



Thailand: Agriculture Outlook and Response during Covid 19

Shweta Sinha*

Pridi Banomyong International College, Thammasat University, Bangkok, 10200 Thailand

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Abstract

Covid 19 is unprecedented and has had profound impact on the agriculture sector globally. According to the United Nations Thailand Economic Focus, Covid 19 led to contraction in the manufacturing sector in the first quarter of 2020. The three key sectors that faced economic losses during the first quarter of 2020 include agriculture (-5.7%) followed by industry (-1.9%) and services (-1.1%). Reduction in tourists had negative impact on the accommodation and food service activities (-24.1%) on YoY basis. The National Economic and Social Development Council (NESDC) indicated that droughts coupled with pandemic, which act as double disasters, affected a total of 6 million farmers in 2020 impacting their employment or adversely affecting their involvement in agricultural activities. Digital technologies have provided immense support during the period. Microsoft cloud platform has been utilized by the Bank of Agriculture and Agricultural Cooperatives (BAAC) to support Thai farmers. Innovative technology applications have also been used by the private product and service providers. The research methodology includes literature review, interaction and discussion with food industry officials and rice experts to analyze the pandemic influence on agriculture. Apart from the challenges farming households faced during Covid 19 in terms of reduced incomes and increased debts, Covid 19 accelerated the use of digital technologies in the agriculture sector through online platforms, digital payments and digital advisory applications. Covid 19 also poses a great opportunity for Thailand to leverage on technology, innovation and logistics to take the food industry to the next level.

Introduction

Thailand is the world's 11th largest food exporter with a worldwide market share of 2.51 percent, according to the National Food Institute. Thailand had successfully contained Covid 19 cases in the first year with a total of 87 deaths (Worldometers, 2021), but the epidemic has

caused several socio-economic impacts which might have devastating effects in the long term. Thailand's government imposed a curfew on the 3rd of April 2020 to discourage people from violating physical distancing and to allow operations of essential businesses. Thailand's economy contracted at 6.1% in 2020, the worst ever since the 7.6% decline during the Asian Financial Crisis in

1997. In 2021, Siam Commercial Bank (EIC) forecasted growth of 2.2% because of very slow recovery of foreign tourism, depressed export demand and revival of Covid 19 (Deloitte, 2021).

Thailand Labor Force Survey observed as increasing unemployment rate in various sectors during April-May 2020, 0.3% in agriculture, 1.3% in manufacturing, 2.8% in construction, 1.2 % in wholesale and retail and 2.2% in hotel and restaurant businesses and was expected to increase if Covid 19 continued until Q3. The sectors most impacted by unemployment were tourism, restaurants & food shops, hospitality industry, retail & wholesale, logistics and construction. The Social Security Office in Thailand also indicated that foreign tourists declined by 83% in 2020 and were expected to reach 4 million in 2020 and it could take 2-3 years to revive as normal pre Covid levels.

Thailand ranks 51st on the global food security index, 32nd in terms of food affordability and 67th in terms of food availability (The Economist, 2020). NESDC indicated that the real GDP growth rate in the agriculture sector was expected to decline -3.9% in 2020 and bounce back at 2.2% in 2021 as compared to 5.0% in 2018 and 2.0% in 2019, respectively. Although a decline was seen in 2019, Covid 19 slowed down the growth rate significantly (World Bank Group, 2021).

Thai agricultural sector employs 24% of the total (38 million) workforce with 62% of Thai agricultural households dependent on income from general employment outside the agricultural sector (Deloitte, 2021). The agriculture sector generates the lowest value added per worker with the slowest growth amongst other economic sectors accounting for only 10% of GDP in 2019 (United Nations, 2020b). The agricultural sector has been adversely affected by partial lockdown and measures to suppress the epidemic has affected most household income.

Covid 19 is unprecedented and best practices and mitigation measures continue to evolve. The study documents how the pandemic has impacted the various players in agriculture and food systems in Thailand and provides suggestions on how technology can be utilized not only to mitigate its impact but also accelerate the journey towards some of the policy goals. It examines the agro-economic trends post the onset of the pandemic as well as its impact on food security and nutrition, which was further exacerbated by droughts. Further analysis was undertaken to understand its impact on rice and other food systems. Literature review was carried out

based on secondary data available from public and private stakeholders. The information collected was further validated through interviews with experts from government, food industry and academia and considers the response from various stakeholders including government measures and subsidies. Noting the important role that digital technology has played during the pandemic, it emphasizes on the importance of technology and shares the emerging trends and application in the agricultural value chain.

Agriculture Sector: Trends during Covid 19

Various studies indicate that Covid 19 had major disruptions in transportation and logistics which led to changing market demands and impacted agricultural households with high debt burden (Aday & Aday, 2020; FAO, 2020). Farmers in the south of Thailand faced maximum decrease in agricultural income by around forty percent (Puey Ungphakorn Institute for Economic Research, 2020). According to BAAC, 54% of Thai farmer households are on debt settlement or debt restructuring programs mostly from the central and metropolitan regions of Thailand and 50% of approximately 4.5 million farmers have debt of more than 200,000 THB (Thai Baht) and 20% of farmers have debt of more than 400,000 THB. With restrictions at both domestic and international level, the middleman merchant has disappeared and the farmers are facing lower price for their product and marketing problems have reduced the income levels as well. Exporting for products like rice, cassava and rubber trees were impacted due to the lockdown. The Trade Policy and Strategy Office (TPSO) reported that exporting products of Thailand in June 2020 valued at US\$16,444.3, a decline of 23.17% from July 2009. Major stakeholders impacted were the food companies and several retailers. While big retailers had little negative implications, the small retailers were heavily damaged and many small retailer stores, have been forced to shut down their businesses. According to the Government Saving Bank (GSB) research estimations, the growth of these retailers dropped by 10.0%-13.6% compared to last year.

Besides the agricultural food system, consumption behavior has also impacted the market. For many food businesses, fewer customers led to lay off employees, in order to sustain their businesses. This contributed to increasing unemployment and slowing down the economy creating problems of food security in terms of

access and appropriate nutrition.

Food loss has been a major concern during Covid-19. Logistics disruptions were responsible for the damage of products such as fruits, vegetables and livestock. The domestic poultry market accounts for 62% of total production where demand of meat products particularly declined due to the closure of restaurants and decline in tourism. Consumers explored alternatives that involved less meat consumption and were more economical. Also, chicken price had declined from 33-36 THB in March to 30 THB per kg in April (Agroberichten Buitenland, 2020).

Thailand's Q3/2020 experienced a slight recovery as the GDP contracted by 6.4% as compared to 12.1% in Q2/2020. This was a result of improvements in total exports of goods and services, private investment, and private final consumption expenditure. During this period, the government expanded the final consumption expenditure and public investment (The Nation, 2021).

Perception of people clearly influenced market behavior and demand. Surveys conducted by Suan Dusit Poll and GroupM Thailand reported that consumers preferred plant-based protein, immune boosting foods and other natural local ingredients either because they believed natural food were healthier or due to the limited

opportunity caused by lockdown (FFTC-AP, 2020). Covid 19 has impacted overall economic slowdown, disrupted supply chains and increased inequalities, further impacting food prices, change in demand and production and shifting food patterns and environment that could lead to food insecurity issues (Fig.1).

The Committee on World Food Security through the HLPE Global Narrative report highlighted six dimensions of food security including availability, access, utilization, stability, agency and sustainability (Committee of Food Security HLPE, 2020). These issues discussed with the agricultural experts and consumers clearly highlighted the impact of Covid 19 to all dimensions especially sustainability as they witnessed reduced attention to environment and climate change issues, rise in food losses and waste, rise in plastic waste through packaging and overall social and economic losses affecting food systems (Table 1).

Covid 19 and droughts acting as double disaster

Covid 19 further worsened the impact on households that have already been affected by droughts, stagnant wages and increasing poverty in 2016 and 2018 (The World Bank, 2020). During April 2020, about 6,255

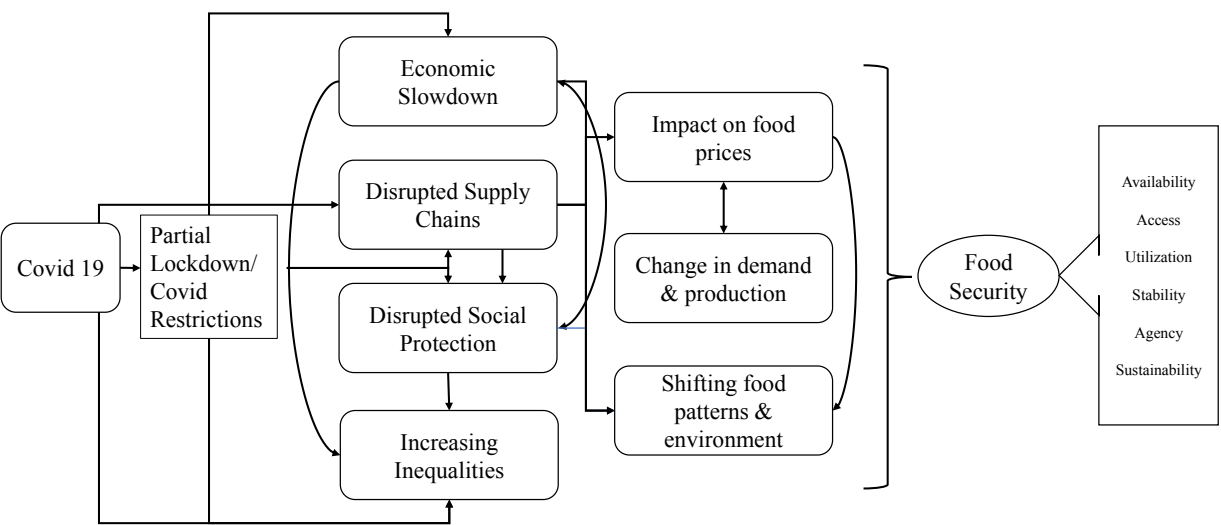


Fig. 1 Linkages between Covid 19 and agricultural landscape
Source: Adapted from Moseley et al. (2020)

Table 1 Impact of Covid to all dimensions of food security and nutrition

| Dimensions of food security and nutrition | Criteria |
|---|---|
| Availability | <ul style="list-style-type: none"> • Disrupted supply chains • Shortage of labour • Closure of high-risk locations such as restaurants, food stalls and processing plants • Farmers shifting to lower risk crops |
| Access | <ul style="list-style-type: none"> • Jobs and income loss • Increasing food prices • Disruption of school meal programme • Reduced safety nets or access to them • Closure of informal and local nearby markets |
| Utilization | <ul style="list-style-type: none"> • Shift to cheaper / less healthy diets • Shift towards processed and shelf stable food • Link between malnutrition and Covid -19 |
| Stability | <ul style="list-style-type: none"> • Access to markets and inputs • Disrupted supply chains • Restrictions on exports • Unpredictable price |
| Agency | <ul style="list-style-type: none"> • Access to ICT • Loss of economic and social empowerment • Loss of jobs and affiliations • Restrictions to meet, demonstrate and organize • Weakening farmers' and producers' organization |
| Sustainability | <ul style="list-style-type: none"> • Rise in food loss and waste • Rise in plastic waste through packaging • Reduced attention to environment and climate change issues • Social and economic losses affecting food systems |

Source: Adapted from Committee of Food Security HLPE (2020)

villages in 24 provinces had been declared as drought affected areas and the dam and reserves had 49% of its water capacity (Bangkok Post, 2020a). The forest fire further created health concerns in the north of Thailand. The vulnerable labor migrants returned back to their country. Over 120 thousand workers returned to Myanmar from Thailand during March-October 2020 (FAO, 2021), more than 90 thousand returned to Cambodia and about 120 thousand returned to Laos during March-June 2020 (ILO, 2020). This crisis was very different from the Asian financial crisis where reverse migration created opportunity for laborers to work in their homeland. Droughts and other structural problems in the same period created challenges in fulfilling the employment requirements in the agricultural sector.

According to TMB analysis, food products in Thailand were categorized as positive, moderate and slow recovery products. Positive recovery product included frozen meat and canned fruit and vegetables that projected increase both in domestic and export markets. Moderate

recovery products included rice and grains, palm oil and seafood that projected increase domestically with high competition in the region and slow recovery products included rubber, tapioca and sugar (TMB, 2020). Neither of the demands increased due to Covid 19 and severe drought, as it depended on foreign markets.

Because of the pandemic, healthy, functional and processed food were seen to have higher demand as consumers were preparing for a lockdown, or stocking for possible major outbreak. In addition, livestock has seen a surge in demand in the international market according to the Office of Agricultural Economic (OAE). The high rate of informal consumption debt in Bangkok had already created insufficient income for a group of people even before Covid 19 (United Nations, 2020a) and the lockdown further reduced the income for many families involved in the informal sector and lowered its ability to purchase basic necessities. The most vulnerable were the migrant workers from the rural north-eastern provinces that returned home with less money than they previously earned adding stress to their local food resources.

Rice market during Covid 19

Thailand's rice market had positive and negative impacts from Covid 19. Positively, because other major rice exporting countries such as India, Vietnam and Cambodia were concerned about their supplies during the pandemic and imposed restrictions on rice export between late March to April. This temporarily led to increase in Thai rice export inflating the price up to 570 USD/MT that is 43 percent higher compared to the same period in 2019. But after Vietnam removed their restriction, Thai rice export price dropped to 470 USD/MT (Fig. 2a, c). However, the price was 18% higher than in 2019 because the off-season rice production declined by 40% due to severe drought. After Vietnam resumed its exports in May and with the return of other competitors, Thailand's rice exports declined. The rice market was further negatively impacted as many countries introduced restriction policies on imports creating further difficulties for agricultural exports and decreasing the income of exporting companies directly. A decrease in rice prices were seen reflecting the decline in the purchasing power in the country (Fig. 2b).

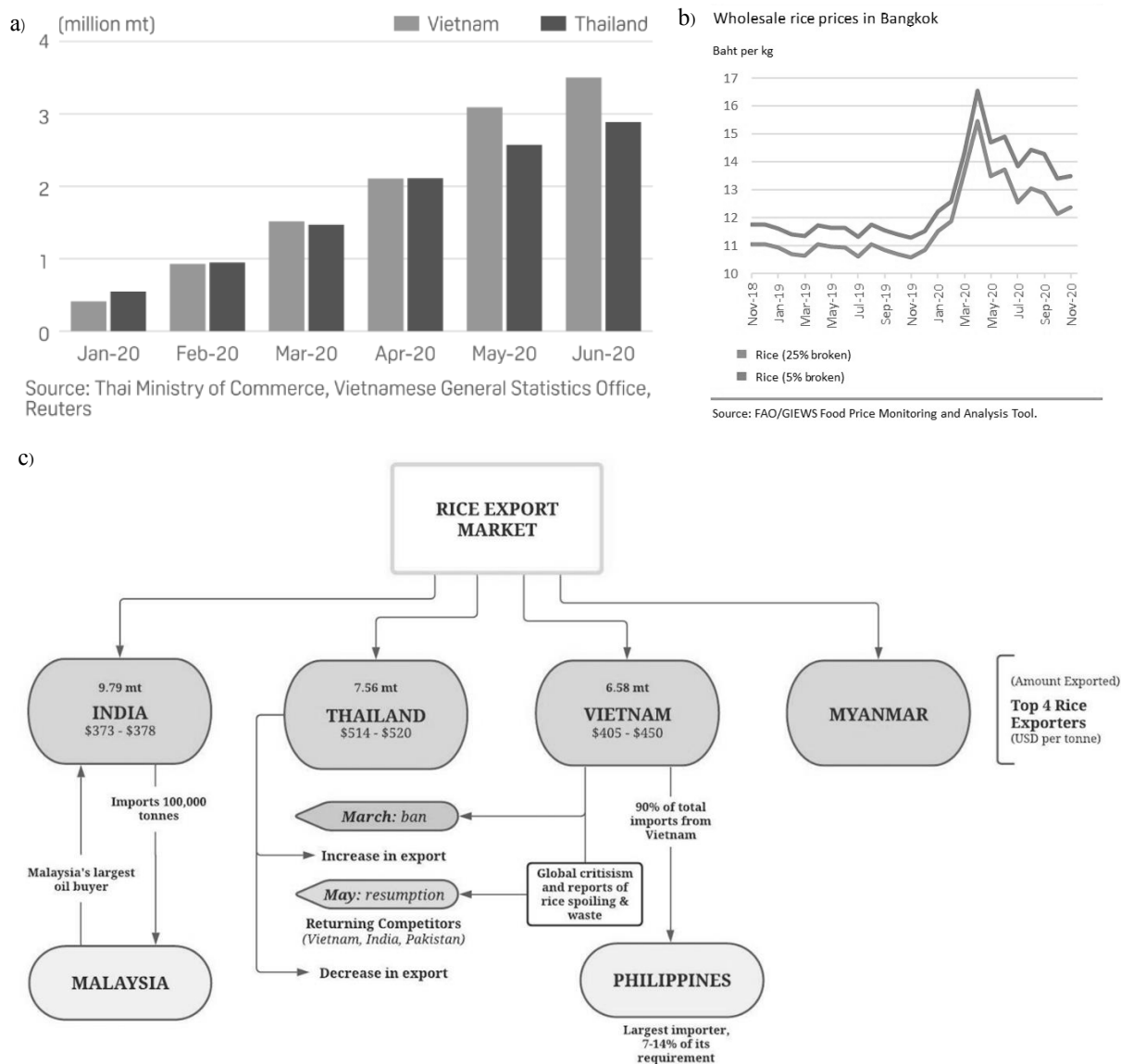


Fig. 2 Rice market during Covid 19 (a) Vietnam and Thailand rice exports during Covid 19 (b) Wholesale rice prices in Bangkok (c) Analyzing rice export scenario during Covid 19

Source: Adapted from USDA (2020); TRIDGE (2020); NIKKEI Asia (2020); (Bangkok Post, 2020b); Reuters (2020); IMF (2020); The Nation (2021)

Meat, eggs, milk and fisheries

Local demand for several food products declined in Thailand such as chicken meat, pork, fishery products, milk, wheat-based products and fruit. Small wheat flour mills were heavily impacted by the government's lockdown enforcement in the first half of the year which caused a reduction of domestic wheat consumption. Decrease in the wholesale prices for livestock, eggs and

fishery products were seen (Fig. 3).

Ministry of agriculture and cooperatives (MOAC) also indicated that shrimp prices declined 10.6% YoY basis in 2020. Hog and shrimp prices saw a dip during April and the prices shot up again in May (USDA, 2020). Egg price saw a rise as the lockdown was announced but soon the government realized people were hoarding eggs and a ban on the exporting of eggs was introduced to ease the domestic consumption. Similar decline was

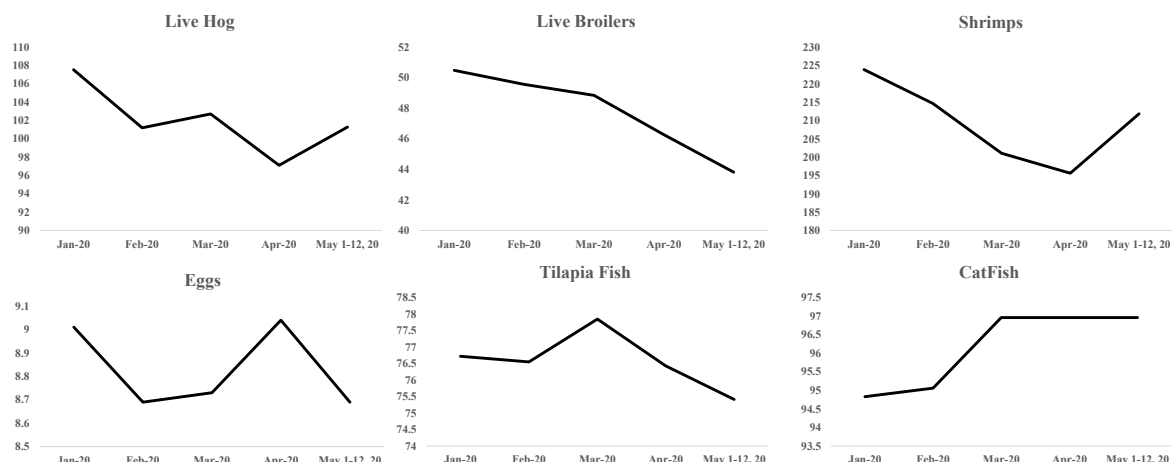


Fig.3 Wholesale prices of various food items in Bangkok

Source: Data adapted from Ministry of Commerce, 2020 (USDA, 2020)

observed with broilers and tilapia fishes. The worst hit was broiler farms and chicken meat processing factories as they had stock piled and had to somehow disperse it reducing the price by more than 13% from January to May. At the same time, milk production industry was also hit as the schools were closed due to the lockdown. As half of milk consumption is from government schools and the other half from commercial sales that was also disrupted in the lockdown period (Pattaya Mail, 2020).

Impact on agricultural stakeholders

All stakeholders across the agricultural value chain were seen to have varied impact. Major stakeholders

impacted were the food companies and several retailers. While big retailers had little negative implications, the small retailers were heavily damaged and many retailer stores have been forced to shut down their businesses. Examples of some organizations/stakeholders having positive and negative impacts have been highlighted across the value chain (Fig. 4). Central Food Retail reported 710 million USD sales revenue, 4% increase from previous year. Siam Makro also reported an increase in sales, 9% growth rate for the first quarter at 1.7 billion USD. Covid 19 also indicated growth on retailers online shopping platforms, although it may only be around 10-15% of the total revenue.

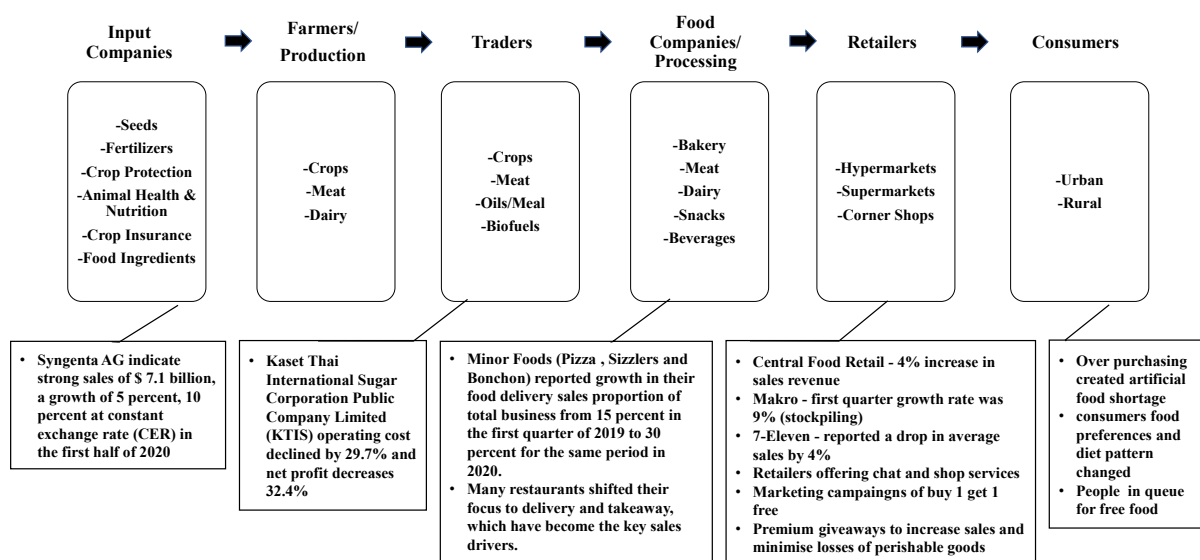


Fig. 4 Highlights of positive and negative impacts on agriculture stakeholders in Thailand

1. Input Industry: Thai Seed Trade Association (THASTA) and the Seed Association of Thailand (SAT) together contribute significantly to the Thai seed industry where the seed market was valued approximately US\$ 565 million in 2016. Thailand has been an attractive hub for seed production not only for the domestic varieties but also exporting vegetables seed to India, Vietnam, China, US. Approximately, 20% of corn production in Thailand is kept for domestic consumption, the rest is exported to Vietnam, Myanmar, Indonesia and other neighboring countries (Mordor Intelligence, 2020). Syngenta AG, Bayer AG, East West Seed (Thailand Co.), Pioneer Hi-Bred (Thailand Co.) are amongst the top seed market players in the region. Syngenta AG indicate strong sales of US\$ 7.1 billion, a growth of 5%, 10% at constant exchange rate (CER) in the first half of 2020, where the crop protection sales improved by 6% (12% at CER) and seed sales improved by 2% (9% at CER) (Syngenta Group, 2020).

2. Farmers/ Production: Thailand's domestic markets accounts for 62% of poultry production. About 85% of fisheries and seafood production goes for export and fruits exports are worth 88,000 million baht per year (Agroberichten Buitenland, 2020). Production has been stable while huge decline in exports have been observed. More than direct impacts from Covid 19, farmers face indirect impacts such as decline in production because of droughts, while income from non-farm activities (60% of their total income) and remittances have also declined. Besides, decline in tourism has reduced the food demand by 66.2% on YoY basis (Thailand Development Research Institute, 2020).

3. Traders: Thailand rice export forecasts were slashed to 6.5 million tons, the lowest in 20 years because of the early year drought and also the rise in prices making it uncompetitive in global market. Although export of Thai jasmine rice increased by 63% because of the panic purchasing done by countries during Covid 19 (Reuters, 2020).

4. Food Companies/Industry: Thai food industry currently comprises of around 30 thousand food processing factories generating an annual income of about US\$25 billion according to the National Food Institute. Thailand food industry sources 80% raw material locally and is expected to grow by 2.6% annually. Some of the multinational leaders are Nestle, Thai Union, Charoen Pokphand Group, Dole Thailand, Betagro, P&G and Ajinomoto. Nestle pet foods experienced 9% growth in 2020 as compared to last year, partly because during

the Covid 19 consumers spent more time with their pets. Unilever was impacted by the disruption in transportation and logistics. As an alternative, it produced sterilization products for hospitals, schools, and other venues. It included product donations, collaborations, and legitimate handwashing education programs through government agencies and independent organizations to help communities in great need. Apart from that, Unilever's suppliers and customers provided financial liquidity for 17.5 billion baht to support the livelihoods of individuals in the value chain (UNICEF, 2020).

5. Retailers: Siam Makro Public Company Limited, a wholesale business under the Charoen Pokphand Group (CP) was impacted in both positive and negative ways. Panic buying especially in the dry food segment during March 2020, positively affected sales of the Makro business in Thailand and abroad. While the food business service was severely hit, declining mid-February 2020 onwards because of the widespread impact on the tourism industry. However, revenue, service fees, and other income of Makro totalled 1,149 million baht. The company's total revenue was 56,308 million baht, an increase of 4,509 million baht or 8.7% compared to the same quarter last year indicating a growth of 10.7% within a year (The South African, 2020). TESCO believes that the impact of Covid 19 will last for another three years. In this period TESCO is focusing on opening small branches like TESCO Express in the EEC or Eastern Zone gaining benefits from local nearby logistics.

6. Consumers: The National Statistics Office (NSO) suggests that Thai household spent about 33.9% of their expenditure on foods and beverage based on their preferences and taste rather than cleanliness and nutrition (FFTC-AP, 2020). Post Covid 19, consumers are more concerned regarding the health, food safety and hygiene making the consumers more conscious and aware engaging more digitally. McKinsey & Company research indicated that consumers seemed worried about the increasing meal cost because of the takeout, delivery and ready meal consumption preferences. 41% respondents suggested that grocery spending has increased and 92% respondents who have switched stores will move back to their original stores post Covid 19 situations (McKinsey & Company, 2020).

In the initial days of the lockdown, artificial shortage of food made some food items more expensive. Consumers also panicked and over purchased and stocked up on food items leading to empty racks at various retailers in Thailand. The poor could not access various

items as they did not have enough resources to purchase food items and were seen in queues for free food distribution because of the rising food prices. With reference to commercial sales, the McKinsey survey indicated that people in Thailand have been getting more conservative with their money since the pandemic and they are also cautious in going out to buy groceries. Thailand's consumers have found a way to avoid their fear of going to stores through E-marketplaces and food/groceries delivery services practicing social distancing. Their preference of cooking at home increased by 57.48 percent (HFocus, 2020).

Measures and Policies by Ministry of Agriculture and Cooperatives (MOAC)

Thai government supported various initiatives such as Kon La Khrueng campaign, Rao Mai Thing Kun campaign, Shop Dee Mee Kuen campaign, etc. to promote buying and selling of agricultural products. The

Ministry of Agriculture and Cooperatives (MoAC) and the State Bank for Agriculture and Agricultural Cooperatives (BAAC) established financial aid, an exemption for repayment of loans to restore and balance the effects of the pandemic. Thailand planned a new large-scale cash transfer programs to support vulnerable individuals that were not registered in any social protection database earlier (Table 2). This scheme supported almost half of the employed informal workers in Thailand.

There have been three main categories of beneficiaries:

(a) Informal off-farm workers received 5,000 baht per month for 3 months (April to June) under the 'No-One Left Behind' scheme. At about 37% of monthly GDP per capita, this amount is close to the median monthly income for informal workers in most sectors and is higher than the global average of cash transfers provided in response to Covid 19. To date, over 15 million recipients have received this assistance (almost

Table 2 Thailand key fiscal measures under the 1 trillion-baht emergency decree

| | Planned amount (Bln baht) | % GDP | Approved amount (Bln baht) | Disbursed amount (Bln baht) | Target recipients (Mln) | Total recipients (Mln) | Timeframe |
|---|------------------------------|-------------|-------------------------------|--------------------------------|----------------------------|---------------------------|---------------------|
| 1) Healthcare measures | 45.0 | 0.27 | 2.56 | 0.52 | | | |
| 2) Relief measures for households, farmers, entrepreneurs | 555.0 | 3.29 | 365.66 | 310.59 | | | |
| - 5,000 Baht cash transfer to the informal workers for 3 months – "No-One Left Behind" 15 | 170.0 | 1.01 | 170.0 | n/a | 16.00 | 15.30 | Apr – Jun 2020 |
| - Farmer assistance of 5,000 Baht for 3 months | 150.0 | 0.89 | 150.0 | 114.31 | 10.00 | 7.59 | May – Jul 2020 |
| - 1,000 Baht cash transfer to the state welfare card holders for 3 months | 3.49 | 0.02 | 3.49 | 3.49 | 1.16 | 1.16 | May – Jul 2020 |
| - 1,000 Baht cash transfer to the vulnerable groups for 3 months | 20.35 | 0.12 | 20.35 | 20.35 | 6.78 | 6.78 | Jun – Oct 2020 |
| - Top-up of the state welfare card holders of 500 Baht for 3 months | 20.92 | 0.12 | 20.92 | n/a | 13.95 | n/a | Oct – Dec 2020 |
| - 15,000 Baht cash transfer to the formal workers by Social Security Office | 0.89 | 0.01 | 0.89 | 0.89 | 0.059 | 0.059 | Aug – Oct 2020 |
| - Available for additional (as yet unannounced) measures | 189.34 | 1.13 | | | | | |
| 3) Recovery and rehabilitation measures | 400.0 | 2.37 | 120.07 | 9.73 | | | |
| - "We Travel Together" Program | 20.0 | 0.12 | 20.0 | n/a | | | Jul 2020 – Jan 2021 |
| - Uplifting large agricultural plots with new technology and market integration | 13.9 | 0.08 | 13.9 | n/a | 0.26 | | Aug 2020 – Sep 2021 |
| - Co-payment program of not more than 3,000 Baht/person | 30.0 | 0.18 | 30.0 | 9.22 | 10.0 | 8.77 | Oct – Dec 2020 |
| - Promotion of employment on new graduates in public and private sectors | 19.46 | 0.12 | 19.46 | n/a | 0.26 | | Oct 2020 – Oct 2021 |
| - Other approved measures | 36.69 | 0.21 | 36.71 | n/a | | | FY2021 onward |
| - Available for additional (as yet unannounced) measures | 279.93 | 1.66 | | | | | |

Source: NESDC, Fiscal Policy Office, Thailand (World Bank Group, 2021)

all those eligible), at a total cost of 230 billion baht (about 1.4% of GDP). The program was not extended beyond June.

(b) Farmers also benefited from a similar cash transfer of 5,000 baht per month for 3 months (May to July). As of November 2020, around 7.6 million farmers had received this assistance (around three quarters of those eligible), at a total cost of 114 billion baht (about 0.7% of GDP).

(c) Social assistance beneficiaries received top-ups to their regular programs to help them cope with the economic impact of Covid 19. A cash transfer of 1,000 baht per month was paid for 3 months (May to July) for young people up to age 6, older people, and people with disabilities. In the December quarter, state welfare card holders are receiving increased payments totaling 500 baht/person/month; the existing cash transfer is 200-300 baht/person/month.

The major challenge faced by these programs was determining the eligibility. While many of the most vulnerable in Thailand have now benefitted from government support, some vulnerable groups are likely to have missed out, including informal migrant workers. Nevertheless, the expiration of these benefits is already likely to have had significant impacts on the incomes and welfare of these groups, and these impacts may persist in the absence of further targeted support.

Role of Technology

Covid 19 became a major trigger point which forced producers, distributors and consumers to turn towards technology enabled alternatives. This trend influenced food safety and transparency that cannot be ignored for maintaining daily hygiene and dietary preferences. It also gave opportunity to existing stakeholders to explore ways for raising standards in agriculture production and distribution. Kasikorn Research Center forecasted that total number of deliveries in 2020 will increase to 66-68 million times which is about 78.9 - 84.0 percent growth rate compared to last year (Kasikorn Research Center, 2020). According to the research, the growth rate of food delivery platform illustrates trend of consumption which means consumers and producers would benefit from it. The food delivery platform tends to exploit and expand the gap between major and minor actors in the food supply chain.

Online platforms played an important role during the pandemic and created opportunity for the retailers.

Many retailers shifted to online selling and home delivery that indicated positive outcomes. TESCO Lotus adapted the marketing strategy of “Chat and Shop” and e-commerce delivery services. In order to address the decline in fruit export during the first quarter of 2020, the Ministry of Agriculture and Cooperatives (MOAC) in collaboration with 1,300 agricultural co-operatives started marketing through online platform (Ministry of Agriculture and Cooperatives (MOAC), 2020) providing promotions and discounts for domestic consumption. Other applications like Grab and TALAD APP were also used to increase sales in all provinces.

Conclusion

Covid 19 is an ongoing crisis and is yet to fully reveal real impacts on all industries. The impact of the pandemic on the agriculture value chain varied across different players. While it led to increased unemployment, enhanced food security risks and greater challenges for the most vulnerable, it also increased adoption of digital technology by various actors in the value chain including input companies, producers, food companies, retailers, and consumers. This shift to use of technology provides a great opportunity to Thailand in building back better through policies and incentives that accelerate the Thailand 4.0 agenda, improve benefits to farm workers and assist in reducing the uncertainties posed by the pandemic. Farmers and producers are facing losses in revenue and contribute to the negative implication of Covid 19 in the long term. At the same time, retailers are the ones who gain the opportunity in the crisis by shifting to online platforms. Some of the future steps and way forward supporting the agriculture system include:

1. Accelerating the use of digital technologies:

Apart from the challenges farming households faced during Covid 19 in terms of reduced incomes and increased debts, Covid accelerated the use of digital technologies in the agriculture sector through online platforms, digital payments and digital advisory applications. This will further boost the growth of food industry in accordance with Thailand 4.0.

2. Implement robust direct benefit transfer (DBT): Thailand can benefit by implementing digital payment infrastructure by integrated citizens' digital ID with bank account and mobile system for example application of JAM Trinity in India. Other countries like Togo and Bangladesh were also exploring such opportunities to benefit during Covid 19.

3. Opportunity to develop the agriculture sector:

Thailand for years has been producing far more food than it consumes. In 2019, Thailand exported US\$ 33 billion worth of products including rice, processed food and tropical fruits. United Nations forecasts that global demand of food will increase by 60% in the upcoming decade in addition to the insecurities created by Covid 19. It could be a great opportunity for Thailand to leverage on technology, innovation and logistics to take the food industry to the next level.

This aligns with Thailand 4.0 program that has identified 'food for the future' and 'advanced agriculture and biotechnology' among the 12 target industries. Eastern Economic Corridor (EEC), which is a key component of the program, should encourage the use of technology and smart farming approaches to increase the competitiveness of Thailand agriculture sector.

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