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Policy responses of the COVID-19 pandemic in the Philippines: Impacts on the profitability of the agri-food supply chain[1]

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Abstract

The Philippines experienced many challenges brought about by the COVID-19 pandemic. In 2020, the country experienced a decline in economic growth. The agri-food sector's micro, small and medium enterprises (MSME) are amongst the country's most vulnerable. This study analyses the various policy constraints and enablers related to food manufacturing as well as the distribution in the agri-food supply chain. This study applied a mixed methods approach. Interviews with 30 agri-food enterprise owners and key officers were conducted and concept mapping was applied using Leximancer software. Key themes emerged including introduction of new products, increased online selling activity, limited supply of inputs and packaging materials, increased cost of production and delivery, and availability of government assistance. A subsequent survey (n=125) for the food manufacturers, logistics operators, traders, wholesalers, and retailers was also implemented. The effect of policy measures on enterprises' profitability was assessed using ordered probit regression. The results suggest that the likelihood of reporting profitability after the pandemic increases when the owner or key officer is male, the business is operating under a partnership, enterprises suspended their operations at some point during the pandemic, enterprises implemented health and safety protocols for their employees, there is no oversupply of employees during the lockdown period, and enterprises increased operation work hours during lockdown. The study also highlighted that manufacturing and distribution of food during the pandemic should be unhampered. However, MSMEs in the agri-food chain experienced delays and increases in prices of raw materials despite clear policy guidelines. Inter-regional trade was affected due to varying localised policies on health protocols and lockdowns. These policy constraints generally affected the profitability of the enterprises.

***Keywords*:** Agri-food supply chain, COVID-19, food manufacturing, mixed methods, profitability

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Introduction

The Philippine agricultural sector, which traditionally focused on rice, has grown marginally despite the implementation of government policies intended to boost production. Overall, the share of agriculture to gross domestic product (GDP) had fallen before the COVID-19 pandemic, but the share of food and beverage has held constant. Local agri-food chains experienced peaks and troughs before the onset of the pandemic. The archipelagic nature of the Philippines introduces high logistics costs (World Bank, 2020) while rapid urbanisation has precipitated a change in the nature of food retailing (Reardon *et al.*, 2003), particularly the rapid growth of local retail companies (Romo *et al.*, 2009).

The social and economic impact of COVID-19 in many countries is well documented (Lasco, 2020). Supply chains have been particularly affected (Butt, 2021a; Butt, 2021b; Paul and Chowdhury, 2021), including agri-food systems (Barrett, 2020; Béné, 2020; Butler *et al.*, 2021; Coopmans *et al.*, 2021; Dixon *et al.*, 2021; Tripathi *et al.*, 2021). Food processing in low-income economies may be particularly vulnerable due to their labour dependence (Schmidhuber *et al.*, 2020). Lower prices and demand prompted some agro-processing companies to reduce production (Lopez-Ridaura *et al.*, 2021).

Disruption to food systems was brought about largely by COVID-19 mobility restrictions. These delivered income shocks and reduced food security. These restrictions also pose a significant impact on the variety of food available to households (Espino *et al.*, 2021). Food system actors are vulnerable, in that the effects of shocks on one actor can reverberate throughout the chain (Béné, 2020). Southeast Asian countries have implemented measures to contain the spread of COVID-19 while also facilitating the operation of important nodes in the food chain such as food production, processing, and distribution (Gregorio and Ancog, 2020). Policy plays a role in the development of these chains in developing nations (Hainzer *et al.*, 2019) as well as supporting the growth of MSMEs (Devaux *et al.*, 2018). Overall, such interventions have served to enhance the resilience of farming and food systems (Dixon *et al.*, 2021).

Gregorio and Ancog (2020) and Lee *et al.* (2020) listed some interventions in Southeast Asia. Public health protocols such as social distancing and mandatory face masks were implemented. National governments pledged support to the continued operations of food supply chains. Singapore stockpiled food supplies in anticipation of disruptions in neighbouring Malaysia. Financial assistance was extended to farmers in Thailand to ease the negative effects brought by the pandemic. Vegetables were purchased directly from farmers in Malaysia and Thailand and were given as relief goods, while Vietnam launched rice-dispensing machines to facilitate food distribution. In Cambodia, virtual extension services were facilitated to farmers to avoid personal interactions (Gregorio and Ancog, 2020). For consumers, online purchases of food increased mirroring the events in the SARS outbreak in China that helped jumpstart e-commerce (Reardon *et al.*, 2021).

Since the Philippines' first local case of COVID-19 on the 7th of March 2020, there have been a further 3.3 million cases and over 53,000 deaths as of 20 January 2022 (Dong *et al.*, 2020; Department of Health (DOH), 2022) and a decline in GDP (Asian Development Bank (ADB), 2021a; ADB, 2021b) along with widely acknowledged reductions in consumption and investment. Subsequent public policy responses influenced the nation's economic activities. These include government loans or loan guarantees, employee subsidies, and mobility exemptions for workers in the food systems. Socially-oriented policies such as barriers to food exports have also been implemented (Oxford Economics, 2020). Lockdowns preventing workers from travelling for work have had consequences along the agri-food supply chains. Palo *et al.* (2020) observed that, in the National Capital Region (NCR) and throughout Luzon, workers in healthcare, food processing and distribution were exempted from work suspension, when enhanced community quarantine (ECQ) was declared in March 2020, but other food sector workers may not have been exempted.

There are some 995,745 micro, small, and medium enterprises (MSME) in the country, comprising 99.5 per cent of the total number of businesses (Department of Trade and Industry [DTI], 2020a). Some 11 per cent of MSMEs are in the food processing sector, second only in size to the retail and wholesale industry (47 per cent) (Asia Pacific Foundation of Canada [APFC], 2018). While enterprises strive to operate profitably (García-Arca *et al.*, 2014), MSMEs in the manufacturing and service sectors are the most affected by COVID-19's economic impacts (ADB, 2020). According to the ADB (2020), lockdowns imposed in the Philippines led to temporary closures of more than 70 per cent of MSMEs in these sectors. Aside from labour availability, closures were due to a reduction in domestic demand, delays in the delivery of products and interruptions in production. Other reports indicate that in March 2020, 60 per cent of the microenterprises in the Philippines reported no sales, while 45 per cent and 36 per cent of small and medium enterprises, respectively, reported no sales. The revenue of 89 per cent of microenterprises, 90 per cent of small enterprises and 77 per cent of medium businesses suffered reductions of at least 30 per cent (Shinozaki and Rao, 2021). For businesses in agriculture and manufacturing that remained open, a significant decline in demand (more than 40 per cent for both sectors) was observed. Some 40 per cent of these businesses encountered disruptions in the supply chain, and 39 per cent experienced cancellations in contracts. Notably, almost 20 per cent of Philippine MSMEs saw an increase in demand during this time (ADB, 2020), and this included 10 per cent of MSMEs in services and agriculture. Supply chain disruptions also impacted the business operations and sales performance of MSMEs in the country, particularly in Davao region (Laorden *et al.*, 2022).

In the current study, we analyse COVID-19 public policies in the Philippines, focusing on the operations and experiences of Filipino food manufacturing and distribution actors in the agri-food chain. We employ a mixed methods approach to determine the extent of the effects of COVID-19: key informant interviews (KII) to obtain a first-hand view of the food chain actors' experiences and an ordered probit regression model to identify determinants of performance during the COVID-19 pandemic in the Philippines.

Methodology

Approach

Our general approach follows the policy-response-impact nexus. First, we identified the policies implemented by the government relating to agri-food enterprises during the COVID-19 pandemic. Second, we analysed the response of agri-food enterprises to these policies using a mixed methods approach. This involved identifying key themes that emerged from the key informant interviews for qualitative analysis and using ordered probit regression to identify the drivers of profitability focussing on policy responses by the enterprises for quantitative analysis embedded with qualitative results to support the findings. Lastly, we identified the impact of COVID-19 policies on agri-food enterprises by synthesising the results of the qualitative and quantitative approaches.

Following previous studies utilising mixed methods approaches in analysing the impacts of the COVID-19 pandemic on agri-food chains (Coopmans *et al.*, 2021; Tripathi *et al.*, 2021), we used the same methodology by incorporating KII regarding COVID-19 experiences of food industry MSMEs and an ordered probit regression in modelling profitability drivers during the COVID-19 pandemic. The mixed methods research design utilises both qualitative and quantitative research approaches to integrate the information from both methods (Denscombe, 2008; Salkind, 2010). The effect of some COVID-19-related policies by the Philippine government agencies and institutions on agri-food enterprises was analysed.

First, KII was used to collect qualitative information from the owners and key officers of enterprises (Shaw and Carter, 2007) regarding their experiences with the COVID-19 pandemic. Unsupervised

concept mapping using semantic and relational extraction techniques was applied using Leximancer software which identifies keywords and themes (Smith and Humphreys, 2006).

Second, a survey of owners or key officers from food supply chain actors (i.e. food manufacturers, distributors, traders, wholesalers and retailers) was conducted using Google Forms. The analysis employed profitability as the dependent variable on an ordered response scale. Ordered probit analysis was used due to its suitability for modelling firms' profitability (Halabí and Lussier, 2014; Tundui and Tundui, 2018). Quantitative data curation was first organised using Microsoft Excel, and Stata 13 was used for the data analysis.

Data collection

For KIIs, a master list of registered entrepreneurs obtained from the Philippines' Department of Trade and Industry (DTI) was used as the basis for choosing the key informants. The list was reduced or limited to food manufacturers. A total of 30 food manufacturers were interviewed from January to May 2021, with each interview lasting approximately one hour. The participants came from the three major groups of islands of the Philippines (Luzon, Visayas, and Mindanao) and were interviewed via video conference and mobile phone calls. Before each interview, consent from the participants was obtained. Data were then transcribed and translated from the predominant local language to English prior to analysis using Leximancer.

The online survey on the impact on profitability included 125 food supply chain actors – constituting MSMEs from Luzon, Visayas, and Mindanao as identified from the master list provided by DTI. Further, MSME participants were classified according to the number of employees: (a) micro enterprises = 1 to 9 employees, (b) small enterprises = 10 to 99 employees, and (c) medium enterprises = 100 to 199 employees (Senate of the Philippines, 2012). The questionnaire was streamlined and pre-tested in February 2021. Consent from each participant was obtained before they proceeded with the online survey through Google Forms in April and May 2021.

Data analysis

Using the maximum likelihood estimation method, equation (1) shows the ordered probit modelling the latent random variable response as follows:

$$Profitability = \beta_1 Age + \beta_2 Gender + \beta_3 Education + \beta_4 CivilStatus + \beta_5 SocialSecurity + \beta_6 Savings + \beta_7 YearsBusiness + \beta_8 Partnership + \beta_9 OtherStructure + \beta_{10} SellOnTime + \beta_{11} ProtocolsImplementation + \beta_{12} Suspend + \beta_{13} ConcernsWorkers + \beta_{14} LabourOversupplyDuring + \beta_{15} WorkHoursDuring + \beta_{16} FinancialSupportDuring + \beta_{17} WorkHoursAfter + \beta_{18} NumberEmployeesAfter + \varepsilon \quad (1)$$

where $Profitability$ is an ordered response: (1) unprofitable, (2) break-even, or (3) profitable. The dependent variable was measured using the perception of the owners or key officers regarding their profitability. The independent variables refer to: the socio demographic profile including age (Age), gender ($Gender$), the education level of the survey participant as an ordinal variable ($Education$), with 1=did not complete college, 2=college graduate, and 3=completed a postgraduate degree, married or not ($CivilStatus$), social security membership ($SocialSecurity$); and the business profile including savings ($Savings$), years in business ($YearsBusiness$), business structures - partnership ($Partnership$) or other ownership structure ($OtherStructure$) relative to a base (viz. sole proprietorship). The policy-response variables include the pandemic conditions such as: COVID-19 policy adaptations as reflected in selling on time ($SellOnTime$), implementation of health and safety protocols ($ProtocolsImplementation$), suspension of production at some time during the pandemic ($Suspend$); COVID-19 related concerns of workers such as fear of being infected in the workplace

($ConcernsWorkers$); the lockdown conditions, including oversupply of labour during the lockdown ($LabourOversupplyDuring$), work hours per week during the lockdown ($WorkHoursDuring$), financial support for the enterprises during the lockdown ($FinancialSupportDuring$); and conditions after the lockdown, namely work hours in a week after the lockdown ($WorkHoursAfter$), and number of employees of the enterprise after the lockdown ($NumberEmployeesAfter$)[2]. Both dependent and independent variables are defined in Table 1 along with their descriptive statistics.

Results and Discussion

Policies on agri-food enterprises during the COVID-19 pandemic

The Philippines had one of the strictest and longest lockdowns in the world, which lasted for seven months (World Bank, 2020; Hapal, 2021). According to Lee *et al.* (2020), the large domestic market and lower trade dependence in the Philippines necessitates substantial COVID-19 measures to weather its negative effects. The government, through agencies and institutions such as the Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF-EID), has been implementing policies to ensure that the public will follow health protocols such as social distancing measures, prohibition of mass gatherings, and mobility restrictions as ways to curb the spread of the virus, especially during service encounters or business transactions (Ocampo and Yamagishi, 2020; Cuaton *et al.*, 2021).

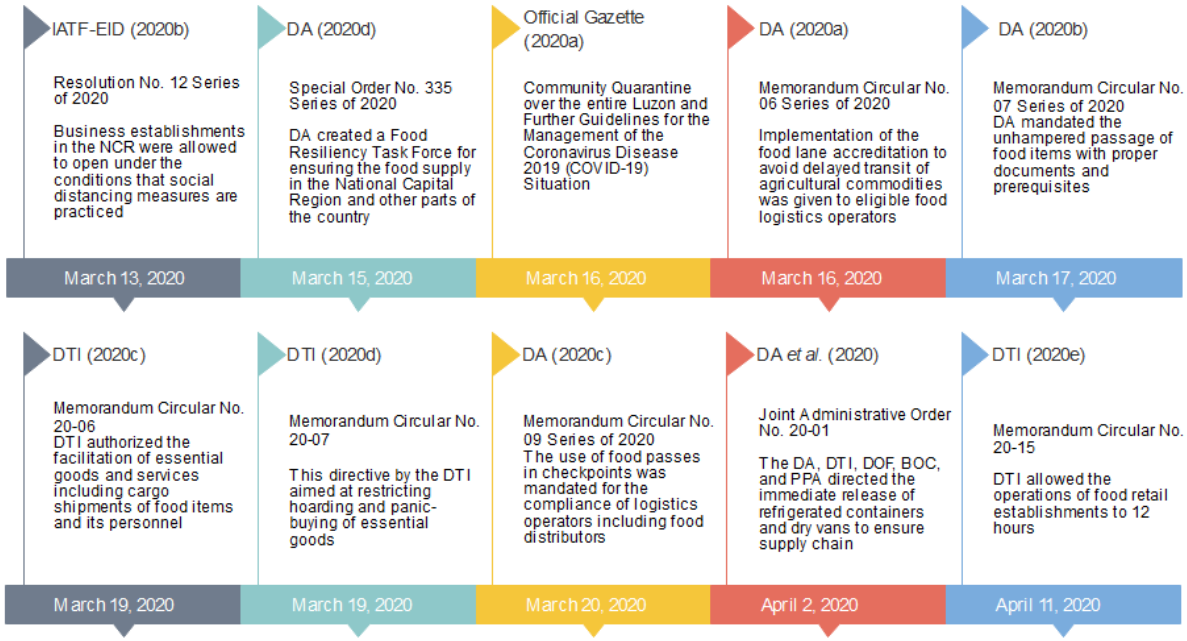
Figure 1 presents a timeline for some of the Philippine policy actions during the COVID-19 pandemic. One of the most important policies implemented to secure food supply and distribution during the early stages of the COVID-19 pandemic in the Philippines was Resolution No. 12 of 2020 by the IATF-EID on 13 March 2020. This allowed business establishments in the National Capital Region (NCR) to operate provided that social distancing guidelines were complied with (IATF-EID, 2020). This resolution followed the declaration of NCR to Code Red Sublevel Two, which requires stringent social distancing measures. On 15 March 2020, Special Order No. 335 was issued by the Department of Agriculture (DA) creating a Food Resiliency Task Force to ensure continuous food supply to affected areas (DA, 2020d). Due to the community quarantine in Metro Manila, there were concerns about the availability, affordability, and accessibility of food supply in the capital region; hence, the Food Resiliency Task Force was activated.

On the 16th of March 2020, Luzon was placed under ECQ, requiring the continued operation of essential services including food production, processing, and delivery (Ocampo and Yamagishi, 2020; Official Gazette, 2020a; Tee *et al.*, 2020). At the same time, the Agriculture Secretary issued Memorandum Circular No. 06 for guidelines concerning the transit of agricultural commodities to and from the NCR (DA, 2020a). This memorandum was designed to outline the guidelines for unhampered trade and delivery of products and inputs related to the agri-fishery sector following the start of community quarantine in the capital region.

DA's Memorandum Circular No. 07 on 17 March 2020 facilitated the movement of food items, provided that vehicles carry the correct documents (DA, 2020b). This is a supplemental circular that outlines the Food Resiliency Protocol to improve the access of households in Luzon and other metropolitan areas to safe and affordable food. This was supported by permission for movement of business establishments' personnel in Memorandum Circular No. 20-06 of DTI last March 2020 (DTI, 2020b). The DTI memorandum stipulates that all types of cargoes for both food and non-food operations should not be delayed and their movement should be unhampered.

[2] Number of employees during lockdown is highly collinear with the number of employees after lockdown. Hence, condition during the lockdown was not included in the final model.

Figure 1. Timeline of COVID-19 policies affecting food manufacturing and distribution



DTI's subsequent Memorandum Circular No. 20-07 focused on the prohibition of hoarding and panic-buying of several essential goods such as food items including instant noodles, canned sardines and mineral water (DTI, 2020c). This memorandum was in response to reported incidents of hoarding essential commodities in anticipation of a long lockdown period. At the same time, it imposed a price freeze on basic necessities during the public health emergency.

Concerning the purchase of food items, rostered visits to wet markets were implemented in many regions to prevent market congestion and the spread of the virus (Espino *et al.*, 2021). On March 20, 2020, DA issued Memorandum Circular No. 09 Series of 2020, which was another set of guidelines mandating a priority food and medicine pass for use of relevant logistics operators in checkpoints but ensuring that all agricultural outlets are allowed to operate (DA, 2020c). The memorandum aims to stabilise the prices of agri-fishery inputs and products through the unhampered movement of cargoes in the agri-fishery supply chain.

In general, the lockdown policy aims to control the movement of the public to prevent the spread of the virus. This includes suspension of classes, prohibition of mass gatherings, and minimum (at most 50 per cent) working capacity of essential establishments provided that they have complied with the community health standards which in effect have limited the public to market access (Ocampo and Yamagishi, 2020). For business establishments that fall under the category of "essential", quarantine passes and business certifications are required for operations to continue.

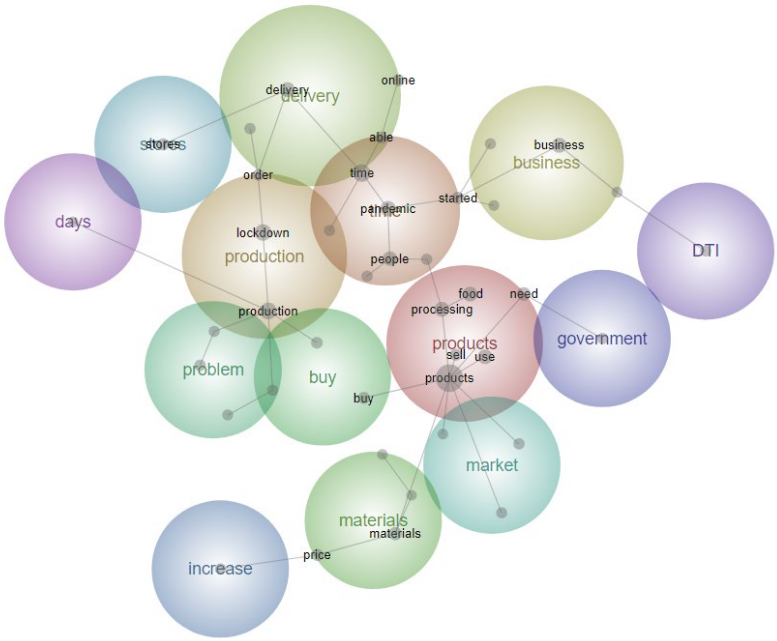
Responses of agri-food enterprises to COVID-19 policies

Thematic analysis

As shown in Figure 2, the unsupervised concept mapping using Leximancer revealed the frequently-used words during interviews, and their inter-relatedness forming themes. The focus of the interview was the effect of COVID-19 policies on their businesses, especially the lockdown policy. It highlights the words *products*, *time*, *production*, *delivery*, *materials*, *business* which are linked to *buy* and *stores*,

and *DTI*. These words composed the five key themes that emerged from the interviews using unsupervised concept mapping.

Figure 2. Concept map from key informant interviews



Theme 1: Introduction of new products

One of the most important COVID-19 policies was Republic Act No. 11469 or the *Bayanihan*[3] to Heal as One Act, which was signed by President Duterte on 24 March 2020 (Official Gazette, 2020b). *Bayanihan* entailed the reallocation of PHP 275 billion (US$ 5.37 billion)[4] from the 2020 national budget for the Philippine government's COVID-19 response (Venzon, 2020; Castaneda, 2020). Its provisions include the Social Amelioration Program (SAP), part of which is a cash subsidy worth between PHP 5,000 to PHP 8,000 (US$ 97.62 to US$ 156.19)[4] for households in April and May 2020. This also includes the distribution of relief food packs including processed foods, livelihood assistance, and a price freeze in affected areas. As an effect, many of the interviewed food manufacturing enterprises reported a substantial decline in the demand for processed food products. This implies that, even if processed food is considered essential, it does not mean that processors can ensure its profitability since processed products might be more costly and consumers have to prioritise basic food such as rice. A notable result is that during the pandemic there was growth in online sales of ready-to-eat products and food products believed to help in fighting against the virus. This, in turn, provided a livelihood option for workers who were either stranded at home or laid off. This also meant that businesses with excess resources could pivot their product offerings. This competition brought new products or product variants to established businesses:

> "We are a certified Halal dine-in restaurant that also sells ready-to-cook products, but we had to close our restaurant for eight months due to the lockdown policy. During

[3] *Bayanihan* is part of Filipino culture and may be translated as the communal efforts of a community to achieve a common goal (Romo, 2019; Ferraris and Matsumura, 2021) such as transfer of a house to another site (Ferraris and Matsumura, 2021), land preparation and tilling for each community member and construction of a community hall (Romo, 2019).

[4] As of 24 March 2020, US$ 1.00 was equivalent to PHP 51.2210 (BSP, 2020a). The date considered for this exchange rate was when the law was signed by President Duterte.

> this time, we have observed that online selling of ready-to-eat products is a trend. To cope with the situation, we have engaged in delivery, changed our menu and instead of family portions, we have made a good one to three portions to make it affordable to the consumers." (Female, 38 years old.)
>
> "Our calamansi juice[5] and concentrate business became popular during this time of the pandemic, as calamansi is a good source of Vitamin C that helps to fight against the flu. Our production has increased due to high demand since the beginning of March 2020 and gives us an opportunity to develop new products such as calamansi-dragon fruit juice. This new product helps in strengthening the immune system." (Male, 50 years old.)

Theme 2: Increased online selling activity

On the 2nd of April 2020, Joint Administrative Order No. 20-01 was issued by DA, DTI, Department of Finance (DOF), Bureau of Customs (BOC), and the Philippine Ports Authority (PPA) to direct the immediate release of refrigerated containers and other equipment to ensure operation of the food supply chain (DA *et al.*, 2020). DTI's Memorandum Circular No. 20-15 issued last 11 April 2020 regulated the operating hours of retail establishments during the ECQ to 12 hours (DTI, 2020d). As outlined in the Guidelines for Interzonal and Intrazonal Movement last 19 May 2020, local deliveries within local government units (LGUs) were enabled, although food delivery riders needed to provide proof of orders, their employment identification card, and a Quick Response (QR) code at checkpoints. In the case of non-local delivery outside the city, personnel were required to secure similar documentation, and some LGUs required negative test results from Rapid Antigen Test (RAT) or Reverse Transcription-Polymerase Chain Reaction (RT-PCR) tests (Office of the Presidential Spokesperson, 2020). Innovative practices of enterprises have been key strategies during the COVID-19 pandemic (Acopiado *et al.*, 2022), as online selling and deliveries became effective in minimising consumer movement and public exposure and creating additional income streams for enterprises:

> "Online selling has become more popular so we coordinated with online riders for the delivery and added new products that are mostly ready-to-eat." (Male, 45 years old.)
>
> "We cannot afford to stop our production for a couple of months because our workers are farmers and do not have any other sources of income. Hence, we prioritised acquiring quarantine passes for our workers so that they can continue to work. We have also partnered with Shopee to distribute our products so we do not have to worry about the cost of the riders' pass and swab tests and other documents which are costly for us." (Female, 32 years old.)
>
> "Online platforms such as Facebook and Instagram help us to sell our products because many people are on social media during the pandemic." (Female, 29 years old.)

Theme 3: Limited supply of inputs and packaging materials

Enterprises face a considerable challenge in managing their sales especially as raw materials were disrupted during the pandemic (Laorden *et al.*, 2022). In our interviews, the difficulty in transporting inputs reportedly led to an increase in their prices paid. Some processors resorted to sourcing cheaper materials from more distant locations, which required buying in bulk. Enterprises with fewer resources

[5] Calamansi or Philippine lemon is commonly processed into a juice or concentrate in the Philippines (Gabriel *et al.*, 2018).

to absorb the high delivery cost would have to purchase their requirements locally at a much higher price as shared by one of the participants:

> "We had to deal with the limited supply of meat due to travel restrictions and this was aggravated by the spread of African Swine Fever [ASF]. The price of meat has not gone down since then. The supplier could not cater to our required volume because of the limited supply. The supplier's goal is to divide the supply to all the regular customers, so we have decided to source additional supply and other input material from the local market." (Female, 43 years old.)

> "Packaging materials are expensive due to their limited supply. I also need to provide a bigger allowance for my workers to cover their meals for more hours of work. For instance, the usual ten-minute transaction with a courier provider now takes three hours to complete." (Male, 60 years old.)

> "The packaging materials are very expensive. We were able to get limited packaging materials before for around PHP 50,000 (978.97 US$)[6] for one of our products in Davao City. Recently, we ordered only three [packaging materials from Manila] but these already cost us PHP 150,000 (2,936.92 US$). The payment was in instalments. We do not know which government agencies to approach for assistance on where best to get the packaging materials for our products." (Female, 43 years old.)

Theme 4: Increased cost of production and delivery

As mandated in Civil Service Commission's (CSC) Memorandum Circular No. 18 Series of 2020, 15 October 2020, which included on-site accommodation for workers, a mandatory 14-day quarantine for workers exposed in high-risk areas or workers experiencing symptoms of the virus, and travel documents and negative COVID-19 test results are required (CSC, 2020; Department of Labor and Employment [DOLE], 2020). The majority of the respondents reported reduced demand and increased expenses due to COVID-19-related policies and guidelines. During the first few months of this period, many food establishments temporarily suspended food processing activity to acquire the necessary documents, underwent a 14-day quarantine period, and made other adjustments such as partnering with third-party delivery services. However, having these requirements does not only affect third-party logistics services but also food manufacturing that provides delivery services of their raw and finished products. It not only requires time but also results in extra costs for doing business. Checking these requirements at inspection points causes a delay in product delivery and production.

With policy and guidelines needing compliance, some KII participants reported selling their personal and business assets to finance the additional operational expense. In addition, they decided to reduce labour or shifted to on-call services. Some of the participants shared their adaptation measures to manage labour-related problems:

> "Purchasing and delivery of goods are adversely affected because of the restrictions of travels and lockdown implementations. Products were not delivered on time resulting in food spoilage." (Female, 45 years old.)

> "Quarantine was required for some of our workers because they appeared to have the symptoms of contracting COVID-19. As a result, we have experienced a labour

[6] As of 27 March 2020, US$ 1.00 was equivalent to PHP 51.0740 (BSP, 2020b). The date considered for this exchange rate was when the program was enacted.

> shortage. We acquired additional freezers and storage boxes to prevent input spoilage since we could not hire more people for food manufacturing. Moreover, hiring new people entails additional costs for training." (Male, 49 years old.)
>
> "We constructed a facility to house our staff. We also bought a vehicle for their transportation needs and our deliveries. But in order to finance this, we sold some of our furniture and appliances from our restaurant and borrowed money from the family." (Female, 38 years old.)
>
> "Currently, our production workers are on call. The schedule of our production depends on the orders that we receive. We also rotate workers so that everyone can still work." (Participant from a cooperative.)

Theme 5: Government assistance

Throughout the COVID-19 Adjustment Measures Program (CAMP) implemented on 28 March 2020, workers in the private sector affected by the pandemic are qualified to be given a lump sum of PHP 5,000 (US$ 97.90) each (DSWD, 2020; DSWD *et al.*, 2020; World Bank, 2020). Businesses had to secure certification to prove their business legitimacy together with a list of employees to avail this program:

> "During the lockdown, we stopped our production for one month affecting the source of income of our workers. We encouraged them to apply for assistance from DOLE. Meetings were also conducted to identify actions that could help those who lost their jobs." (Participant from a cooperative.)

COVID-19-related restrictions also disrupted the delivery of inputs to enterprises' production areas. COVID-19 Assistance to Restart Enterprises (CARES) 2 Program was issued last 28 March 2020. One of its offerings is the *Livelihood Seeding Program – Negosyo sa Barangay* (LSP-NSB), which has provided free processing and packaging materials worth PHP 5,000 to PHP 8,000 (US$ 97.90 to US$ 156.64) to severely impacted food processing entities. However, some businesses waited long to avail themselves of this assistance. To avoid further concerns, some of the respondents resorted to sourcing input and packaging materials from middlemen despite higher prices:

> "I have maintained open communication with the suppliers but I find the negotiation part strenuous. Almost all of the raw materials' prices went up or raw materials became scarce. Fortunately, we received non-financial assistance from DTI in the form of packaging materials worth PHP 8,000 (approx. 157 US$)." (Male, 34 years old.)

Another program under CARES 2 enabled MSMEs to apply for PHP 10,000 to PHP 500,000 (US$ 195.79 to US$ 9,790.72) loans at zero interest facilitated by DTI. Aside from this, the department has also provided a series of webinars and seminars. Some of the topics provided were digital marketing of products, financial literacy, good manufacturing practices, and entrepreneurship in the midst of the pandemic recovery:

> "We availed a PHP 250,000 (4,894.86 US$) loan from DTI." (Female, 43 years old.)
>
> "DTI training helps and enlightens us on how to cope with the current situation. The good thing is that they have given us not just one topic but a series of topics so we can learn how to be resilient, where we can [access] emergency loans, and how to make use of social media in marketing our products." (Male, 24 years old.)

Overall, according to the participants, the assistance and programs of the government had been very helpful to their business. However, many areas in the Philippines experienced extended lockdown and loans were not only used for operational expenses but also personal and family expenses. Thus, food manufacturing enterprises were also challenged to look for other credit options.

Embedded approach

With regards to MSME size, most (85 per cent) of the participants were considered micro enterprises, with employee numbers ranging from one to nine personnel. Small enterprises (with 10 to 99 employees) make up 14 per cent of the total while the sole medium enterprise (ranging from 100 to 199 employees) only constitutes less than 1 per cent of the 125 surveyed enterprises. After the COVID-19 lockdown period, the majority of the surveyed businesses reported being profitable (74 per cent), followed by break-even condition (16 per cent) while some were unprofitable (10 per cent) (Table 1). The average age of respondents was 33 years old, and most of them were female (53 per cent). Although most of the participants did not complete a college education (59 per cent), some were college graduates (37 per cent) and post-graduates (4 per cent). Most of the respondents were not married (60 per cent), and the majority of respondents reported having social security insurance (69 per cent).

The majority of the enterprises retained cash savings during the survey period (62 per cent), and these enterprises have been operating for an average of 7.81 years. Most of the businesses are either owned solely by proprietors (67 per cent) or under a partnership structure (21 per cent) while the rest have other business structures (12 per cent). The majority of the surveyed enterprises (70 per cent) reported selling on time during the pandemic, and almost four in every five businesses reported compliance with labour-related health and safety protocols (79 per cent). Additionally, the majority of the businesses suspended their operations during the pandemic (60 per cent), and some participants reported having COVID-19-related concerns (38 per cent). Several businesses experienced an oversupply of labour (28 per cent) during the lockdown period. During the lockdown, the average work hours per week is at 38.18 hours, and 22 per cent of the surveyed enterprises received financial support during the lockdown period. After the lockdown, owners and key officers reported working, on average, 48 hours per week after the lockdown. The average number of employees after the lockdown period is around seven personnel.

The ordered probit model for profitability of the food enterprises is statistically significant at a 1 per cent margin of error with $X^2(18) = 36.28$ and a p-value of 0.007 (Table 2). Multicollinearity is not an issue in the model with a maximum variance inflation factor (VIF) of 2.46 and average VIF of 1.48. Other covariates remaining constant, businesses run by male entrepreneurs appear to be more likely to report being profitable than those run by their female counterparts (10 per cent level of significance). Food enterprises with a partnership business structure are found to be positively associated with reporting profitable operations (1 per cent level of significance). At a 5 per cent level of significance, the implementation of health and safety measures can likely lead to an enterprise to report being profitable. Enterprises who have suspended their operations at some point during the pandemic are likely to report being profitable after lockdown at 10 per cent significance level. Enterprises that reported experiencing labour oversupply claimed a negative impact on reporting profitability (1 per cent level of significance). For enterprises who have continued their operations during the lockdown, more work hours may lead an enterprise to report being profitable after the lockdown period (5 per cent level of significance).

Table 1. Description and summary statistics of the variables

Variable	Description	Mean	SD	%
Dependent variable				
Profitability after lockdown	1=Unprofitable; 2=Break-even; 3=Profitable			9.60 16.00 74.40
Independent variables				
Owner or key officer profile				
Age	Number of years	33.30	11.91	
Gender	1=Male; 0=Female	0.47	0.50	
Educational attainment	1=Did not complete college; 2=College graduate; 3=Post-graduate			59.20 36.80 4.00
Civil status	1=Married; 0=Otherwise	0.40	0.49	
Membership in social security	1=Yes; 0=No	0.69	0.47	
Having any forms of monetary savings	1=Yes; 0=No	0.62	0.49	
Enterprise profile				
Years in operation of the enterprise	Number of years of the enterprise's operation	7.81	9.94	
Enterprise structure	1=Sole proprietorship; 2=Partnership; 3=Other structure			67.20 20.80 12.00
During pandemic				
On time selling	1=Yes; 0=No	0.70	0.46	
Enterprise implemented health and safety protocols for their labour	1=Yes; 0=No	0.79	0.41	
Suspension of operation during the pandemic	1=Yes; 0=No	0.60	0.49	
Enterprise with workers facing COVID-19 related concerns	1=Yes; 0=No	0.38	0.49	
During lockdown				
Enterprise encountered labour oversupply	1=Yes; 0=No	0.28	0.45	
Work hours per week during lockdown	Number of hours per week	38.18	24.60	
Enterprise received financial support during lockdown	1=Yes; 0=No	0.22	0.42	
After lockdown				
Work hours per week after lockdown	Number of hours per week	48.14	21.59	
Number of employees after lockdown	Number of employees	6.61	13.75	

Number of surveyed enterprises=125

Table 2. Ordered probit model of enterprise profitability during the COVID-19 pandemic

Variable	Estimate	Std. Err.	P>z	
Owner or key officer profile				
Age	-0.015	0.013	0.258	
Gender	0.601	0.321	0.061	*
Education	-0.234	0.265	0.378	
Civil status	0.140	0.336	0.678	
Membership in social security	0.364	0.318	0.252	
Having any forms of monetary savings	0.301	0.281	0.284	
Enterprise profile				
Years in operation of the enterprise	0.011	0.015	0.452	
Enterprise structure (base = 1, sole proprietorship)				
Partnership	1.117	0.402	0.005	***
Other structure	0.498	0.458	0.276	
During pandemic				
On time selling	0.473	0.306	0.123	
Enterprise implemented health and safety protocols for their labour	0.700	0.342	0.041	**
Suspension of operation during pandemic	0.711	0.371	0.055	*
Enterprise with workers facing COVID-19 related concerns	-0.215	0.296	0.467	
During lockdown				
Enterprise encountered labour oversupply during lockdown	-0.848	0.318	0.008	***
Work hours per week during lockdown	0.017	0.008	0.034	**
Enterprise received financial support during lockdown	0.402	0.365	0.271	
After lockdown				
Work hours per week after lockdown	-0.003	0.008	0.670	
Number of employees after lockdown	-0.009	0.010	0.340	
Cut 1	0.144	0.772		
Cut 2	1.033	0.776		

N=125; $X^2(18) = 36.280$; $P>X^2 = 0.007$; Pseudo $R^2 = 0.197$

*, **, and *** denote significant independent variables at 10%, 5%, and 1%, respectively

The marginal effects of the covariates were computed as shown in Table 3. Male owners and key officers are associated with an increase of reporting being profitable by 15.0 per cent, while it has a negative effect for reporting break-even condition by 7.4 per cent and less likelihood of reporting being unprofitable by 7.7 per cent. Business partnership shows a positive likelihood reporting profitability by 23.5 per cent. Concurrently, this ownership structure reduces the chance of reporting either unprofitability or a break-even condition by 11.3 per cent and 12.2 per cent, respectively. With regards to labour, measures concerning their welfare and safety such as the implementation of health protocols including social distancing positively affect the chance of reporting profitability after the lockdown by 17.5 per cent. On the other hand, reporting an unprofitable or break-even condition

Table 3. Marginal effects of determinants of enterprise profitability after the COVID-19 lockdown period

Variable	1=Unprofitable				2=Break-even				3=Profitable			
	dy/dx	SE	P>z		dy/dx	SE	P>z		dy/dx	SE	P>z	
Owner or key officer profile												
Age	0.002	0.002	0.264		0.002	0.002	0.255		-0.004	0.003	0.250	
Gender	-0.077	0.042	0.070	*	-0.074	0.040	0.063	*	0.150	0.078	0.053	*
Education	0.030	0.034	0.384		0.029	0.032	0.376		-0.059	0.066	0.374	
Civil status	-0.018	0.043	0.679		-0.017	0.041	0.677		0.035	0.084	0.677	
Membership in social security	-0.047	0.041	0.257		-0.045	0.039	0.251		0.091	0.078	0.244	
Having any forms of monetary savings	-0.038	0.036	0.288		-0.037	0.035	0.291		0.075	0.070	0.281	
Enterprise profile												
Years in operation of the enterprise	-0.001	0.002	0.455		-0.001	0.002	0.447		0.003	0.004	0.447	
Business structure (base = 1, sole proprietorship)												
Partnership	-0.113	0.036	0.002	***	-0.122	0.042	0.004	***	0.235	0.067	0.000	***
Other structure	-0.067	0.052	0.202		-0.059	0.055	0.284		0.125	0.105	0.231	
During pandemic												
On time selling	-0.061	0.040	0.132		-0.058	0.037	0.113		0.118	0.074	0.109	
Enterprise implemented health and safety protocols for their labour	-0.090	0.045	0.046	**	-0.086	0.044	0.050	*	0.175	0.083	0.035	**
Suspension of operation during pandemic	-0.091	0.049	0.062	*	-0.087	0.047	0.064	*	0.178	0.091	0.049	**
Enterprise with workers facing COVID-19 related concerns	0.028	0.038	0.471		0.026	0.036	0.463		-0.054	0.074	0.464	
During lockdown												
Business encountered labour oversupply during lockdown	0.109	0.043	0.012	**	0.104	0.042	0.012	**	-0.212	0.076	0.005	***
Work hours per week during lockdown	-0.002	0.001	0.043	**	-0.002	0.001	0.041	**	0.004	0.002	0.029	**
Enterprise received financial support during lockdown	-0.051	0.047	0.277		-0.049	0.045	0.269		0.101	0.090	0.264	
After lockdown												
Work hours per week after lockdown	0.000	0.001	0.671		0.000	0.001	0.671		-0.001	0.002	0.670	
Number of employees after lockdown	0.001	0.001	0.344		0.001	0.001	0.338		-0.002	0.002	0.334	

N=125; *, **, and *** denote significant independent variables at 10%, 5%, and 1%, respectively.

decreases as a result of this practice by 9.0 per cent and 8.6 per cent, respectively. Enterprises that have suspended their operations at some point during the pandemic may lead to a higher likelihood of reporting profitability by 17.8 per cent. Conversely, the likelihood that enterprises to report either unprofitability or break-even condition decreases by 9.1 per cent and 8.7 per cent, respectively. Enterprises that have encountered excess labour during the lockdown show that this can lead to an increase in reporting unprofitability after the lockdown by 10.9 per cent and break-even condition by 10.4 per cent, while this labour issue reduces the likelihood of reporting profitability by 21.2 per cent. Lastly, for enterprises operating during the lockdown period, an additional work hour per week increases the likelihood that the MSME will report being profitable after the lockdown by 0.4 per cent. On the other hand, this will also lead MSMEs to be less likely to report being unprofitable by 0.2 per cent or having a break-even condition by 0.2 per cent.

The results of the ordered probit regression model and its marginal effects show that agri-food enterprises' profitability during the COVID-19 pandemic has been affected by several factors. It is evident that employment in the agri-food chain has been affected with a substantial number being unemployed during the lockdown period (Reuters, 2020).

The results show that the male gender of an entrepreneur is a significant factor in reporting profitability during the COVID-19 pandemic, consistent with the findings of Kiefer *et al.* (2022). The reduced performance of female-led enterprises may be explained by their share of household tasks (Millman and Martin, 2007; Nagler and Naudé, 2017). The gender disparity was exacerbated by external shocks stemming from the COVID-19 pandemic as women lack comparable support and accessibility to capital, including relief support (Ragasa and Lambrecht, 2020). Additionally, female- and male-led enterprises may have different growth aspirations, with both genders taking different approaches to investment and females being relatively risk-averse compared to men (de Groot *et al.*, 2017).

> "There has been a significant increase in my income during the quarantine and lockdown because we were able to develop and introduce new products. However, my workload increased along with the additional products by, let's say, around 30 per cent to 40 per cent. The decrease in the sales volume of our existing products was compensated by the sales of our new products resulting in an overall increase in the revenues." (Male, 45 years old.)

> "Our profit was pretty good. My workload now is lighter compared to the pre-lockdown period because my wife helps me with most of the tasks related to the operation of the business." (Male, 53 years old.)

> "During the lockdown, I noticed a moderate decrease in my workload. This was just temporary since there was an increase in demand after the lockdown. I oversee all aspects of the business, especially the processing of the products. We earn a reasonable profit but not enough for us to scale up the business. Besides, the business is still very young." (Male, 24 years old.)

> "Our income decreased by almost 80 per cent. We lost a lot during the lockdown. Being a working mother is hard because of the multiple responsibilities. As mothers, we make sure that the family is fed, children are bathed, and the house is clean while attending to our business operations." (Female, 42 years old.)

Our findings suggest that owning a food enterprise business through a partnership is more likely to report being profitable during the COVID-19 pandemic relative to sole proprietors. As opposed to individual arrangements which may have constraints in raising capital by themselves, partnerships

may lead to sharing of resources (Holderness, 2003). This is similar to co-preneurship arrangements of couples engaged in business, where a collaborative effort leads to shared labour and skill pools (Fletcher, 2010). Relative to partnerships, sole proprietors are sensitive to crises as they can be twice affected, by being both private individuals and entrepreneurs (Runyan, 2006). Moreover, Acopiado *et al.* (2022) posited that partnerships are more receptive to adopting innovative measures such as digital payment schemes as partnerships entail spreading of risks and liabilities along with more diverse inputs that are beneficial for better decision-making. This may help enterprises strategically as they continue to look for other ways to serve their customers, as what was shared by some KII participants in this study wherein some have ventured into online commerce.

> "My business partner used to supply vinegar for my business. I saw potential in this product so I invited him for a business partnership. Currently, we are working together on developing new products. There is a high demand for our product and we cater to orders from outside of Cagayan de Oro City such was Bohol and Cebu City. We are lucky to be chosen as one of the participants of DTI's Go Negosyo program, which taught us the importance of e-commerce in sustaining the sales despite the pandemic. Our participation paid off because we were able to promote our product online as well as the coffee and coco sugar that we are reselling." (Male, 34 years old.)

Labour compliance to health protocols during the COVID-19 pandemic was found to contribute significantly to reporting an increase in profitability. As mandated in multiple government memoranda and directives, these health protocols were crucial to the reopening of the economy, as public health guidelines lessen community transmission (IATF-EID, 2020; Majra *et al.*, 2020; Panzone *et al.*, 2021). Moreover, the risk of a potential superspreader event is pronounced in food processing plants and retail outlets and is exacerbated by poor ventilation and confined spaces (Majra *et al*., 2020).

> "I requested the workers and their families to stay in our farmhouse and cottages. This would ensure their health and safety as they are able to minimise contact with the public. We provided a hand wash area outside the cottages, alcohol dispensers, thermometer scanners, foot bath water system, and computerised sign boards. We strictly imposed health and safety protocols such as wearing of face masks and face shields, washing of hands, use of alcohol, thermometer scanning, and foot bath and alcohol dispenser. Through these protocols, we can ensure the safety of our workers while we are working on meeting the customers' volume of orders." (Male, 60 years old.)

> "Even though a significant number has already been vaccinated, we still need to follow protocols, especially that we are dealing with the increasing demand from customers." (Male, 45 years old.)

> "When we started implementing the health protocols, we observed that the workers would not want to wear the masks, face shields or PPEs because it is hot and they find these uncomfortable and they have difficulty in breathing. Social distancing was also not practised. Not long after, our company had to deal with 16 positive cases of COVID-19, both in the office and processing site. We also had employees in another facility who contracted COVID-19. Because of this surge of COVID-19 cases, we had to halt our operations." (Male, 73 years old.)

> "Aside from the workers' scheduled rotation, our office attempted to set social distancing measures but these are hard to follow because our space and working stations are small." (Male, 22 years old.)

Enterprises that have suspended their operations at some point during the pandemic were found to be more likely to report being profitable after the lockdown period. Our findings suggest that suspensions of enterprises may enable them to preserve their financial resources (Didier *et al*., 2021). Suspension of operations may then allow them to reopen at a better time wherein profitability can be better achieved (Didier *et al*., 2021). However, MSMEs cannot tolerate longer lockdown periods during the pandemic as these may lead to more difficulties and even bankruptcy (Shafi *et al*., 2020).

> "Majority of our products were sold at pasalubong centres and tourism stores. The tourism sector was badly hit during the pandemic so we had to stop our business during the implementation of lockdown. We knew that we had to dispose of our inventory of unsold products. We resorted to selling the products to our neighbours, co-workers, and customers online. We also deliver our products, not limited to what we are producing, to customers to supplement our income. Innovation is key for businesses to survive during the pandemic so we also developed new products including mango-flavoured buffalo chicken or mango-chilli sauce dip. After having introduced these new products, our number of workers has increased from three to ten. This increase in the number of people is a manifestation of how this innovation has helped in the profitability of our business" (Female, 56 years old.)

> "I closed my physical store because of the lockdown and temporarily suspended my operation for less than a month. I shifted to an online store. Consumers' cravings during the COVID-19 pandemic vary differently so I developed food products that are mostly in demand. This helped me earn a good profit. Fortunately, I did not encounter labour-related problems even when there was an increase in demand for the product offerings since most of the workers are family members and are staying with me in the same house." (Female, 55 years old.)

> "We suspended operations for a very short period. We had time to adjust to meet the required health and safety protocols. I used my savings to fund the operation of our business and to develop new products. I can say that we are profitable partly because we did not hire additional people aside from my parents who are in charge of the purchase of raw materials and delivery of food."(Female, 22 years old.)

Another significant covariate is labour oversupply wherein it lessens the likelihood that an enterprise will report being profitable. Labour oversupply increases the overhead costs of an enterprise, and retrenchment of labour as a short-term solution can increase the liquidity of a struggling business and its ability to recover, particularly during times of crises (Robbins and Pearce, 1992). Indeed, during the COVID-19 pandemic, reduction of labour has been seen as an adaptation measure (Pham *et al.*, 2021). However, retrenchment may also affect an enterprise in restoring its operations as hiring new employees can be costly because they may require time to acquire the level of productivity of current employees (KPMG, 2020).

> "We are losing profits because of the increasing input prices and the labour oversupply. Our employees have been with us for a long time. We do not want them to lose their jobs, especially during the pandemic. We adopted rotation and reassignment to other tasks. Based on our agreement, we paid them based on their hours of work so no one had to lose a job." (Female, 38 years old.)

> "Because of the pandemic, everything became expensive including fuel and inputs for food processing. A decreasing demand for our product offerings compounded these problems. Despite these setbacks, we did not reduce the number of employees resulting in a labour oversupply. Our income was just enough to sustain our

> operations and for our other expenses. We made sure that our workers had enough for their daily basic needs even if our income would go lower than our break-even point." (Female, 52 years old.)
>
> "Even though we experienced a substantial decrease in our income and we had to temporarily stop our production, our cooperative cannot immediately reduce the number of workers. Instead, the workers who were involved in the production were temporarily assigned to other jobs." (Participant from a cooperative.)

Lastly, work hours per week during lockdown was shown to have a positive effect on the likelihood of enterprises to report being profitable after lockdown. For enterprises that have continued operations during the lockdown period, the productivity of employees can have a positive effect on profitability even if the lockdown period is over. Employees' efforts are among the drivers of enterprises' profitability (Yasbek, 2004; Oxenburgh *et al*., 2004). Increased work hours may also have a positive effect on productivity (Yasbek, 2004; Paul and Chowdhury, 2021) and consequently profitability (Feldman, 2002). However, more work hours may increase employee fatigue (Feyer and Williamson, 1995; Yasbek, 2004; Knauth, 2007) so implementing a work-life balance is needed to increase profitability (Yasbek, 2004).

> "Our estimated income for our yogurt business was only PhP 8,000 (US$156.63). Before the pandemic, our regular working days would be four hours a day twice a week. During the pandemic, we have been working up to six to seven days a week and five to seven hours per day due to an increase in demand. Currently, our monthly income is PhP 40,000.00 (US$ 783.18) which is significantly higher than our estimate before the pandemic." (Female, 27 years old.)
>
> "From 8 hours a day, we are now working for at least 16 hours during the lockdown to meet the increasing volume of calamansi juice demanded by our consumers. Our product became more popular during the pandemic. After the lockdown, we were able to hire additional workers to help us with the increasing orders." (Male, 50 years old.)
>
> "During the lockdown, we were allowed to operate for only 12 hours. We no longer had a second shift in our operations. At this time, we saw a substantial decrease in the sales volume of about 15 to 25 per cent." (Female, 62 years old.)

Impacts of COVID-19 policies on agri-food enterprises

The COVID-19 pandemic has led to renewed initiatives for supply chains to innovate (Modgil *et al.*, 2021) as enterprises adapt to the new-normal business environment that has emerged during the pandemic (Acopiado *et al.*, 2022). Some of the concerns faced by this industry during lockdown are regarding the source of input materials for processing and packaging and time spent on the delivery of products. Quarantine procedures such as ECQ, Modified Enhanced Community Quarantine (MECQ), General Community Quarantine (GCQ), and Modified General Community Quarantine (MGCQ) during the delivery of food products via interzonal and intrazonal movement require QR code, identification card, food pass, employment certificate, negative COVID test results in some areas/LGUs, and other government protocols (Prasetyo *et al.*, 2020; Ocampo and Yamagishi, 2020). Food processors incur additional costs to meet these requirements. Some businesses needed to suspend processing activities while completing the necessary documents. Delays in delivery may be traced to the long queues of vehicles at checkpoints due to lack of coordination. A shortage of packaging materials was also observed. As packaging materials were considered non-essential, they were not prioritised for transport (Chitrakar *et al.*, 2021), resulting in delays, supply shortages, and price increases. With

regards to the quantitative results of the study, partnerships which are a significant precursor to profitability can also be associated with a greater likelihood of adopting innovative business practices such as digital payment schemes (Acopiado *et al.*, 2022).

Businesses are also encouraged to implement labour adaptation measures. Some of these guidelines are policy on disinfection and social distancing; isolation, mandatory quarantine and swab testing of employees who have symptoms of the virus; alternative working arrangements; support labour in terms of accommodation to avoid labour's public exposure (DOLE, 2020). Both the qualitative and quantitative results of the study show that enterprises have adopted health protocols in their establishments. Quarantine of workers showing COVID-19 symptoms could affect the labour force; however, implementation of these health protocols can also lead to a greater likelihood of enterprises reporting profitable operations, as our quantitative results suggest. Since food enterprises were able to continue their operations as prioritised by the government through several measures (Ocampo and Yamagishi, 2020; Official Gazette, 2020a; Tee *et al.*, 2020), the aim of lessening community transmission of COVID-19 can also be achieved if enterprises abide by strict health protocols. Labour oversupply may also become a problem because of the lower demand for products and lack of operational capital since savings and capital were used mainly to assist workers during the pandemic for paying operational expenses such as bills and rent, and lastly for household expenses (Ali *et al.*, 2021).

Lack of packaging materials and lack of financial capital were two of the most commonly encountered problems of the food manufacturing enterprises because of the pandemic. To address these issues, the government-initiated business support in the form of financial loans, free materials and packaging, and one-time financial assistance for workers (DSWD *et al.*, 2020). However, it became hard for the processors to acquire and submit the requirements for this assistance due to lockdown guidelines. For some businesses that have availed themselves of this financial assistance, they also used this outside of their business operations to cover personal and household expenses.

Conclusion and Implications

Conclusion

Our study shows that Philippine enterprises had varied COVID-19 experiences. Overall, the pandemic has shown both adaptation and challenges faced by agri-food chain actors. By utilising a mixed methods approach, this paper provided a picture of the impacts of the COVID-19 pandemic on the agri-food chain, both on the MSMEs' individual experiences and the entrepreneurs' profitability. Although policies provided an enabling effect for those actors who handled basic food necessities, the qualitative analysis provided an understanding that food manufacturers were still affected by reduced demand. Online selling became an important adaptation measure during the pandemic. Delivering products and sourcing raw materials from distant locations incurred additional costs, particularly as many such materials (such as packaging) were not deemed essential. Shortages of raw materials led to firms' restricted operations. Government assistance programs helped food manufacturers partially recover from the effects of the COVID-19 pandemic. However, because of the intermittent nature of lockdowns, loans were used not only for the business but also for their personal and household needs.

For food manufacturers delivering food outside of cities, they would have to process additional requirements for their workers who are handling the deliveries. These additional requirements have cost implications not only for the food manufacturers but also for the input suppliers and third-party logistics providers. The long queues and curfew may also have adverse effects on the availability of the raw materials for food processing and the quality of the products; it may even result in food spoilage. Availability of raw materials is key for food manufacturers to sustain their operations.

Increasing prices of these materials such as packaging materials due to more costly distribution and limited supply within the cities are among the primary issues of the entrepreneurs. These concerns are largely attributed to the categorization of these materials as non-essential, unlike the final food products. To partially address the tedious process of getting the raw materials, entrepreneurs resort to sourcing these inputs from middlemen.

The research findings from the quantitative analysis on profitability drivers also suggest and highlight the vulnerabilities of women, sole proprietors, enterprises encountering excess labour, and MSMEs that could not easily implement the health protocols in their operations. The pandemic aggravated the situation of women as they have less access to financial resources and because they have multiple roles to fill. Individual owners may also face the most difficulty in accessing resources to counter the negative impacts of pandemics as they have no partner with whom to share the responsibilities and risks. Excess labour will result in lost source of income for workers and reduced profitability for food manufacturers. Lastly, some enterprises are unable to adopt health protocols due to constraints on financial capabilities and infrastructure.

Implications

Several lessons are drawn from this study. First, in crafting government policies and programs for food businesses, there is a need to consider the whole food system and the actors comprising this system, not only those who are directly involved in food manufacturing. Second, the effects of the COVID-19 pandemic on all actors in the food system need to be characterised and quantified to ensure that disruptions in the food supply chains are minimised. Third, studies on how to streamline the processes at checkpoints and borders need to be conducted now and for future pandemics and other external shocks. Fourth, various communication materials need to be designed for different levels of the government to ensure that policies are understood. Fifth, there should be plans on how to minimise the adverse effects of pandemics on vulnerable groups such as women, sole proprietors, and workers in food manufacturing companies. Sixth, training on how food manufacturing companies can handle excess labour properly during pandemics to minimise the negative impact on them and the workers is needed. Seventh, the enterprises need to go through a series of theoretical and practical training programs on crafting and implementing the business continuity plans that would enable them to recover from pandemics with minimal work suspensions and disruptions. Eighth, preparations, plans, and programs need to be crafted to help the food manufacturing companies in acquiring the skills and resources that would enable them to adhere to health protocols. Lastly, future studies assessing the impact of COVID-19 may replicate the approach we used on using the policy-response-impact nexus as this may provide valuable insights into how a particular segment of the society such as the agri-food enterprises respond to various policy constraints and enablers.

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