetables and mushrooms; 12% each in seafood and meat; 8% each in dairy, herbs, spices and essential oils; and the remainder in juice, sugar and tapioca starch. ■

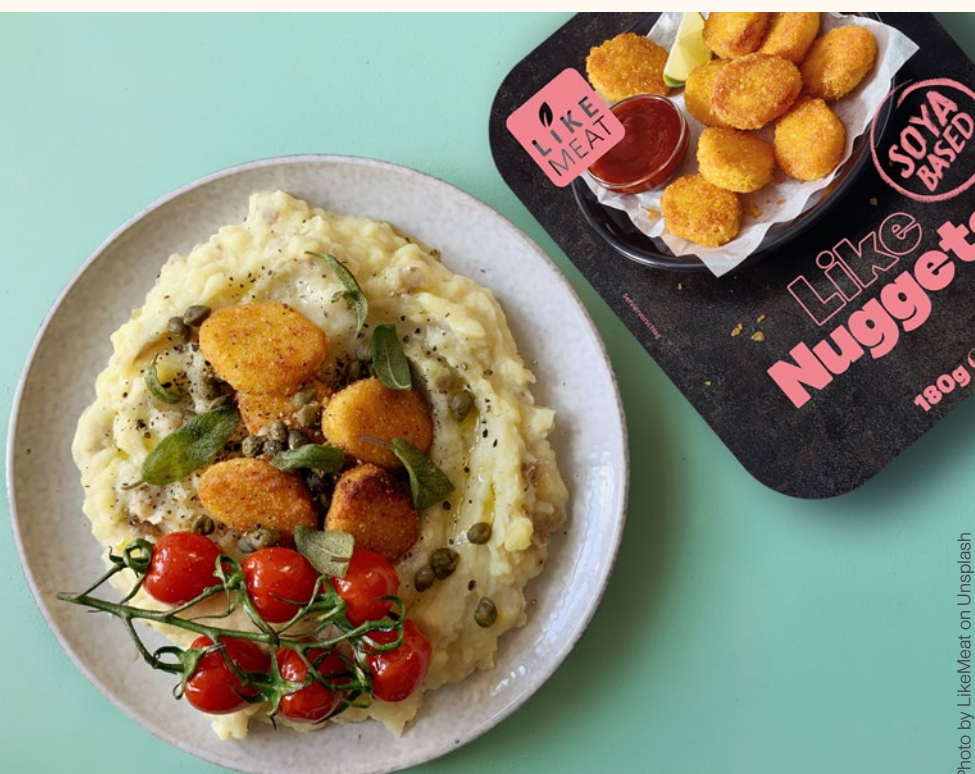
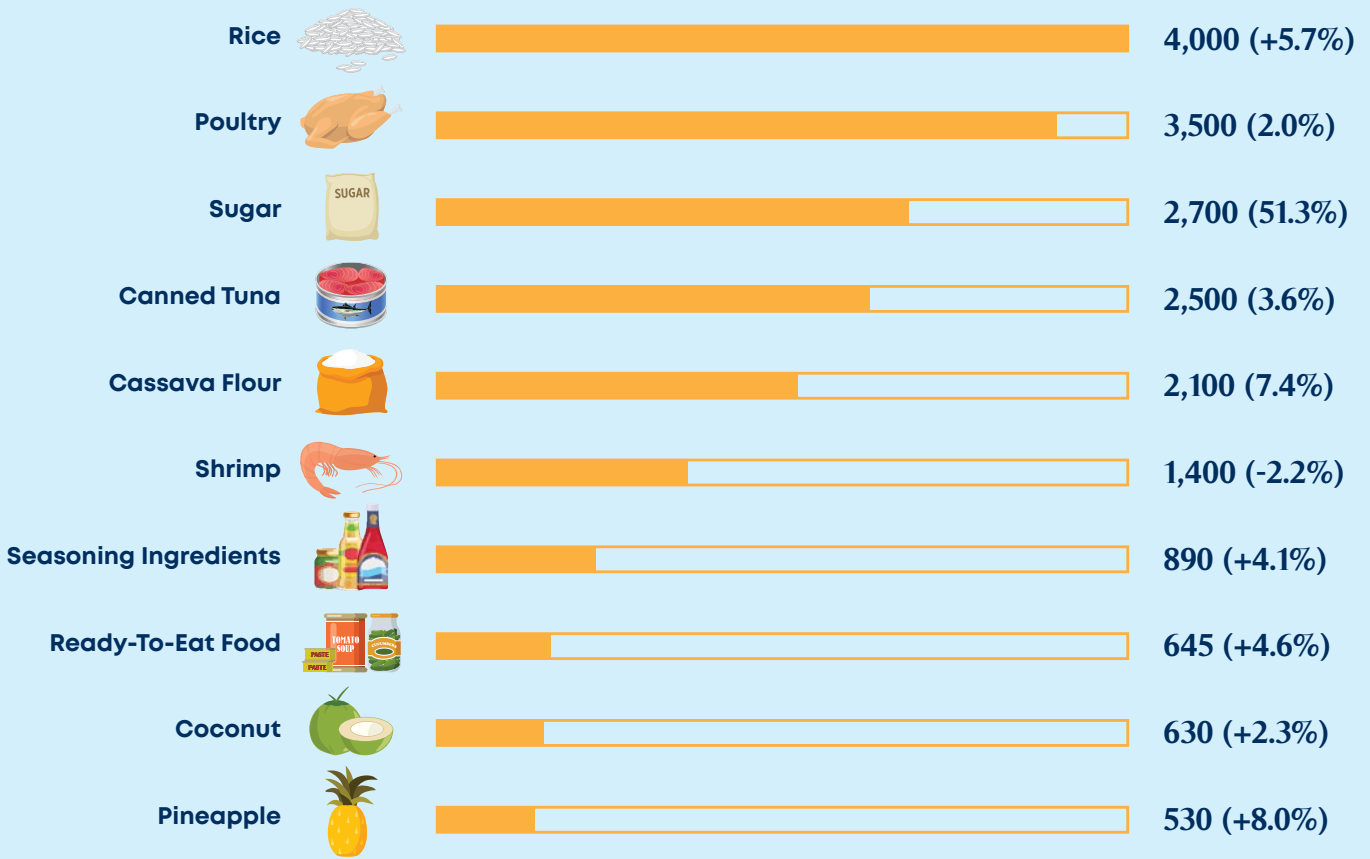


Photo by LikeMeat on Unsplash

# Thailand's Food Export Forecast (2020/2021f)

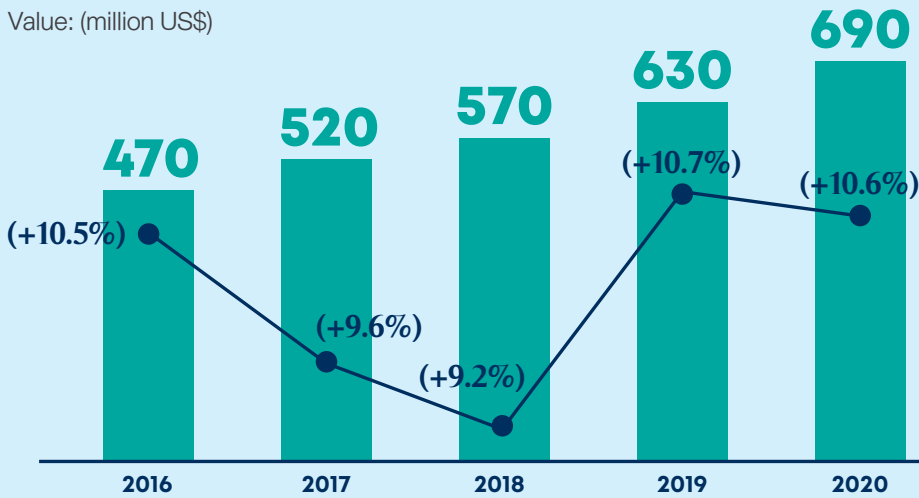
Units: million US\$



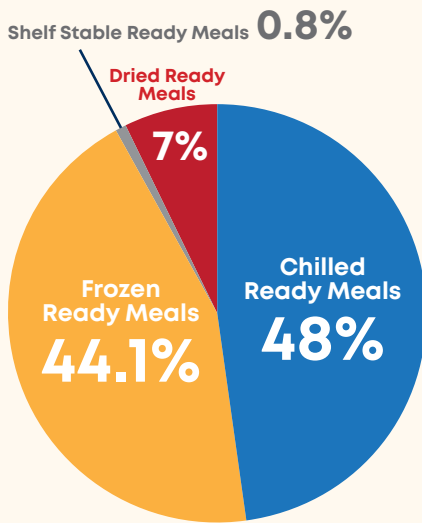
Source: The Thai Chamber of Commerce and Board of Trade of Thailand

## Local Sales of Ready-To-Eat Foods

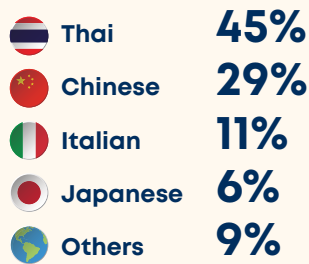
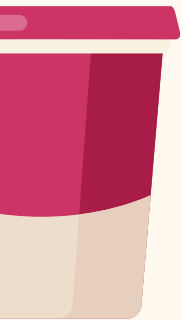
Value: (million US\$)



## Product Share (Qty)



## Product Share (Nationality)



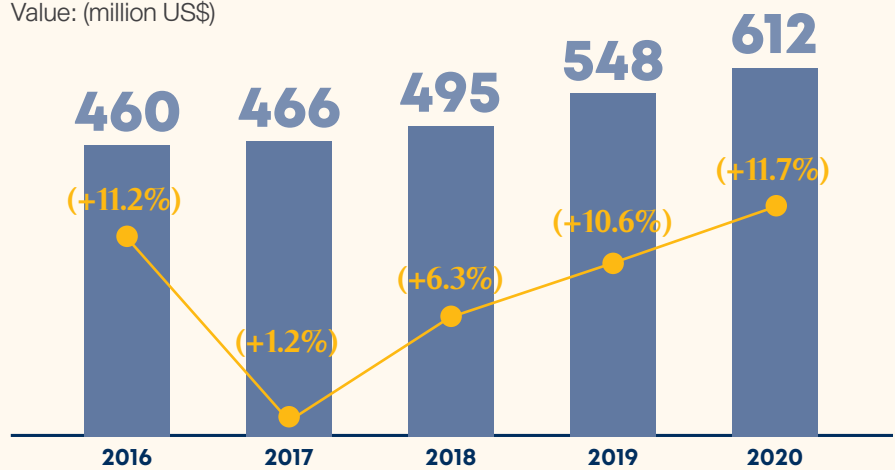
## Forecast of Local Ready-To-Eat Food Sales



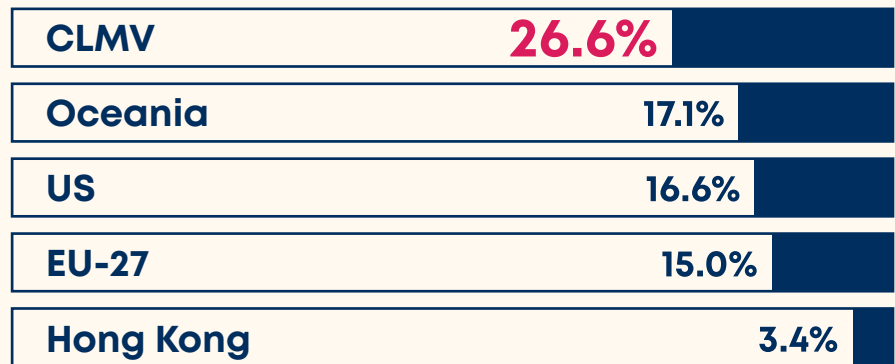
Value: **764** Million US\$  
Growth: **10%**

## Export of Ready-to-Eat Foods

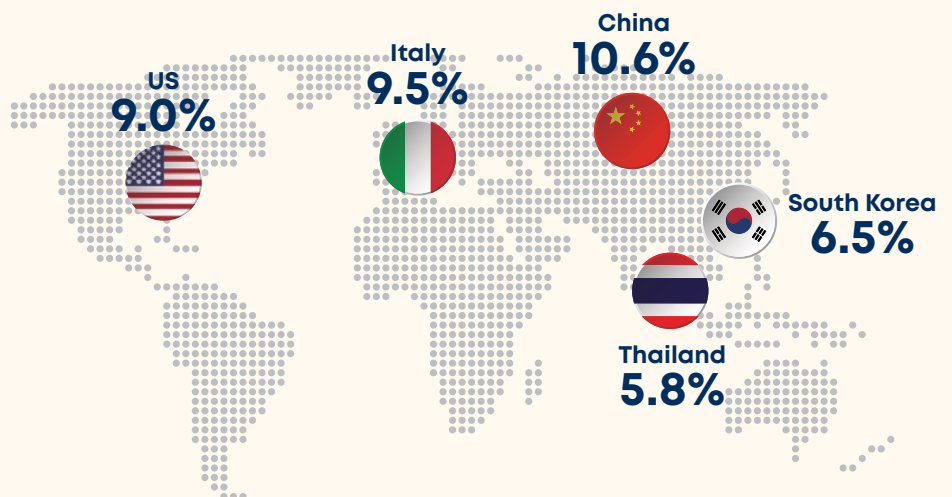
Value: (million US\$)



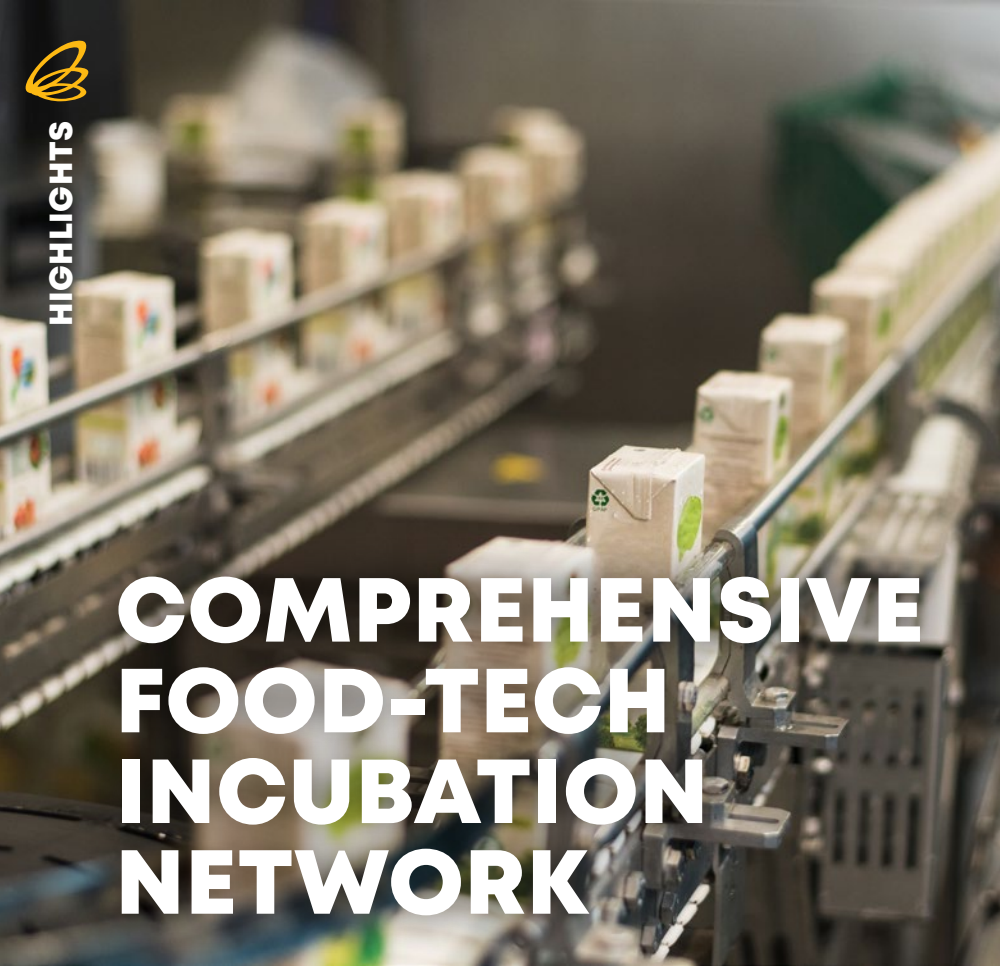
## Top 5 Markets for Thai RTE Foods



## Top 5 Exporters of RTE Foods



Source: National Food Institute



# COMPREHENSIVE FOOD-TECH INCUBATION NETWORK

**As part of the Thai government's consistent support for R&D and scaling innovation in food technology, the country houses integrated R&D centers linking the public sector's high-quality facilities with universities and private sector labs.**

Central to the network is Food Innopolis, an integrated food innovation complex located at the Thailand Science Park, Pathum Thani Province. Under the supervision of the National Science and Technology Development Agency (NSTDA), the complex offers comprehensive services to R&D and business development, ranging from rental space for laboratory facilities, sourcing personnel and technical assistance in R&D and business development as well as applying for approvals from Food and Drug Administration to entrepreneurs.

Food Innopolis also offer networking and knowledge sharing services to members and easy access to the public sector's facilities in food technology and

food standardization and testing. These facilities include Food and Feed Innovation Center, Bioresource Center, Central Lab, Sensory Evaluation Center and the Synchrotron Light Research Institute which offers molecule-based research analysis, which are also located at Thailand Science Park.

To date, more than 40 local food conglomerates, multinational companies and SMEs have established R&D activities in the innovative food cluster for products such as seafood, poultry, dairy, nutritional and functional foods, as well as in the areas of food safety, automation and robotics.

Food Innopolis has opened a facility at EECi in Wangchan

Valley, an R&D complex located in the Eastern Economic Corridor. Focusing on application of digital technology in the farm and food innovation and production processes, the Food Innopolis aims to drive Thailand as a regional center of future food industry and advanced agriculture and biotechnology.

The Future Food Lab zone offers a similar one-stop service center to the facilities at Thailand Science Park which provides assistance to businesses in R&D and scaling innovations, such as lab access to facilities and experts to help with developing prototypes, finding raw materials, marketing, and applying for regulatory approval.

The EECi compound also offers an IoT test bed service for areas including precision farming, smart harvest and packaging, robotics for fruit harvesting and packaging, automated pilot plants, smart logistics, smart warehousing and retail distribution, and software system integration. The facility is also a research area for big data, AI and machine learning applications to support database development and traceability for the farm and food industry.

To strengthen the country's food tech ecology, the facility also helps develop similar operational concepts in seven well-regarded provincial universities, which have a history of producing skilled human resources in the field of agricultural technology. These universities include Kasetsart University, Chulalongkorn University, Mahidol University, King Mongkut's University of Technology Thonburi, Chiang Mai University, Kon Kaen University and Prince of Songkla University. ■

<sup>1</sup> <https://foodinnopolis.or.th/en/about-us>

<sup>2</sup> <https://www.eeco.or.th/en/food-for-the-future>

# FOOD OF THAILAND FOR A FUTURE WORLD



The COVID-19 pandemic has taken a heavy toll on most economies worldwide. Thailand is no exception. However, Thai food exports have become a bright spot, bucking the trend of the country's overall sliding exports, with the demand for processed and canned foods having held up in these uncertain times.

This trend reflects the surge in global demand toward home cooking and ready-to-eat foods in the wake of restrictive measures to contain the pandemic. The resilient export of food and farm products also highlights Thailand's commitment to R&D and advancements in the application of technology to meet the growing demand of consumers for nutritious and quality food products that serve the specific needs of each individual, while also meeting the expectations of the younger generation for reduced environmental footprints from the manufacturing sector.

In line with the "Thailand 4.0" strategic economic development plan, which is aimed at extensively developing the use of technology within Thai industries, the Thai government has designated the agri-food industry as a priority area. The plan aims to strengthen the food technology ecosystem to enhance the economic value and global positioning of Thailand's farm and food industries.

The Thailand Board of Investment (BOI), the key government agency entrusted with promoting investment in the country's strategic direction, is offering incentives in the form of exemptions on corporate income tax (CIT) and import duty on raw materials to both Thai and foreign investors, with a focus on enhancing R&D in food technology. The incentives cover a comprehensive range of activities, especially those related to investment in R&D or those adopting biotechnology, digital services, and robotics and automation which can further increase the competitiveness of the industry.

“

The pandemic has pushed consumers worldwide to become more health conscious and focus on the nutritional benefits of foods. This global trend, which we are also seeing in Thailand, creates tremendous new opportunities for food innovations, food safety and organic foods.

”

Sonklin Ploymee  
BOI's Deputy Secretary-General

The BOI offers 8-year CIT exemption on the manufacture of functional and medical foods and food supplements, with additional CIT exemptions for companies that invest in upgrading their production through Agri tech, food tech, digital technology, automation and robotics and plant factories to improve the efficiency of both production and quality testing activities.

Responding to the following questions, Ms. Sonklin Ploymee, the BOI's Deputy Secretary General, explained the direction taken by Thai policymakers in promoting investment in the agri-food industry and possible additional incentives.

### **How significant is the agri-food industry's contribution to the Thai economy?**

The food industry has long driven Thailand's economic development through the value it adds to the agricultural sector and industrial supply chain, covering 128,000 mainly micro enterprises, employing more than one million people – representing about 3% of the country's workforce – and generating approximately 6% of the country's gross domestic product.

As one of the targeted beneficiaries of the "Thailand 4.0" policy, the food industry will receive further incentives and support from the government aimed at enhancing its competitiveness by building on its strengths and potential. The Thai government has long promoted Thailand as the "Kitchen of the World" in recognition of the country's strengths in the food industry, particularly the abundance of raw materials, large pool of skilled labor and well-established and competitive supply chain.



Under the Thai government's development plan for the agri-food industry, which is effective until 2028, the country has set the agri-food industry the target of generating 7% of GDP, with efforts focusing on R&D and productivity improvement.

### **What are Thailand's best competitive advantages in agri-food technology?**

Thailand has a year-round agricultural season and vibrant agri-food industry, producing the largest exports of cassava, canned tuna, canned pineapple, rice and sugar as well as a variety of other food products to the world.

The country's food processing industry currently uses as much as 80% of local raw materials in its products. This enables entrepreneurs to operate with low costs, enhancing the competitiveness of the food processing industry in the global market.

Thailand's long history in the agri-food industry has enabled the country to develop its productivity. Indeed, Thailand has the most competitive ecosystem for food technology among the

ASEAN countries. Even so, there is still a need to focus on R&D in order to increase the value added to the processed food industry.

Thailand is also among the top ten most competitive countries in the food processing industry. According to Oxford Economics, Thailand's food processing industry was ranked 9<sup>th</sup> worldwide in 2016, with the Thai government aiming to reach 3<sup>rd</sup> place by 2026. The Thai government's commitment to promote biotechnology and R&D is seen as a key factor in increasing confidence in the country's food processing industry.

Thailand's food processing industry will also benefit from large investment in transportation, utilities and modern special economic zone infrastructure, which will make it the best-connected country in the ASEAN region. Thailand also enjoys a strategic location at the heart of the ASEAN market, whose combined population of 650 million is roughly half of China's, making it a significant consumer market. Moreover, the China-Thailand Free Trade Agreement and Thailand's membership in the ASEAN Free Trade Area have bolstered the country's trade and economic growth.





In terms of human resources, Thailand has a highly skilled workforce, with solid institutional support and efficient recruiters to meet the workforce demands of investors.

### **What could emerge as Thailand's most recommended products in the global market?**

If we consider the present behavior of consumers worldwide during the pandemic, there will be plenty of opportunities for Thailand's food processing industry. People are forced to stay at home and cook at home, as they cannot go to supermarkets as often as before. As a result, ready-to-eat food has high potential. Thailand can further apply technology and automation to roll out more innovations and raise productivity. Moreover, the pandemic has pushed consumers worldwide to

become more health conscious and focus on the nutritional benefits of foods. This global trend, which we are also seeing in Thailand, creates tremendous new opportunities for food innovations, food safety and organic foods.

In this regard, innovations and technology are the areas where we are taking serious actions to move the development forward.

As a large and growing percentage of the world population consumes Halal food, for which the "Made-in-Thailand" brand is well-regarded, the country is well-positioned to harness the opportunity deriving from this consumer group.

Overall, Thailand has a diversified food industry with high capability to harness the potential of medical and functional foods and serve the increasing demand from the aging society.

### **What roles have the government and BOI played in enhancing technology in the agri-food industry?**

The Thai government and the BOI have steadfastly supported technological capacity-building in the future food industry. We

have promoted a wide range of measures to help entrepreneurs enhance their efficiency in the food supply chain, from upstream to downstream, and our efforts extend beyond manufacturing to the service sector in the agri-food industry.

R&D is a target activity of our promotional incentives. The BOI's additional incentives will also be offered to entrepreneurs who invest in productivity, even if they do not increase production capacity. The BOI is also considering new incentives to further strengthen Thailand's food positioning in the world market.

### **How do you foresee Thailand's development of the food industry in the world market?**

There is huge potential in the Thai food industry, primarily given the abundance of raw materials, pool of skilled labor, steadfast institutional support, and advanced infrastructure.

Government agencies, not only the BOI, have promoted productivity, quality, technology and R&D in the food industry. As I mentioned before, the food industry is at the top of the agenda of the Thai government's efforts, given its importance to our population.

The Thai government has ensured strong institutional support is in place to promote capacity building in important areas such as the international standard for foods, innovations, marketing and support for small and medium-sized enterprises. With this direction, I am confident that Thailand is well-positioned to be the largest investment hub in Asia for the food industry and to have a larger share of the world food market. ■



# INTERVIEW WITH Saumil Shah, founder and CEO of EnerGaia



“At least for us, Thailand has an abundance of great talents who are skilled microbiologists and professionals in the agroindustry. The country has an important agroindustry and very good reputation for the foods it produces. When we create new and nutritious products here and export to countries in Western Europe and the United States, people’s perceptions of these products are relatively more positive in terms of quality than for similar products from other countries.”

**Saumil Shah**  
Founder and CEO of EnerGaia

and sustainable food options among consumers worldwide. Having been working for General Electric on energy projects in Thailand, US-born former engineer Saumil Shah founded EnerGaia in 2009 out of his desire to offset the impacts of carbon emissions by the energy industry. In a diverse kind of algae which grows faster than trees and thus absorbs CO<sub>2</sub> more efficiently, he found his solution in spirulina.

Aside from the sale of fresh and processed spirulina worldwide, EnerGaia also offers its unique proprietary bioreactor technology as well as engineering and scientific consultation for spirulina farms. Mr. Shah discussed EnerGaia’s business expansion plan in Thailand along with the competitive advantages it offers investment in the food sector.

## The Simple Protein of the Future

On the rooftop of a spacious 3-story shophouse close to downtown Bangkok lie rows of airlift plastic-wrapped wire mesh columns filled with green water. Resembling something out of a seafood farm, they are in fact EnerGaia’s proprietary technology used for harvesting spirulina, single-celled algae that have gradually evolved from being known for many years only as food supplements into part of mainstream plant-based diets in response to the growing demand for more eco-friendly



### **What are EnerGaia's technological innovations and products?**

We offer unique bioreactor technology and solutions for farming spirulina, a highly nutritious single-celled algae that can grow floating in the water, with high quality and a neutral taste. People around the world typically grow spirulina in open and shallow ponds. However, there's a problem with that design as many things can fall inside and contaminate it. We have adapted a technology from the oyster industry in Australia and other countries and modified it to grow spirulina. We use plastic bags inside of wire mesh cages and turn them into containers for growing spirulina outdoors in the sunlight. With our spirulina smart farming software, we can monitor the parameters of the growth rate and recommend farming methods and ingredients. Our technology is actually a smart farming solution for spirulina. With automation for the outdoor system and the software system, anybody can produce a very high-quality product. We are offering this technology in Thailand and finding partners to work with us. We also have overseas operations to find customers.

### **What makes your spirulina products and farming solutions unique?**

Our technology produces a very clean, neutral-tasting and high-quality spirulina that will also have a very long shelf life. Normally, fresh spirulina that grows upon ponds will have a short shelf life of less than one week. With our technology, including what we have done on the processing side, our fresh spirulina can have a shelf life of three to four weeks if stored in a refrigerator. Also, it doesn't have a bad taste or smell. The technology allows us to use spirulina either in fresh form or processed form as we can also dry it into powder for people to add to or mix into their foods. Because of this neutral taste, we can process spirulina into finished mainstream food products like energy bars, pasta or noodles for consumers to receive the nutritional value from spirulina. It can be blended into mainstream food products to give them a greener color without changing the original taste.

Spirulina farming also doesn't require a lot of space. Each farming tank occupies just one square meter and can generate

almost two kilograms of protein per year. This is a good amount because a normal person would need to consume 50 to 100 grams of protein per day. Our system can connect 40 tanks under a central control system. On average, each tank can produce 15 to 20 kilograms of fresh spirulina per year, depending on the weather. Spirulina takes 7 to 10 days for each harvest.

### **What are the competitive advantages of your investment in Thailand?**

I founded this business from the motivation of using microbiology to reduce carbon dioxide emissions from power plants, industrial plants and other sources by turning algae into something productive so that people can have a very good environmental footprint from food. Because microalgae like spirulina grow very well in tropical conditions where the temperature is around 30-32 degree Celsius, countries with tropical environment like Thailand are the places where spirulina can grow very well.

At least for us, Thailand has an abundance of great talents who are skilled microbiologists and professionals in the agroindustry. The country has an important agroindustry and a very good reputation for the foods it produces. When we create new and nutritious products here and export to countries in Western Europe and the United States, people's perceptions of these products are relatively more positive in terms of quality than similar products from other countries.

### **What is your vision for your operations in Thailand?**

I want to offer a comprehensive solution for spirulina production in Thailand and elsewhere, to



grow it from a small niche industry today to become a big industry producing millions of tons of spirulina per year, and I want Thailand to be one of the main places it's produced.

Thailand is also the headquarters for us, where we oversee technology, produce foods and try to find production partners. We work with many factories here to create finished products for export to the West and for local consumption.

Our vision is to continue to expand by working with different partners to grow more spirulina and then use it to make finished food products, some of which can be sold locally, but more, around 70%, will be exported. We also plan to increase our exports to Asian markets.

**What kind of perception do consumers have of your products?**

The generation X and generation Y around the world are interested in sustainable food, healthy food and plant-based food. This trend is rising to a larger percentage of the population and even though we started this business some years ago, before this trend started, now it still seems good timing for us. Given that spirulina is a microalga, or a form of plant-based protein, that is rich in protein, with actually 65% protein in powder form, and also a good source of vitamins and minerals such as iron, it resonates well with consumers. However, they don't know how to use it, either in fresh form or powder. That's why we're trying to make it very easy for them to

use in products they're already accustomed to, such as natural energy bars, noodles and western pasta, without changing the original taste.

**How have the government agencies and the BOI supported your venture in Thailand?**

With the BOI's investment benefits, they have made it easier for foreigners to obtain work permits for foreign experts who are skilled in different areas such as engineering, science, and R&D. The Thai government is also trying to promote smart farming technology which will benefit the Thai economy. I think there are still a lot of opportunities for the Thai government and the BOI to make it easier for foreign experts to start businesses in Thailand. I believe they are working in that direction but there are still opportunities to make more progress. ■

# THAI ECONOMY At A Glance

## Key Economic Figures



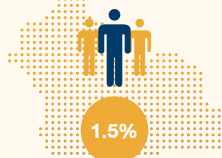
### GDP Growth



Note: \*Estimated value | Source: NESDC  
(Data as of March 2021)

### Unemployment

Dec 2020\*



### Headline Inflation

Average 2020\*



Source: National Statistical Office,  
Ministry of Commerce

### Investment Growth



### Export Value of Goods Growth



Note: \*Estimated value  
Source: NESDC

## Market Profile (2019)



**US\$ Approximate**  
US\$ 9.98-10.71

Source: Ministry of Labour



## Export Figures

### Export value (USD million)

Jan - Dec 2019 : 246,268.8

Jan - Dec 2020 : 231,468.4

Jan - Feb 2021 : 39,925.6

## Top 10 Export Markets (January-December 2020)

Rank	Value (US\$ million)	Share
<b>United State</b>	34,343.71	14.83%
<b>China</b>	29,754.18	12.85%
<b>Japan</b>	22,876.34	9.88%
<b>Hong Kong</b>	11,292.25	4.88%
<b>Vietnam</b>	11,163.82	4.82%
<b>Australia</b>	9,828.83	4.25%
<b>Singapore</b>	9,508.92	4.10%
<b>Malaysia</b>	8,734.50	3.77%
<b>Indonesia</b>	7,650.26	3.30%
<b>Switzerland</b>	7,525.32	3.25%

## International Competitiveness

### Global Competitiveness

2018 : 38<sup>th</sup>    2019 : 40<sup>th</sup>

Source: World Economic Forum

### World Digital Competitiveness

2019 : 40<sup>th</sup>    2020 : 39<sup>th</sup>

Source: IMD

### Ease of Doing Business

2019 : 27<sup>th</sup>    2020 : 21<sup>st</sup>

Source: World Bank

## Top 10 Exports

Goods / Products	Value (US\$ million)	Share
1. Vehicles and Parts	21,266.84	9.19%
2. Computers and Parts	18,668.85	8.07%
3. Jewelry	18,207.33	7.87%
4. Rubber Products	12,113.82	5.23%
5. Plastic Pellets	7,971.54	3.44%
6. Integrated Circuits	7,155.14	3.09%
7. Chemical Products	6,735.69	2.91%
8. Machinery and Parts	6,528.00	2.82%
9. Refined Fuel	5,354.92	2.31%
10. Air Conditioners and Parts	5,251.81	2.27%

Source: Ministry of Commerce

## Exchange Rates (As of 31 March 2021)



Source: Bank of Thailand

## Tax Rate

**Corporate Income Tax: 0 - 20%**

**Personal Income Tax: 5 - 35%**

**VAT: 7%**

**Withholding Tax: 1 - 15%**

Source: the Revenue Department  
(As of March 2021)

## ABOUT BOI

The Office of the Board of Investment (BOI) is the principle government agency that operates under the Prime Minister's Office for the purpose of encouraging investment in Thailand. We at the BOI serve as the professional contact points for investors, providing them with useful investment information and services. We offer business support and investment incentive to foreign investors in Thailand, including tax and non-tax incentives. A few non-tax incentives include granting land ownership to foreigners and facilitating visas and work permits. Besides serving the needs of overseas investors, we also offer consultation services to Thai investors who are interested in investment opportunities abroad.



## BOI OVERSEAS OFFICES



### Head Office, Office Of The Board Of Investment

555 Vibhavadi-Rangsit Road., Chatuchak, Bangkok 10900, Thailand  
Tel: (+66) 2553 8111 Fax: (+66) 2553 8315 Email: head@boi.go.th

#### Los Angeles

Thailand Board of Investment,  
Los Angeles Office  
Royal Thai Consulate-General,  
611 North Larchmont Boulevard,  
3rd Floor  
Los Angeles CA 90004, USA  
Tel: +1 323 960-1199  
Fax: +1 323 960-1190  
E-mail: boila@boi.go.th

#### New York

Thailand Board of Investment,  
New York Office  
7 World Trade Center  
250 Greenwich Street, Suite 34F  
New York, NY 10007, USA  
Tel: +1 212 422 9009  
Fax: +1 212 422 9119  
E-mail: nyc@boi.go.th

#### Stockholm

Thailand Board of Investment,  
Stockholm Office  
Stureplan 4C, 4th Floor  
114 35 Stockholm, Sweden  
Tel: +46 8 463 1158, +46 8 463 1174  
Fax: +46 8 463 1160  
stockholm@boi.go.th

#### Frankfurt

Thailand Board of Investment,  
Frankfurt Office  
Investment Section,  
Royal Thai Consulate-General  
Bethmannstr. 58, 5.0G 60311  
Frankfurt am Main  
Federal Republic of Germany  
Tel: +49 (069) 92 91 230  
Fax: +49 (069) 92 91 2320  
Email: fra@boi.go.th

#### Paris

Thailand Board of Investment,  
Paris Office  
8 Rue Greuze 75116 Paris, France  
Tel: 33(0)1 56 90 26 00-01  
Fax: 33(0) 1 56 90 26 02  
E-mail: par@boi.go.th

#### Mumbai

Thailand Board of Investment,  
Mumbai Office  
Royal Thai Consulate-General  
12th Floor, Express Towers,  
Barrister Rajni Patel Marg, Nariman Point  
Mumbai 400021, India  
Tel: +91-22-2204-1589  
+91-22-2204-1590  
Fax: +91-22-2282-1525  
Email: mumbai@boi.go.th

#### Osaka

Thailand Board of Investment,  
Osaka Office  
Royal Thai Consulate-General  
Bangkok Bank Building, 7th Floor  
1-9-16 Kyutaro-Machi, Chuo-ku  
Osaka 541-0056, Japan  
Tel: (81-6) 6271-1395  
Fax: (81-6) 6271-1394  
E-mail: osaka@boi.go.th

#### Tokyo

Thailand Board of Investment,  
Tokyo Office  
8th Floor, Fukuda Building West,  
2-11-3 Akasaka, Minato-ku,  
Tokyo 107-0052 Japan  
Tel: +81 3 3582 1806  
Fax: 81 3 3589 5176  
E-Mail: tyo@boi.go.th

#### Seoul

Thailand Board of Investment,  
Seoul Office  
#1804, 18<sup>th</sup> floor, Koryo Daeyongak Center,  
97 Toegye-ro, Jung-gu, Seoul, 100-706,  
Republic of Korea  
Tel: (+82)2 319 9998  
Fax: (+82)2 319 9997  
E-mail: seoul@boi.go.th

#### Taipei

Thailand Board of Investment,  
Taipei Office  
Taipei World Trade Center Room:3E40  
No.5 Xinyi Rd., Sec.5, Taipei110  
Taiwan R.O.C.  
Tel: (886)-2-2345-6663  
FAX: (886) 2-2345-9223  
E-mail: taipei@boi.go.th

#### Guangzhou

Thailand Board of Investment,  
Guangzhou Office  
Royal Thai Consulate-General  
No.36 Youhe Road, Haizhu District,  
Guangzhou 510310 P.R. China  
Tel: +86-20-8385-8988 ext. 220-225,  
+86-20-8387-7770 (Direct Line)  
Fax: +86-20-8387-2700  
E-mail: guangzhou@boi.go.th

#### Shanghai

Thailand Board of Investment,  
Shanghai Office  
Royal Thai Consulate General, No. 18,  
Wanshan Road, Changning District,  
Shanghai 200336, P.R. China  
Tel: +86-21-5260-9876,  
+86-21-5260-9877  
Fax: +86-21-5260-9873  
Email: shanghai@boi.go.th

#### Beijing

Thailand Board of Investment,  
Beijing Office  
No.21 Guanghua Road,  
Chaoyang District, Beijing,  
P.R. China 100600  
Tel: +86 10 85318755-57,  
+86 10 85318753  
Fax: +86 10 85318758  
E-mail: beijing@boi.go.th

#### Sydney

Thailand Board of Investment,  
Sydney Office  
Suite 101, Level 1, 234 George Street,  
Sydney, NSW 2000, Australia  
Tel: +61 2 9252 4884  
E-mail: sydney@boi.go.th

#### Jakarta

Thailand Board of Investment,  
Jakarta Office  
Royal Thai Embassy,  
Jl. DR Ide Anak Agung Gde Agung  
Kav. E3.3 No.3 (Lot 8.8),  
Kawasan Mega Kuningan,  
Jakarta 12950, Indonesia  
Email: jkt@boi.go.th

#### Hanoi

Thailand Board of Investment,  
Hanoi Office  
26 Phan Boi Chau Str., Hoan Kiem,  
Hanoi, Vietnam  
Tel: (84) 24 3823 5092-4  
Email: hanoi@boi.go.th

**BOI Marketing**

