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MYANMAR

STRATEGY SUPPORT PROGRAM | WORKING PAPER 01 MAY 2020

Assessing the Impacts of COVID-19 on Myanmar's Economy

A Social Accounting Matrix (SAM) Multiplier Approach

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EXECUTIVE SUMMARY

The policy measures taken by the Government of Myanmar to contain the transmission of COVID-19 are a necessary and appropriate response to the pandemic. In-depth analysis of policy measures of this magnitude on firms, households, government, and the economy as a whole is key to the design of policy interventions that can mitigate the economic losses and support a sustained and robust recovery. Our analysis found:

- National GDP is predicted to fall by 41 percent during the two-week lockdown period. The COVID-19 pandemic will likely push Myanmar's economy into a recession or lead to stagnant growth in 2020.
- The agri-food system (AFS) is predicted to fall by 24 percent during the lockdown period. Although the lockdown policies provide exemptions for most agricultural activities, linkages to other sectors indirectly affect the AFS sector significantly. Economy recovery in AFS will be slow – in the case of a slow recovery for the overall economy, the annual growth rate in the sector for 2020 will be negative. With faster recovery, stagnant growth is the best that can be expected.
- Manufacturing GDP is predicted to fall by 40 percent during the lockdown period. However, closure of manufacturing factories will have a large negative impact on both the agri-food system and the economy as a whole due to the strong linkage effects between manufacturing and upstream primary agriculture and downstream marketing services. Reopening the manufacturing sector is crucial for economic recovery in Myanmar, both for the broader economy and for the agri-food system.
- Nonfarm employment is predicted to fall by more than five million jobs during the lockdown period. Compared to a slow economic recovery, a fast recovery would will allow 1.1 million more people return to their jobs or businesses by the end of FY 2020. Even with fast recovery, there will be 500,000 nonfarm jobs lost in 2020.
- Household income is predicted to fall across all household groups, falling most among rural nonfarm households and urban households. Fast recovery can reduce the loss in household income, particularly for rural nonfarm households. However, even with fast recovery, rural farm and nonfarm households' annual income will be 4.5 percent and 5.6 percent lower, respectively, than under a normal situation.

In this policy paper, we use a Social Accounting Matrix (SAM) multiplier model to assess the effects of the COVID-19 pandemic on Myanmar's economy. The SAM multiplier model is a simulation tool ideally suited to measuring short-term direct and indirect economy-wide impacts of unanticipated, rapid-onset economic shocks, such as COVID-19. The multiplier model builds on a SAM, which is a database that captures resource flows associated with all economic transactions taking place in an economy and represents the structure of the economy at a point in time by showing the interlinkages and relationships between actors, i.e., productive activities, households, governments, and relationships with the rest of the world. The Myanmar SAM captures 63 distinct activities or sectors to characterize Myanmar's economy in 2019.

We assess the effects of COVID-19 resulting from:

- External shocks to Myanmar's economy that affect exports and tourism, that interrupt export-oriented manufacturing supply chains, and that lower international remittance incomes, and
- Policy-induced shocks resulting from the necessary response of the Government of Myanmar to the pandemic.

Considering both external factors and policy measures, we use the model to simulate the economic effects of COVID-19 under different situations.

Section 1 of this paper highlights Myanmar's policy responses to COVID-19 and describes the possible impacts of major policy measures on agriculture, industry, and services. Section 2 focuses on the external impacts of COVID-19 on Myanmar's economy, including agricultural exports, tourism, mining, and remittances. These two first sections draw intensively from published information and knowledge and other information collected by the authors through interviews with experts from the public and private sectors in the country. Section 3 describes the Myanmar economywide multisector multiplier model methodology used in the analysis for this paper and defines the scenarios used in the model simulations. Section 4 discusses the economic costs of COVID-19 for Myanmar that were estimated through the use of the SAM multiplier model. Section 5 concludes.

1. MYANMAR'S POLICY RESPONSES TO COVID-19

After Myanmar received notification on January 4 from Southeast Asia regional office of the World Health Organization of an unexplained pneumonia disease occurring in China, the Government of Myanmar responded with a series of meetings facilitated by the Ministry of Health and Sports (MoHS). These meetings eventually led to the formation on March 13 of the National Central Committee to Prevent, Control and Treat COVID-19.[1] The Committee is led by State Counsellor Aung San Suu Kyi and has the responsibility of overseeing the management of preventing the spread of COVID-19 in the country. On March 23, the first positive COVID-19 case was confirmed in Myanmar – a person who recently had returned from the United States. The first case of community transmission, i.e. a person without travel or contact history, was confirmed on March 28.[2] On March 31, the first COVID-19-related death was announced – a person with severe underlying health conditions. As of May 18, Myanmar had 187 confirmed cases, 6 deaths, and 97 recovery cases (MoHS).[3]

[1] See https://www.mohs.gov.mm/Main/content/publication/covid-19-situation-report-38-15-5-2020

[2] See https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Myanmar#Case_details

[3] See https://www.mohs.gov.mm/ for case details and health measures .

1.1. Policy measures to contain COVID-19 in Myanmar

Due to its proximity to China, the Government of Myanmar's early response was to curtail the entry of Chinese travelers by suspending visa-on-arrival privileges, cancelling flights between some high-risk provinces in China and Myanmar, and setting more restrictive conditions for those who were allowed to enter the country (Myanmar Times, January 27 and February 3, 2020). Despite its proximity to China, Myanmar was regarded as being virus-free for the entire month of February, a period during which all of its Southeast Asian neighboring countries, except for PDR Laos, had reported confirmed cases. To prevent and contain any potential spread of the virus, the Government of Myanmar strictly quarantined all returnees from abroad and all individuals who were in contact with test-positive patients. In April alone, the government placed almost 48,000 people under mandatory quarantine at 8,300 government-facilitated quarantine centers across the country for 21 days (extended from the previous 14-day rule), with home quarantine under watch for an additional 7 days (MoHS).

On April 6, just before the Thingyan water festival seven-day holiday that marks Myanmar's traditional New Year, Union and regional governments issued a nationwide stay-at-home order to contain the spread and to prevent outbreaks of COVID-19 in the country (Irrawaddy, April 6, 2020). This was the most radical policy imposed by the government and is termed a "lockdown" of the country. Government urged all citizens to stay at home as much as possible during the holiday period and for the week following the holiday. Celebration activities for the festival were strictly prohibited, travel and movement were restricted, most industrial activities were shut down, public and private administrative activities were curtailed, and all non-essential businesses and schools were closed. Governments of large municipal cities, such as Yangon and Mandalay, imposed more stringent measures; notably, in the cities the travel restriction period started earlier and lasted longer (Irrawaddy, April 6, 2020). With slight variations across regions in defining non-essential businesses, the stay-at-home order was nationwide.

The economic reopening is expected to be a gradual process. As Myanmar eased the lockdown in late April, new restrictive policies were imposed. These include requiring all factories to undergo a mandatory health inspection before reopening; extending previous bans on gatherings, events, and the opening of recreational facilities until May 15; limiting business hours at banks and commodity exchange centers; subjecting returned foreign workers to quarantine; and restricting the usage of certain highways and transportation in certain states (Central Bank of Myanmar 2020; Irrawaddy, April 6, 2020; Myanmar Times, April 20, 2020) . While the Government of Myanmar wants to protect food supply chains with more lenient policies, these supply chains have been continuously affected since the lockdown. In particular, many restaurants and food catering businesses remained closed voluntarily until May 15 because it was judged to not be economically viable for their businesses to open with a drastically reduced number of customers.

In the COVID-19 Community Mobility Report for Myanmar prepared by Google Analytics, average mobility started decreasing on March 18 and then dropped rapidly after the first COVID-19 case was found on March 23 and after the civil servants' rotational policy was issued on March 27 (Google 2020).[4] Using mobile phone locational data, this analysis measures changes in number of visits and lengths of stay at different categories of places from baseline levels between January 3 and April 17. By April 17, visits to retail and recreational locations, such as restaurants, cafes, shopping centers, and movie theaters, had dropped by 74 percent, visits to public transport stations by 67 percent, and to grocery stores and pharmacies by 64 percent. These decreases in mobility are larger than those observed in neighboring countries, such as Thailand and Vietnam. However, they are relatively more modest than in Italy and France, where more restrictive policies

[4] See https://www.google.com/covid19/mobility/ for updated mobility report by Google Analytics for Myanmar.

have been implemented. Overall, the sharp drop in the mobility of Myanmar's population demonstrates a strong response to policies imposed to contain viral transmission.

In geographic and administrative terms, the Union government's stay-at-home order and directives were uniformly and respectfully practiced throughout the country during the lockdown. Some regional governments added restrictive directives on the top of the central government order. Particularly, Mandalay and Naypyidaw have imposed more serious restrictions on travelers incoming from other regions by imposing additional restrictions on movement and a health screening requirement (Irrawaddy, April 6, 2020)

Quarantine and movement restrictions measures were vigilantly monitored across Myanmar. As infected cases continued to rise, authorities continued efforts to raise awareness of preventive practices among the public through social media campaigns and village-level poster campaigns. People are expected to follow basic safety measures, such as wearing face masks and undergoing temperature screening at building entry points. However, there were many reports that hygiene and sanitation practices, including wearing masks, were exercised flippantly in many areas, including in cities (Irrawaddy, May 12, 2020). In Yangon, Mandalay, and Naypyidaw, enforcement measures included fining pedestrians who did not wear masks (Irrawaddy, May 11a and May 12, 2020). For self-administered zones and geographical regions under the control of ethnic armed groups, it is harder to assess the policy measures taken, healthcare preparedness, and the effectiveness of any efforts to control COVID-19.

To address national food security concerns, the Myanmar government implemented more lenient policies for food supply chains. During both the lockdown and post-lockdown periods, the government permitted retail shops and markets to open and allowed supply chain logistics to operate without restriction on highways. The Ministry of Commerce also relaxed import rules to ensure access to essential imported goods. Authorities neither limited nor prohibited selling food staples and commodities. They also did not attempt to disrupt companies and businesses along the food supply chain (Global New Light of Myanmar, April 3, 2020). However, the government did order restaurants and teashops to close their dine-in services to prevent the spread of the disease. Since the first positive cases were confirmed, the government announced a series of laws and warned the public against price gouging, market manipulation, and exploitive pricing practices in order to stabilize food prices (Global New Light of Myanmar, April 3, 2020). For staples, such as rice, pulses, and beans, the authorities suspended export permits and made arrangements to create staple food reserves. For low-income citizens, the government distributed basic commodities, including rice, cooking oil, potatoes, pulses, and onions (Myanmar Now April 8, 2020).

The policy measures and directives implemented by the Government of Myanmar in response to COVID-19 are expected to have impacts beyond the lockdown period on the agriculture, industry, and service sectors through several different pathways.

- **Restrictions on residents' movement and transportation** to curb COVID-19 spread, including ordering people to stay at home, shutting down public transport, and prohibiting gatherings of five or more people, could affect production and processing activities in all economic sectors. Supply chain logistics for various sectors will also be disrupted because restrictions on highways and vehicle use will hinder the normal flow of goods. The lockdowns is likely to result in truck supply shortages, labor supply shortages, and volatile pricing for logistics services (Karzo 2020).
- **Restrictions on banking hours and suspensions on microfinance institution operations** could slow down normal financial functions, such as payments, funds withdrawals and transfers, and obtaining the loans that vendors, workers, suppliers, and

cooperate customers need to maintain their cash flow. These restrictions within the financial sector will also prevent farmers from raising the capital they require to obtain commercial inputs for the upcoming growing season (Myanmar Times, May 5, 2020).

- **Restriction on public administrative activities** may delay or disrupt the normal operation of government functions, which include supporting private enterprises, providing public goods and services, and providing social welfare services.

Although these policies are implemented by the central government, a number of them, such as the 21-day quarantine rule for returning workers after the holiday, social distancing measures, and hygiene practices in workplaces, are expected to be difficult to administer fully. This will particularly be the case in remote regions and for central and local government agencies which lack the capacity to adequately monitor and enforce them. For instance, returning workers from Yangon to Mandalay are required to enter quarantine upon arrival. However, anecdotal reports are circulating that some workers are avoiding quarantine by entering Mandalay using secondary roads rather than the main roads where authorities monitor returnees.

1.2. Policy measures to maintain necessary economic activities

The above discussion focused on measures imposed by the government to contain and prevent COVID-19 spread in the country. The government has also instituted a series of policy measures to maintain essential economic activities and trade flows and to reduce interruptions in supply chains, especially for pharmaceutical products and essential food items.

The Myanmar International Trade Center (MITC) established the COVID-19 Business Helpdesk in collaboration with port authorities, customs, airport authorities, and other related departments (Global New Light of Myanmar, March 16, 2020). The main purpose of the helpdesk is to minimize delays in the export of Myanmar products and the import of prioritized items, such as medicinal products. With collaboration between different departments, the following policies and regulations have been established:

- Companies are required to submit original certificates and documents for normal customs clearance at ports. As the courier service DHL has stopped operations in Myanmar, it is difficult to send original certificates, such as a Bill of Loading (BL). In consequence, port authorities are allowing submission of copies of certificates and documents until the crisis is over.
- Demurrage charges and other storage charges for containers at ports have been reduced by 50 percent.
- Services will be provided to connect shipping lines for faster transport of commodities.
- For import tax reduction, some forms and documents are officially required to be submitted in their original formats. However, the customs department currently allows submission of copies. After the crisis is over, the companies will be required to submit original versions.
- MITC initiated online applications for export and import licenses.
- Extension of business visas can be done through an online application process.
- License fees for importation of prioritized items, such as medicinal products, are waived.
- Standard import licenses of 30,000 MMK (about 22 USD) are applied to other products. Before the pandemic, fees for import licenses varied according to the Harmonized System (HS) code for classifying goods.

- Trade flows for agricultural products via border trade zones are monitored daily and negotiated with trading partner countries.

In addition, at the end of March, the Ministry of Planning, Finance and Industry (MoPFI) announced the Immediate Loan Program to ease the economic impact of COVID-19 on industries. It is a one-year loan plan with a one-percent interest rate for small- and medium-sized businesses (MoPFI 2020a) . According to informants for this study, most producers in agriculture and livestock sectors, however, are not eligible to apply for these funds because they are unable to submit the required documents, such as land ownership documents, tax records, company registrations, etc. Additionally, within the livestock sector, most broiler farmers are running as a family business, so are not registered with the Department of Livestock Breeding and Veterinary. That they are not registered make them ineligible for the loan program.

Economic Relief Plan

On April 27, MoPFI released the COVID-19 Economic Relief Plan (CERP) (MoPFI 2020) which set out seven goals and 38 action plans.[5]. The seven goals of the CERP are:

1. *Improving macroeconomic environment through monetary stimulus:* Government plans to provide a monetary stimulus via several different pathways:
    - Lowering bank deposit and lending rates by 3 percent (completed by Central Bank in April),
    - Lowering minimum reserves requirements by banks (completed by Central Bank), and
    - Conducting credit auctions to inject more liquidity into the banking and financing sector.
2. *Easing impact on the private sector through improvements to investment, trade, and banking:* Government will:
    - Provide 100 billion MMK to improve the working capital of affected local businesses, particularly to small and medium-sized enterprises (SME), the cut-make-pack (CMP) sub-sector of the garment industry, and the hotel and tourism sectors (Completed by MoPFI in April).
    - Under a credit guarantee scheme, guarantee 50 percent of any new bank loan to Myanmar enterprises for working capital.
    - Allow deferral of corporate income tax, commercial tax, tax withholding on exports, specific goods tax, custom duties, and commercial tax for critical medical supplies and products related to the prevention, control, and treatment of COVID-19.
    - Provide cash or loans to smallholder farmers for input purchases in time for the monsoon planting season.
    - To promote investment, expedite investment approval processes and solicitation of renewable energy projects and strategic infrastructure projects.
3. *Easing impact on laborers and workers:* The government plans to extend labor benefits to unemployed Social Security Board (SSB) members (completed by MoLIP on March 13) and implement labor-intensive community infrastructure projects for laid-off workers and returning migrants.
4. *Easing impact on households:* The plans include:
    - Exempting the electricity tariff (completed by MoEE on April 6).

[5] See the Ministry of Information Management Unit to assess CERP in pdf. https://themimu.info/sites/themimu.info/files/documents/Core_Doc_Overcoming_as_One_-_COVID-19_Economic_Relief_Plan_27Apr2020.pdf.

- Providing in-kind food transfers and emergency rations to low-income households (completed by GAD and MoC on April 10).
- Providing cash transfers to vulnerable households, including Internally-displaced Persons (IDP) in high-risk areas.
- Improving benefits for social pension and Maternal Child Cash Transfer beneficiaries.
- Negotiate with financial institutions for more flexibility related to interest rates and mortgage payments for affected households.

5. *Promoting innovative products and platforms:* Government will:

   - Promote mobile payment systems and usage of e-commerce and social commerce systems.
   - Encourage retail businesses and logistics firms to make use of existing websites to sell products and provide services.
   - Develop a central e-commerce website.
   - Initiate grant competitions for innovative ideas to combat the pandemic's impacts.

6. *Strengthening healthcare systems:*

   - Under immediate plans, the government will improve quarantine facilities, import key medical products required for COVID-19, and improve preventive healthcare measures.
   - For long-term plans, government will improve capacity building for the health care sector and upgrade existing health and medical facilities.

7. *Increasing access to COVID-19 response financing (including contingency funds):*

   - All government entities will reallocate part of their 2019/20 budgets to the CERP fund, improve budget flexibility, and acquire external grants and concessional loans to finance the CERP action plans.

The plan is expected to cost a minimum of 2 billion USD (Myanmar Times, May 11, 2020). Currently, Myanmar expects to receive around 2 billion USD from up to five international development partners (Irrawaddy, May 11b 2020). The Myanmar government will provide additional funds through a reallocation of the budget – 22 ministries will surrender 10 percent of their 2019/20 fiscal year budgets and reallocate the funds to CERP (Myanmar Times, May 11, 2020). However, the exact amount that will be realized through this reallocation process is yet to be known.

To summarize, Table 1.1 provides a timeline of COVID-19 policy measures put in place by the Government of Myanmar both to contain the spread of the virus and to maintain essential economic activities from the beginning of 2020 through May.

Table 1.1: Policy measures of the government of Myanmar to contain COVID-19 transmission and maintain essential economic activities, January through May 2020

Date	Policy measures
Jan 8	Emergency preparedness meetings started after WHO South East Asia Regional Office notified the Myanmar government on Jan 4 of unexplained pneumonia cases in China (MoHS).
Jan 28	The national level COVID-19 central committee led by the State Counselor was formed to: prevent and contain viral spread, monitor quarantined patients and suspected cases, educate the public, disseminate news and information, and oversee management (MPO).
Feb 3	Travel restrictions on Chinese travelers were placed at multiple levels: cancelling flights, suspending visa-on-arrival privileges, and requiring medical certificates from tourists to enter the country (MoFA).
Mar 15	Announcement of travel restrictions and a 14-day mandatory quarantine rule for incoming travelers from 17 high risk countries (MoFA). Orders to close preschools, nurseries, and cinemas announced (MoSWRR). Announcement on extension of labor benefits to workers unemployed (MoLIP)

Date	Policy measures
Mar 18	Announcement of COVID-19 emergency fund (US$ 72 million) to give loans to three sectors: cut-make-pack (CMP) sub-sector of the garment industry, tourism sector, and SMEs (MoPFI). Directives on social distancing were provided for NGOs and private companies. An order to ban activities involving meetings, gatherings, and events was announced.
Mar 21	Suspension of visa-on-arrival and e-visas for all countries. Suspension of entry of foreigners at border gates with neighboring countries. Health screening measures announced at border check points (MoFA).
Mar 23	First two COVID-19 cases reported in Myanmar (MoHS).
Mar 26	Social distancing measures announced for civil servants; order announced for government offices to work on a rotation basis with half of staff in office at one time (MPO).
Mar 26	First local transmission confirmed. Myanmar no longer allowed any international passenger flights. Restrictions on public transportation were placed; bus lines to reduce passengers by half and Myanmar railway to cut the number of trains and routes under operations. Directives on food supply chains announced; notification of the law to protect essential goods from price gouging, speculation in the market, and playing with prices (MoC). Ban on dine-in services at restaurants and teashops.
Apr 1-9 (before lockdown)	More restrictions on transport and movement announced; suspension of private passenger bus lines and Mandalay government banned entry of commercial buses and personal vehicles with more than seven passengers (MRTA). Announcement of exemptions on first 150 units of household electricity (MoEE). Distribution of basic food commodities to low-income citizens (MoC). Suspension of rice export permits and warning on food hoarding implemented (MoC). Microfinance institutions were ordered to suspend operations until April 30 (MoPFI).
Apr 10–18 (Stay-at-home order, i.e., 'lockdown')	Stay-at-home order became effective on April 10 and lasted until April 19 (MPO). Restrictions on population movement, transport, and non-essential businesses effective; stay-at-home order; ban on festive activities; ban on gatherings of more than five people; closure of non-essential businesses and factories; closure of public and private administration; reduction of public transportation; night curfews in some states. Seven townships under semi-lockdown measures starting April 18.
Apr 19	Official order to undergo mandatory health inspection at factories (MoHS).
Apr 20	Yangon bus lines resumed operations. Commodity exchange centers and wholesale markets limit opening hours. Employees returning after the Thingyan water festival were ordered to enter a 21-day quarantine. Government offices reopened.
Apr 23	Yangon government extended night curfews to 2 months. Yangon circular train further cut down the number of trains under operations to 90 percent (YRTA).
Apr 25	Central Bank announcement to all banks; all banks will open for limited hours and have deadlines extended for banking and financial regulations. Suspension of passenger airline operations was extended to May 15. Semi-lockdown measures placed in 10 townships.
Apr 27	COVID-19 Economic Relief Plan was announced and consists of seven goals, 10 strategies, 36 action plans, and 76 actions (MoPFI).
Apr 30	Extension of mandatory health inspection until May 15 announced (MoHS and MoLIP). Closure of beaches extended until May 15.
May 1-11	Announcement to quarantine one million returning migrants from China and Thailand (MoHS). Suspensions on microfinance institution operations extended to May 15 (MOPFI).
May 12	Announcement on bank hours reverting to regular business hours on May 12 (CBM). Yangon made wearing masks mandatory with fines for violators (Yangon Government).
May 14	Announcement on job creation program in agriculture and construction to unemployed (MoALI)
May 15	Announcement on incrementally extending the previous bans on gatherings and festivals, closure of nurseries, boarding schools, and cinemas until May 31(Covid-19 Central Committee).

Note : CBM = Central Bank of Myanmar; MoALI = Ministry of Agriculture, Livestock and Irrigation; MoC = Ministry of Commerce; MoEE = Ministry of Electricity and Energy; MoFA = Ministry of Foreign Affairs; MoHS = Ministry of Health and Sports; MoLIP = Ministry of Labor, Immigration and Population; MoPFI = Ministry of Planning, Finance and Industry.; MoSWRR= Ministry of Social Welfare, Relief and Resettlement; MPO = Myanmar President Office; YRTA = Yangon Region Transport Authority

1.3. Agriculture and agribusiness activities – possible impacts of COVID-19 policy measures

No restrictions have been imposed by either the Union or regional governments on the movement of farmers and field workers or on farming either during the lockdown period or after the lockdown being lifted. Nevertheless, restrictions on travel and residents' movements still affect the farming

sector. Media reports instances of local authorities or villagers or towns people erecting barricades or roadblocks at village and community levels (Irrawaddy, May 13, 2020). IFPRI's own interviews confirmed the existence of such roadblocks. Together with the general restrictions on travel and residents' movement, these physical barriers made it difficult for farmers to go to their fields and for farmers and traders to sell agricultural products between villages (Irrawaddy, May 13, 2020).

Fruit and vegetable distribution centers and wholesale markets in Myanmar usually operate 24 hours a day due to the high perishability of fresh produce. Wholesale markets operate through the night so that vendors can retail to individual households the next morning at wet markets. The largest wholesale centers are in Yangon. In the second week of April, Yangon authorities ordered curfews to restrict the movement of people, which included major wholesale markets for fish, fruit, and vegetables. As a result, these markets and centers had to operate for 18 hours a day instead of the usual 24 hours. The combined effects of not allowing wholesale markets to open at nighttime, travel restrictions in border trade zones, and the high risk of loss for perishable products in hot weather resulted in more than half of all wholesalers halting operations. For consumers, this resulted in significantly reduced supply of fresh produce. However, adequate supplies of less perishable vegetables, such as potatoes and onions, were made available even during the stay-at-home period.

Crops

For those crops for which the harvest season coincides with the lockdown and post-lockdown restrictions, losses can be expected in the field and through reduction in value-added processing. Harvesting of tea and chili peppers takes place in March and April, coinciding with the period of the COVID-19 restrictive measures. The harvesting and post-harvest handling of these crops are highly labor intensive. As workers could not commute to fields easily for harvesting, we were told that losses of these crops were substantial.

Demand for non-perishable staple products, including rice, chickpea, black gram and cooking oil, has increased significantly due to the stay-home order during the lockdown period. In our interviews, we were told that, due to fear of food shortages, these staple goods were stockpiled by households, since they are storable. On the other hand, demand for perishable products fell even before lockdown when the government started to ban dine-in services in restaurants. It becomes economically unviable for restaurants to remain open with few customers. Our respondents estimated that 30 percent of restaurants in Mandalay closed temporarily following the ban on dine-in services. Trade in leafy greens and vegetables fell by half during the lockdown period according to informants.

In the post-lockdown period, some restrictive orders were imposed nationwide, such as reducing hours in major wholesale markets and imposing curfews. These hindered the recovery of trade and sales and adversely affected the employment of low-income workers, such as hawkers, truck-drivers and porters, who depend on these markets for daily income. The prolonged restrictive orders also created uncertainty in the market. Sales of pulses and beans dropped nearly 40 percent because of restrictions imposed on entering or on movement through some villages even after the lockdown. Local farmers cannot go outside their villages while these restrictions are being enforced. Without an assured market, farmers have no incentive to grow crops. In addition, trade in agricultural commodities that are normally transported using passenger bus lines was restricted during the lockdown period and this trade has been limited in the post-lockdown period.

Livestock and fisheries

Due to high perishability, the livestock and fishery sectors were seriously affected by the lockdown. We were informed that sales and production of poultry meat, pork, and red meat decreased by roughly 40 percent. Travel restrictions have made transportation of meat products extremely

difficult, resulting in many producers being unable to sell their products. At the same time, demand for meat consumption fell as consumers switched to cheaper foods due to falling incomes. Based on our interviews, we estimate that the farm gate prices for meat and milk products could fall temporarily by between 30 and 80 percent.

According to informants from Myanmar's livestock and fishery sectors, production of livestock with short production cycles, such as chicken and pigs, were more seriously affected when restaurants and food caterers closed, lowering demand for poultry and pork significantly. Poultry had already been affected before COVID-19 because of media publicity related to Salmonella bacteria in chicken. Under a normal market situation, broiler farms could expect higher prices from February to April when many donation and wedding ceremonies take place. However, demand for poultry is estimated to fall by 40 percent this year, with February prices dropping below the breakeven point for the chicken industry (MLF's official Facebook 2020). With continued travel restrictions in the country, prices are not expected to return to normal until May.

Chicken layer farms also face difficulties. Under normal circumstances, eggs can be exported to China via the border. However, with the COVID-19 outbreak, the Chinese currency's value started to depreciate at the end of January, so Myanmar egg exporters sent their produce to domestic markets instead. With higher domestic supply, wholesale prices for eggs initially fell in March but rose later in April because of panic buying and food donations. The Myanmar Livestock Federation proposed "a systematic analysis of integrated poultry and fish farming" as a way of efficiently utilizing resources, especially during the pandemic.

Since April pig farms have also suffered from lower purchases by slaughterhouses. Concerned about high feed costs, pig farmers are trying to sell their pigs even before they reach a marketable age.

The major wholesale markets for fish and seafood products in Yangon were operating normally in March, but their hours of operation were reduced in April. Combined with reduced demand due to restaurant closure, the whole fish supply chain has been affected. Fishery products also experienced oversupply and falling prices due to lack of access to export markets, such as China. We estimate that fish prices have fallen between 50 and 80 percent since February. Fish farmers also face feed shortages and higher costs because the supply of fish feed depends in part on imports. With falling fish prices and higher feed prices, farmers have had to reduce fish harvests.

In summary, business people and agricultural sector experts interviewed stated that they expect government to treat the agriculture and livestock sectors differently than other business sectors in the recovery period. Although the most stringent restrictions on movement and travel have recently been partially lifted, many restrictions are still in place. Consequently, market and price stability policies are necessary for small and medium businesses in the agricultural sector and support for the application of proper postharvest technologies and practices is urgently required.

According to the recent *Myanmar Economic Relief Plan*, four action plans will be applied to the agriculture sector under MOALI's lead, including "(a) support COVID-19 communication campaigns, (b) cash or lending support to smallholder farmers who have lost sales revenue or remittance income to support input purchases in time for monsoon planting, (c) complement support with advice on productivity enhancement and market connectivity, and (d) following the lifting of movement restrictions, establish rural cash-for-work programs."

1.4. Industrial activities – possible impacts of COVID-19 policy measures

Myanmar has a large industrial sector in which manufacturing is the largest component. Manufacturing, which has been booming in recent years, is currently dominated by small firms

(EuroCham 2019; EuroCham 2020a). Companies with over 500 employees dominate the garment and textile sector (EuroCham 2020b). The manufacturing sector, along with tourism and construction, is regarded as the sector that has been hardest hit by COVID-19 impacts (Myanmar Times, May 7a, 2020). These adverse impacts started in February, intensified in April when the lockdown was imposed nationwide, and have continued post-lockdown.

For those industries whose activities rely heavily on imports and exports, the first wave of impacts came in February and March when importing and exporting countries started to impose travel restrictions and local lockdowns. From both media news reports and IFPRI interviews with respondents from the manufacturing sector, cancellation of export orders, declines of incoming orders, and difficulties in supply chain logistics were reported throughout February and March (Myanmar Times, March 29, April 3 and May 7a, 2020). Until January, Myanmar's manufacturing sector was marked as healthy and improving (Markit Economic 2020). IHS Markit surveyed 450 manufacturing companies and based their judgment of the strength of the sector on several indicators, including new orders, employment, and delivery times. However, stagnation was signaled in February with a continuing gradual drop in March. The IHS Markit survey links the drop in March in part to China's lockdown measures (Trade Economics 2020).

For most companies in the industrial sector, impacts intensified in early April in the first week of lockdown with the closure of most construction sites and of manufacturing operations, coinciding with the Thingyan water festival holiday. In a normal year, workers return home just before Thingyan, but this year, due to the public's fear of the outbreak, workers returned home several days earlier than they normally do. According to IFPRI interview respondents from the construction, food processing, and mining sectors, employees returned home as early as late March or beginning of April this year. With the nationwide stay-at-home order, virtually all manufacturing factories were closed and workers who returned home during the holiday period were unable to return to their places of work.

On April 19, which marked the end of the lockdown, MoHS ordered all factories to undergo mandatory health inspections prior to reopening. While essential manufacturing sectors, such as agrochemical, food processing, medical, pharmaceutical, hygiene, and sanitation manufacturing, were prioritized for health inspections, there are almost 7,000 factories in the Yangon region alone (Myanmar Times, April 19, 2020). A total of 17 teams from MoHS conducted daily inspections for notified factories. As of May 1, over 3,300 factories across the country had been inspected (Global New Light of Myanmar, May 7, 2020). On April 25 the mandatory inspection order was extended to May 15. Factories that had not completed the inspection were ordered to remain closed.

Manufacturing and related industries have had to bear the cost of stringent COVID-19 containment measures, such as the stay-at-home order during lockdown, social-distancing procedures pre- and post-lockdown, and restrictions on travels and residents' movement. Based on news reports and interviews with key informants and leaders in the industrial sector, it is clear that the intensity of the impacts varies by the size and nature of the business, but all businesses suffer from delays in raw material imports and falling orders. Without new orders, firms have to lay off workers. According to the Ministry of Labor, Immigration, and Populations, as of late April, 175 factories had stopped operations, leaving 60,000 industrial workers unemployed since the outbreak began (Myanmar Times, April 28, 2020). In the post-lockdown period, many workers still cannot return to workplaces due to travel restrictions and quarantine rules, so manufacturing and construction companies are facing difficulties in completing orders and projects. Delivery of finished products are delayed due to challenges with logistics and freight companies, including manual labor shortages for loading and unloading goods and for drivers and continued travel restrictions due to post-lockdown curfews (Karzo Logistics 2020). IHS Markit reported that the Purchasing Manager Index nosedived in April to the steepest decline on record. This index is

based on reports from 450 participating manufacturing firms on five indicators – new orders, output, employment, supplier delivery times, and stock of items purchased.

To mitigate these adverse impacts on the industrial sector and to facilitate trade, the government has relaxed some rules and regulations. This includes online import/export applications, reductions in container storage charges, relaxations on required forms and documents for import tax reduction, waivers for license fees for importing prioritized items, and negotiations with trading countries for exports of agricultural products. Furthermore, the government announced a 72 million USD loan program for SMEs, the cut-make-pack (CMP) sub-sector of the garment industry, and the hotel and tourism sector through which loans are offered at a 1 percent interest rate per annum (MoFPI 2020). As of May 1, the government has approved loans for over 200 businesses. Roughly 50 percent of the approved firms were from garment and manufacturing sectors (UMFCCI 2020). The CERP also has established relief plans for the sector, including reducing taxes, extending loan repayment, and continuing benefits for laid off employees.

Garments and textiles

In 2018/19, Myanmar's cut-make-pack (CMP) garment sector comprised 533 garment factories which employed approximately 500,000 workers and generated 4.6 billion USD (Global New Light of Myanmar, December 26, 2019). As 90 percent of raw materials for the sector were imported from China, the garment industry supply chain was severely disrupted when the lockdown with China was imposed. Approximately 90 percent of garment factories rely on the export market with 70 percent of exports going to the EU market (EuroCham 2020b). With the COVID-19 outbreak in Europe, all orders from the region were cancelled in March (Myanmar Times, March 29, 2020).

Job loss in the garment sector has been widely discussed in the news media. Before the cancellation of orders from the EU, 22 factories had shut down, leaving over 10,000 workers unemployed (Myanmar Times, March 27, 2020). According to the EU official website, over 25,000 workers from about 40 factories manufacturing garment, textiles, and footwears had lost jobs by the end of March (European Commission 2020). With the closure of these factories, contracts of numerous workers were terminated – some not even receiving compensation (Myanmar Times, April 5, 2020).

On March 18, MoPFI announced a 72 million USD fund for the CMP industry, the tourism sector, and SMEs, with CMP companies prioritized for government support. On April 8, the EU promised cash assistance of 5 million euros through the "Quick Assistance" fund to almost 90,000 workers from garment, shoe, and bag factories (European Commission 2020). The fund will offer three different forms of support: monthly cash transfers for up to three months to those laid off, cash transfers of 125,000 MMK (~ 83 USD) for workers who were illegally terminated, and cash transfer to SME owners who agree to retain workers (European Commission 2020). In addition to these funds, the Myanmar government has extended labor benefits to those laid off from their jobs. According to CERP, the government will also implement community infrastructure projects where laid off workers and returning migrants are likely to be hired.

Construction

Construction is the second largest industrial sector, employing an estimated 1.2 million workers nationwide (Myanmar Statistical Yearbook 2019; Myanmar Construction Entrepreneur Association 2020). The sector imports approximately 85 percent of its raw materials from China, Thailand, Singapore, Malaysia, and India. Due to lockdown measures in exporting countries, imports of building materials experienced delays beginning in March, according to industry leaders that IFPRI interviewed. Soon after the first COVID-19 case was confirmed on March 23 and the resultant directives on social distancing measures, construction companies had to cut their labor forces by half to keep businesses running. The pandemic also coincided with a vital season for the sector

when most projects are at the maximum number of workers in order to wrap up operations before the onset of the monsoon in late May. The shutdown of construction projects resulted in companies failing to complete contracted projects according to their deadlines. The delays could result in legal issues for contractors in addition to disputes with laborers, budget problems, and increased overhead costs.

Even after the lockdown was lifted in late April, many construction sites in Yangon have not fully recommenced. Sites will not be able to operate with a full workforce as workers have been delayed in returning to Yangon due to irregular bus and train schedules and social-distancing measures remain in effect on the work sites. The anticipated recovery time for the industry is 2 to 3 years, according to our respondents. Respondents from the construction sector were of the opinion that construction seems to be regarded as a lower priority sector – none of the construction companies whose managers we interviewed have received a loan yet.

Mining

Mining industry activity in Myanmar had been slowing for some years prior to the lockdown as the government has implemented new regulations on mining blocks (Global New Light of Myanmar, April 15, 2020). In 2020, miners and mining industry employees returned home early due to fear of the outbreak and travel restrictions. Industry key informants have said that numerous workers could not return to work because of restrictions on travel and population movement after the lockdown was lifted. Even though activities in mining have been quiet for factors unrelated to COVID-19, they have been further diminished by the virus containment restrictions.

1.5. Service sector activities – possible impacts of COVID-19 policy measures

Myanmar's service sector was the largest contributor to national GDP in recent years. The sector is comprised of trade, transportation, social and administrative services, communications, retail, hotel and tourism, and financial institutions.

Trade

Since the pre-lockdown period in Myanmar, international trade has been restricted by movement controls in importing and exporting countries. Domestic trade was subdued during the lockdown period and, besides essential trade of food and medical products, has remained low after the lockdown was lifted. This is evident by the reduced amount of local transactions made through the banking system. According to an informant from one of the largest banking systems in Myanmar, overall payment remittances in April dropped 20 percent, while remittances from Upper Myanmar, where many manufacturing and food production businesses are concentrated, have decreased by about one-third compared to the same period in 2019.

The effects are also reflected in the trade statistics reported by the Ministry of Commerce.[6] The total value of border and sea trade between March 27 and May 1 this year was 16 percent lower compared to the same period in 2019 (MoC 2020). Both border import and export volumes fell – border imports were 27 percent less than the same period in 2019 (MoC 2020). Furthermore, the Ministry reported that volumes of animal products exported through May 1 in the current fiscal year dropped 78 percent, compared to a year earlier. However, export volumes of other agricultural products, mineral products, and marine products through May 1 were still higher than the volumes registered over the same period in 2019. The import of CMP products from China and other countries has dropped continuously since early April. Total import volumes are currently 54 million USD less than was the case for the same period a year earlier (MoC 2020).

[6] See trade data from Ministry of Commerce official webpage for up-to-date details on trade statistics: https://bit.ly/2Zi9wVG

Transportation

To curb the outbreak of COVID-19 the Ministry of Transport and Communications ordered commercial bus lines to reduce the number of passengers by half, allowing a doubling in ticket prices in compensation. However, the regional governments of Mandalay and Shan placed strict restrictions on the use of highways and the number of allowed passengers on vehicles, so highway bus line services came to a halt. On April 7, express bus line companies announced the suspension of their services until April 21 as there were no customers due to the nationwide stay-at-home order (Myanmar Times, April 6, 2020). Even after the lockdown was lifted, regional governments continued travel restrictions through night curfews. The Yangon government extended the order for two months (Myanmar Times, April 19, 2020). Night curfews and stringent travel restrictions in a major transit hub, such as Mandalay, severely disrupt operations of highway commercial bus lines. Hence, the majority of Yangon-based bus lines have extended the suspension of their services, while some bus lines in other regions may run under the guidance of the respective governments. A number of inter-state train routes were also suspended by Myanmar Railways (Myanmar Times, April 21, 2020; Eleven Myanmar, May 5, 2020).

For urban public transportation, Yangon Bus Service reduced the number of buses that run in the city during the Thingyan water festival to roughly 25 percent. Normal operations, but with reduced passengers, were resumed after the holiday (Myanmar Times, April 8, 2020). In April and May, the Yangon Circular Railway also cut down the number of trains that run within the city by between 40 and 90 percent of their usual frequency.

Freight transportation on the domestic side has been relatively unaffected, according to an key informant from the industry. Cargo trucks were exempted from travel restrictions in most regions and allowed to use highways even during the lockdown. However, after the lockdown was lifted, freight companies have been facing difficulties in finding drivers as some have not returned to work. Night curfews after the lockdown also limit the hours of operations, which can result in delayed delivery times.

Overall in the transport sector, private commercial bus lines are the hardest hit economically by COVID-19 impacts. Even after travel restrictions have been lifted, public sentiment about non-essential travel may affect bus companies for months to come. Cargo truck companies also have been affected by curfew and travel restrictions. As a relief effort, SMEs in the commercial bus sector will be eligible to apply for the Immediate Loan Plan. The recently released CERP also waives toll fess for cargo trucks, which will improve the flow of trade and may reduce costs for cargo truck companies.

Retail sales

Retail sales of non-essential goods rapidly decreased after the COVID-19 restrictions were announced in Myanmar. On March 28, the Mandalay city government ordered the closure of all non-essential businesses, including its biggest markets (Myanmar Times, March 28, 2020). The Yangon city government did not officially order wholesale and retail markets to close. However, market authorities in Yangon have limited opening hours since April 1 and made their own directives on when the markets would be open. All wholesale and retail markets trading non-essential consumer goods were closed during the lockdown, although some reopened as early as April 23 with social distancing measures and limited hours.

A combination of social distancing measures, public fear, and travel restrictions has drastically reduced customers and, hence, sales since the first positive COVID-19 cases were announced. Retailers from mega wholesale and retail shopping centers who were interviewed for this study reported that roughly 20 percent of stalls in mega wholesale centers were closed since late March. Many retailers reported that they voluntarily closed their stores due to lack of customers and fear of

viral spread in crowded environments. Retail businesses trading luxury goods, such as gems and jewelry, were also hit hard by COVID-19 impacts. Sales since February have declined to almost zero because of public sentiment to hold cash rather than spend it on non-essential items. A key informant from the sector predicted that gem and jewelry businesses are unlikely to recover until next year. This is due both because the nature of the business requires in-person inspection for item quality and because people are likely to hold on to their cash for the foreseeable future.

Retail establishments selling essential goods and services, including food products and pharmaceutical products, were allowed to remain open during both lockdown and post-lockdown periods. Nevertheless, their sales and activities were subdued during the lockdown period. The public stayed home as much as possible because of directives on social distancing, curfews, and movement restrictions. However, sales are quickly recovering since the lockdown was lifted.

Administrative activities

On March 18, the Ministry of Social Welfare, Relief, and Resettlement ordered all NGOs to suspend activities involving meetings, events, and gatherings (MoSWRR 2020). On March 28, the government ordered civil servants to reduce the workforce in offices by half and work on a rotational basis. Subsequently, the government also issued the first air travel restrictions for foreign nationals. Both public and private administrative activities began to gradually decline with reduced staff in offices and fell rapidly as the holiday lockdown approached. The majority of public and private administrative activities were frozen during the lockdown period, though essential civil and military services remained operational with reduced staff. When the lockdown was lifted, public offices reopened, but employees continued practicing a rotational work policy. To implement directives on social-distancing procedures, most public and private organizations and companies maintain roughly half of their staff in offices. Consequently, the efficiency of administrative activities is likely to suffer when compared to normal working times with full staff.

Financial institutions

To implement the government's directive on social distancing procedures, both public and private banks in Myanmar operated with reduced staff from the third week of March, but remained open until the lockdown. After the lockdown was lifted, they continued operating regular hours with reduced staff until the Central Bank order, which took effect on April 28 and limited opening hours from 10 am to 2 pm. Limiting hours created larger crowds in queues and caused longer waiting times. The Central Bank reinstated regular hours on May 12.

Activities of microfinance institutions (MFIs) were frozen by the Ministry of Planning and Finance's order to suspend operations until April 30 (MoPFI 2020).[7] The order was later extended through May 15. All microfinance and non-bank institutions were instructed by MOPF's Microfinance Business Supervisory Committee to suspend "with force" collections of principal or interest on outstanding loans (Myanmar Times, April 12, 2020). The committee further ordered microfinance and non-bank institutions to suspend loan repayments, taking on new clients, and accepting saving balances from April 6 to 30 (Toth 2020). Even before the order in late March, some MFIs in Yangon voluntarily extended loan repayments (Myanmar Times, April 12, 2020; Toth 2020). Suspension of repayments and saving deposits may push MFIs into a cash liquidity crisis because the institutions need to collect repayments and saving deposits as a source of the cash income vital to run institutional functions (Toth 2020). At the same time, with lower capital the institutions will have to bear operational costs, of which salaries makes up more than 50 percent (Toth 2020).

[7] See https://www.fairwear.org/covid-19-dossier/covid-19-guidance-for-production-countries/covid-19-impact-and-responses-myanmar/

2. EXTERNAL IMPACTS OF COVID-19 ON MYANMAR'S ECONOMY

Myanmar relies heavily on the global economy through international trade, participation in global value chains, a rapidly developing tourism industry, and large-scale international migration. In recent years, exports and imports of goods and services make up about 50 percent of the country's national GDP (World Bank 2020). Myanmar also has started to participate in global value chains – for instance, Myanmar's garment industry has been fully integrated within the global textile value chain. Garment exports were about 5 billion USD in 2019 and were expected to rise to 10 billion USD by 2024 (EuroCham 2020b). As for the tourism industry, recent annual in-country expenditure of tourists was about 2 billion USD (UNWTO 2020), equivalent to 3 percent of GDP. For international migration, the Government of Myanmar estimates that there are 4.25 million Myanmar nationals living abroad. International remittances are estimated to be as high as 8 billion USD a year (IOM 2020a), more than 10 percent of GDP.

Such broad integration with the global economy implies that Myanmar's economy is vulnerable to COVID-19 shocks through various external channels. This section focuses on such impacts with a more detailed discussion on the impacts on agricultural exports.

2.1. Agriculture

In recent years, the agriculture sector has accounted for about 25 percent of Myanmar's national GDP and employs around 50 percent of the labor force (World Bank 2020; Myanmar Times, May 5, 2020). Additionally, many agricultural products are oriented for the export market. Agri-food exports make up between 25 and 30 percent of agricultural GDP in recent years.

The unexpected shocks of COVID-19 on Myanmar's agri-food exports started in late January 2020 when the outbreak arose in China. When the outbreak became a global pandemic, the negative effects on Myanmar's agri-food exports intensified as many of Myanmar's trading partner countries were hit by the virus. Making things worse, the negative shock on agricultural exports also came at a time when many agricultural products grown in Myanmar were in their peak export season. Consequently, the areas exporting such products have been the most seriously impacted.

Melon

China is Myanmar's largest export market for melon. Various cultivars of watermelons and muskmelons are widely grown in the Central Dry Zone, Shan State, and Bago Region for export. In recent years, cultivated land in these regions has been re-allocated from growing paddy rice to growing melons due to melon's relatively short growing season and high export potential. As November to April is an off-production period in China, these months are Myanmar's export season. In 2020 the export peak came in the weeks before Chinese New Year, which started on January 25.

There were approximately 150,000 melons farmers in 2019 (Winrock 2019). They can be categorized into three groups: 1) smallholders with 3 to 10 acres, 2) medium-scale farmers with 10 to 100 acres, and 3) large commercial farmers with 100 to 250 acres. The impacts of COVID 19 placed a larger burden on small- and medium-scale farmers as their harvest period is more concentrated in time. Before the COVID-19 restrictions, melon exports began in November and the market operated normally leading up to Chinese New Year. The border market does not ordinarily operate during the New Year celebration period. Myanmar melon traders anticipated that the market would return to usual operations after the celebration. However, when COVID-19 threatened to become an epidemic in China and lockdown policies were imposed there, Chinese importers had to halt their purchasing plans and market operations. Melon export markets were

thrown into chaos. Many trucks loaded with melons were stranded at the Muse border crossing between Myanmar and China. The whole melon supply chain was interrupted (Frontier Myanmar, March 14, 2020; Myanmar Times, January 30 and February 26, 2020).

Changes in border procedures also affected the melon export market. Traders usually negotiate prices on the Myanmar side of the border and then unload cargo on the Chinese side. In the last week of March, Chinese authorities applied very strict rules for border passage that changed the usual process (Irrawaddy, April 24, 2020). As Chinese buyers at the border were unable to cross to the Myanmar side, all business transactions had to be done on the China side. Myanmar trading companies hired certified drivers to cross the border to China. Trucks had to wait in border checkpoint queues for hours, resulting in increased logistical costs and delayed transactions. Furthermore, it is estimated that 30 to 70 percent of loaded melons were damaged in the hot and humid weather.

According to daily price data from a leading trading company at the Muse border trade zone, watermelon prices before Chinese New Year were between 0.40 and 1.50 USD per kilogram. After the New Year, prices fell to between 0.06 and 0.23 USD per kg. At these prices, revenues could not cover even the transportation cost for melon farmers.

The Ministry of Commerce (MOC) and private sector organizations, such as the National Melons Cluster of the Myanmar Fruit, Flower, and Vegetable Producer and Exporter Association, tried to expand the domestic market by creating “Melons Festivals” in cities. In a normal season, 70 percent of total melon production is exported. Even with the promotion of domestic consumption, however, the domestic market is not large enough to compensate for losses in the export market. Additionally, there is a big price gap between the export and domestic markets. Under a normal situation, the average melon price is between 0.70 and 2.00 USD per kilogram in the border trade zone, but just 2.00 to 4.00 USD per fruit in domestic markets. The National Melons Cluster estimates total losses for the 2019/20 export season to be about 65 million USD.

In response, the Myanmar Union Government has arranged measures to relieve such economic losses, such as reducing the export tax from 2 percent to zero for this export season. However, the melon season is almost over, implying that the losses in this season will be impossible to recover. Uncertainty exists for the next season. The future for the fresh produce export sector of Myanmar requires additional analysis.

Mango

According to 2017 data from the Ministry of Commerce, mango is second among Myanmar’s fruit exports. It is estimated that 40 percent of total production goes to export. The three most important export cultivars are Sein-Ta-Lone, Mya-Kyauk, and Hinthar. The mango export season is from mid-April to June. China is the major importing country, followed by Singapore. At the beginning of the mango export season in 2020, China still maintained restrictions on border passage. These were lifted in the third week of April. Mango exports to Singapore have also been affected as flights between Myanmar and Singapore were suspended.

COVID-19 also has affected mango exports through domestic travel restrictions that resulted in labor shortages for harvesting the fruit and limited access to markets. Mango harvesting and packaging requires skilled laborers. With the travel restrictions, orchards in some areas could not get enough laborers and transport to border and domestic markets was delayed. Additional impacts come from postharvest damage to fruit due to longer periods in transit. Companies trying to send mango to Singapore via ships have encountered shelf life problems. Unlike melons, mango has more options than solely export. The domestic market is larger than the export market, and fresh products can be processed. There are two mango puree factories in Yangon and Mandalay and many smaller processors around Mandalay and in Shan state. A single factory can utilize

10,000 metric tons of mango for puree production for the Singapore and European markets. Thus, COVID-19 likely is not affecting the mango sub-sector as seriously as the melon sub-sector.

Chili

COVID-19 affects other seasonal fruit and vegetable markets through limited labor availability, transportation delays, and difficulties for small- and medium-scale processors and traders. With increasing export potential to China and Malaysia, cultivated chili areas have expanded significantly in recent years, especially in the Dry Zone area. Chili is harvested from April to May and is highly labor intensive, both for harvesting and postharvest handling. Despite clear guidance and policies from Union, state, and regional governments, some local authorities still restricted the movement of people, even between villages. As a result, chili farmers in some areas could not hire laborers from other villages. Under the Ministry of Health's ban of gatherings of five or more people, sorting centers could not operate, affecting postharvest operations, such as sorting, grading, and packaging. Large-scale traders and processors could manage these situations by providing the required protective equipment to their workers and applying social distancing in their factories. However, many small- and medium-scale processors and traders involved in the chili value chain had difficulties implementing similar protective practices. Additionally, due to travel restrictions, packaged chili could not be delivered to the market. Many small-scale processors also halted their business due to a lack of working capital.

Grains – rice, beans, pulses, and sesame

Myanmar's major staple crops exports include rice, beans, pulses, and sesame. With the COVID-19 pandemic, the export of rice via border trade with China stopped for some time. Starting from April 3, China changed the regulations Myanmar rice exporters must follow. China now requires border trade exporters to provide a pest-free certificate from the Plant Protection Division of the Department of Agriculture. These certificates have in the past only been required for rice and bean exports shipped through ports and not for border trade. With this change, many storage areas in the Muse border trade zone with China are filled with rice bags awaiting clearance. Negotiation processes are ongoing. In response, the Myanmar Rice Federation (MRF) is working with related ministries to assist basic food support programs and stabilize rice prices. MRF is also setting plans to support rice farmers in the coming monsoon season and to export rice later in 2020. MRF estimates that demand for rice will increase in late 2020 as ASEAN countries will require rice for their domestic markets after the pandemic. However, with COVID-19, in April the Myanmar government stopped approving rice export licenses. This was done to maintain price stability and enough rice stocks for the domestic market.

Black gram, green gram, pigeon pea, and chickpea are mainly grown for export, with China being the main market, followed by India. Exports are done by both border trade or shipping. For the Chinese market, green gram is exported in the largest volume, followed by lablab bean, rice bean, sultapya, groundnut, and sesame.

Since 2017, India has applied a quota system for their imports. According to this system, Myanmar could export black gram, green gram, and pigeon pea in the early part of the year. In late 2019, India government extended the period of the quota system to 2020/21 so that these pulses could be exported throughout the year until the quota amount is filled. This provides exporters the opportunity to delay exporting these crops until after the pandemic.

According to responses from wholesalers, due to the COVID-19 outbreak in China, prices of beans and pulses dropped by nearly 30 percent in February, but recovered in March after China re-opened the border. Conversely, with confirmed cases of COVID-19 in Myanmar, the wholesale and retail prices of bean and pulses increased as an outcome of panic buying. Domestic trade was slowed because most farmers could not come to exchange centers to sell their products. Domestic

trade was also affected by travel restrictions and a lack of skilled workers to operate mills. Overall, COVID-19 is expected to impact the grain market less than other crops because:

- Myanmar still has certain quota amounts remaining for exports of rice, maize, and bean to China.
- Although the government suspended rice exports in April, with the summer paddy harvest coming to market in June and July, export markets are expected to re-open soon.
- Myanmar also has export quotas for major pulses that can be supplied to India in the near future.
- Sesame, groundnut, and maize can be stored temporarily pending export to China via border trade.

Other agricultural products for export

Other agricultural products for export include sugar and tobacco. Local sugar consumption is between 30 and 40 percent of total production, with the balance being exported mainly to China (Myanmar Times 2018). For sugar cane, November to April is harvesting and processing time, but no significant impacts have been observed so far. Little impact on the tobacco market is expected. Dried tobacco leaves are easy to store, and traders can keep them in stock when demand in the export market is low.

Overall, for agricultural exports to recover after the pandemic has eased, government support is needed. The government should have long-term export plans that can be applied to major agricultural export commodities. Continuous market analysis can provide important indicators for what policy measures should be taken. Including in these measures is enhancing compliance on certification and process standardization in agriculture and livestock value chains, as these are critical to gain access to higher-end markets, such as the EU, Japan, and Middle East.

2.2. Tourism

The tourism sector was hit early and severely by the COVID-19 outbreak. Tourists are the dominant clientele for hotel and restaurant businesses, souvenir factories, and many other local small-scale businesses. The peak season for tourism in Myanmar is between November and May. By February, most hotel bookings and tour packages for March and April were completely cancelled.

Losses in the tourism sector also affect restaurant businesses. As a result of such losses, combined with local restrictions allowing only takeaway food from restaurants, most small- and medium-sized restaurants stopped business. Restaurant workers were laid off, leading to higher unemployment rates for unskilled or uneducated workers than for skilled laborers.

Informants in the hotel and tourism sectors stated that many businesses reduced employee salaries in March. Most businesses are running with 30 to 50 percent of employees, with the remaining employees having been asked to go on unpaid leave or with partial salary reduction (Irrawaddy, April 30, 2020). If the COVID-19 crisis and associated restrictions are not over by May, some of these businesses will close completely. Many businesses are negotiating with banks for relief on their loan obligations. Even if the pandemic is over by the end of May, hotel and tourism businesses are unlikely to recover until November due to the cyclical nature of the sector.

2.3. Mining

Jade and gems exports are important for Myanmar’s economy. The Extractive Industries Transparency Initiative reports that over 12,500 jade, 2,500 gem, and 350 gold mining licenses

were granted in recent years (EITI 2020). Three-quarters were granted to mines based in Kachin state, especially in Phakhant. Restrictive policies for containing COVID-19 exempted the mining sector, so mines in Phakhant continue to operate normally. However, jade and gem exports have stopped since the lockdown period. Moreover, most cut-jade markets are in large cities, like Yangon and Mandalay, and these markets were closed following the government's stay-at-home order.

2.4. Remittances

Myanmar has approximately 4 million international migrants, one of the highest population shares in Asia. Remittance inflows are an important income source for many households as well as for the establishment of small enterprises. Migrant workers are predominantly employed in China, Thailand, Malaysia, and India, mostly via border passage. According to a 2017 International Growth Centre report, annual remittances from legal migrants were projected assessed at 3.5 billion USD, equivalent to 5 percent of GDP (Akee and Kapur 2017). The authors estimated that these numbers would be 8 billion USD and 13 percent of GDP if illegal migrant remittances were included.

The lockdowns in China and Thailand and the closure of many factories in Thailand resulted in migrant workers from Myanmar losing jobs and having to return home. According to an IOM COVID-19 response situation report (2020b), there were more than 60,000 returnees as of April 23. At that time, between 80,000 and 100,000 migrants were awaiting entry at border gates, especially at the Myawaddy border gate with Thailand. A second large influx of returnees is expected soon (Myanmar Times, May 7b, 2020).

Information from recent phone interviews with remittance agents in Bangkok show that, although many factories, restaurants, and markets are closed in Thailand, many construction projects are still ongoing with companies implementing precautions against COVID-19 spread at work sites. This implies that there are still many migrants from Myanmar working in Thailand, many of whom are white-collar workers. Consequently, remittance inflows from Thailand will continue, if at a reduced scale. The most vulnerable groups among these workers from Myanmar are the unskilled, as many will have no option other than to return home. Moreover, returnees will be unlikely to have job opportunities at home due to the pandemic. These people should be a major concern for government social protection programs in order to help them to survive during the pandemic.

3. METHODOLOGY: MYANMAR'S ECONOMYWIDE MULTISECTOR MULTIPLIER MODEL

3.1. Social Accounting Matrix multiplier model

COVID-19 and the mitigation policies imposed to control the spread of coronavirus are unexpected shocks to the economy of Myanmar. Such policies can have catastrophic direct impacts on economic sectors when industries and businesses have to suspend operations immediately. In the meantime, with Myanmar's economy becoming more integrated through complex supply networks across sectors domestically and internationally, policy affecting a particular industry can have major indirect impacts on other economic sectors through supply and demand linkages. To assess the broad economic impacts of this type of shock therefore requires an economywide approach.

Economists have several methods for exploring the economywide effects of shocks to the economy, each with their own strengths and limitations. Computable general equilibrium (CGE) models are more sophisticated methods for measuring economywide impact of policy shocks. CGE

models are very useful for considering shocks to equilibrium where adjustments work through price-endogenous market mechanism and through standard optimization behaviors of producers and consumers as they responding to changed prices, adjusting their supply or demand endogenously. However, with COVID-19 shocks coming in unexpectedly, catastrophically, and in such a short period, it is unlikely that the adjustment of the economy will occur smoothly through changes in prices and wages in commodity and factor markets.

We therefore use a multisector multiplier model for the analysis, a well-established technique that has been part of the economics toolkit since the 1950s. The approach was developed to capture the complexity of an inter-connected economy, focusing on inter-industry linkages, or supply chains, as measured by input-output tables. An extension of this type of economywide analysis is based on a Social Accounting Matrix (SAM), which expands the input-output table to include more linked economic actors than just industries.

A SAM is an accounting framework. It is a matrix showing the receipt/expenditure accounts of industries, households, savings/investment, government, and the rest of the world (exports and imports). A SAM integrates input-output accounts with national income and product accounts to show the full circular flow of income in the economy, including the generation of income in production value chains (value added). It also shows how that income is distributed to households and government (through taxes), providing households with income to buy the goods and services produced in the economy.

A SAM can provide a highly disaggregated picture of the economy. We use the 2015 Myanmar SAM scaled up to represent the economy at the end of 2019. There are 63 production sectors (industries) in the SAM, eight different types of labor defined according to four level of education in rural and urban locations, and four types of capital – crops; livestock; mining and other capital used in fishery, forestry and nonagricultural sectors outside mining; and land used in agricultural crop production. The income generated in the production sectors is distributed to 15 types of households that represent rural farm, rural non-farm, and urban households disaggregated by five income quintiles. The income households receive is used for private consumption expenditure (disaggregated by commodity), savings, transfers, and taxes. Households also receive income through inflows of international remittances. Government receives taxes and makes expenditures, including transfers to households. There are five different taxes – value-added tax, sales tax, personal income tax, business income tax, and import tariffs. Finally, the economy is open, with imports of goods and services adding to domestic supplies and exports and other international transfers adding to demand. Detail on the production sectors in the SAM for Myanmar can be found in Table A1 in Appendix.

SAMs are widely used in economywide analysis, while in a standard multiplier analysis there are two key assumptions:

- Industries demand inputs in fixed proportions to output, i.e., all input-output coefficients are fixed and technology and preferences are linear.
- Prices are fixed. Adjustments to shocks work through changes in quantities, not prices.

These assumptions, while strong, are reasonable for analyzing the impact of the COVID-19 pandemic. The shocks we are observing are working through the economy in weeks or months, not years. In such a short period, it is unlikely that production technologies are changed significantly by the pandemic. In the short run, the pandemic will not cause significant changes in relative prices or wages of employed labor. While there are some indications of profiteering leading to price increases, they have not acted as signals or incentives to stimulate production. Rather, these price increases reflect short-run rent seeking and rationing devices.

Because of the nature of the SAM and the SAM multiplier model, the model provides “what-if” projections of a variety of economic indicators given a specified scenario. The results of scenario analysis are not “forecasts” of the future. Rather, they should be seen counter factual comparative statics exercises against a normal situation without COVID-19. Using a consistent empirical model for conducting such counter factual assessments is useful as it provides a disciplined framework for analysts, which can support coherence in policy debates.

3.2. Design of model scenarios

As discussed in sections 1 and 2, the global COVID-19 pandemic and the country’s policies to contain the virus and prevent an epidemic outbreak have caused significant shocks to Myanmar’s economy. Many negative impacts are still unfolding. In the meantime, the global pandemic has reached an unprecedented level and the situation continues to worsen in some countries. As an economy integrated with the world, the global pandemic is expected to further affect not only the virus containment policies imposed by the government of Myanmar but also behaviors of producers and consumers. Both will have implications for the pace at which the economy reopens and recovery progresses after the lockdown period. Moreover, with the risk of a possible second outbreak later in 2020, many restrictive policies are expected to stay in place for a relatively long period. As a result, there is huge uncertainty as to the speed with which restrictions will be eased and, consequently, how long the economy will take to recover.

Taking such uncertainty into consideration, we design different scenarios to use with the SAM multiplier model for Myanmar to simulate both the lockdown period and the impact of the COVID-19 restrictions through 2020. To define the model year 2020, we follow Myanmar’s fiscal year, which runs from October to September. Different assumptions are made for each quarter of the fiscal year as to how the model will capture the effects of the pandemic on Myanmar’s economy.

First quarter (Q1), October to December 2019

This is a COVID free quarter globally and for Myanmar’s economy. We therefore assume for the model that over this period the economy will grow as usual at a projected annual growth rate of 6.4 percent based on the World Bank’s projection published in December 2019 (World Bank 2019).

Second quarter (Q2), January to March 2020

While the first positive COVID case confirmed in Myanmar was in late March 2020, Myanmar’s economy started to be affected by COVID-19 in February through external shocks. China is Myanmar’s largest trade partner, particularly for the country’s agri-food exports. Lockdowns in China started in late January after the COVID-19 outbreak in the country. These actions immediately affected Myanmar’s exports to China, particularly cross-border exports of fresh vegetables and fruits, of which many were in their peak export season for the China market (MoC 2020). Cross-border trade with China fell by more than 200 million USD during the Chinese New Year's period compared with the same period in 2019. Myanmar’s tourism industry was impacted due to its dependence on Chinese tourists. It is estimated that the number of Chinese tourist arrivals dropped by about 40 percent when many Chinese international airlines stopped their operations to Myanmar in early February. Myanmar’s garment sector relies on intermediate products imported from China. Many garment factories shut down in February and early March due to supply chain disruptions. Additional garment factories shut down in early April following the cancellation of a large numbers of orders from Europe in the third week of March.

In the model, the COVID-19 impact in Q2 is captured only through the external shock. Specifically, we assume that January 2020 continues to be a ‘COVID free’ month with all economic activities being in normal. We assume that a fall in export demand starts in February 2020 and

continues for the rest of the year. The shocks on export demand in February and March is the same as in Q3, which is discussed below.

Third quarter (Q3), April to June 2020

The most severe and widespread economic impacts occur in April 2020 after the necessary but stringent policy measures for containing the spread of virus were imposed by both Union and regional governments in early April. While the extreme curtailment of movement and economic activities are likely to be gradually relaxed in coming months, various restrictions on many economic activities still exist. Moreover, the pandemic is still unfolding in the country and in the world at large, suggesting normal international economic activity will not resume soon. Consequently, many of Myanmar's economic activities are expected to continue suffering due to the effects of the pandemic for a long period. A survey of businesses in the first week April just before the nationwide lockdown found that more than 50 percent of surveyed firms expected their sales and revenues to fall in the third quarter, with 26 percent of manufacturing firms and 28 percent of service firms expecting the declines to be severe (MMRD 2020).

Additionally, many immigrants from Myanmar working in Thailand and other Southeast Asian countries were impacted when COVID-19 outbreaks affected those respective economies in late February and March 2020. As these immigrants lost their jobs and returned home, inflows of remittances declined starting in the late March, which results in a reduction in consumer demand within the economy of Myanmar.

In the model, the COVID impacts between April and June are modeled differently in three subperiods: (a) the first week of April is modeled similar as February and March, as discussed above; (b) the two-week lockdown in early April is modeled separately; and (c) slow easing in restrictions is modeled for the rest of April and the full month of May. We define the slow easing of restrictions in late April and May to be a 25 percent relaxation in all domestic restrictions imposed during the lockdown period. In both the lockdown and this slow easing period, the external shock through falling export demand remains at the same level as in early April. We also impose on the model lowered consumer demand due to declines in remittances.

Starting in June, we expect that the restriction measures will gradually ease. However, predicting the economy in June and following months is more challenging. Even with a relatively rapid recovery, the economy is likely far away from returning to business-as-usual. Exports, tourism, and remittances, all important to Myanmar's economy, are particularly unlikely to return to normal. Thus, we consider two stylized recovery scenarios in June and for the rest of the months in 2020.

- **The fast easing and recovery scenario**: We assume that most restrictions imposed during the lockdown period will be lifted by 75 percent in the first two weeks of June with restrictions on trade, transport, hotels and restaurants eased by 50 percent. Th restrictions are further eased by 90 percent in the last two weeks of June with restrictions on trade, transport, hotels and restaurants eased by 50 percent.
- **The slow easing and recovery scenario**: We assume that restrictions will continue to be as in May for the first two weeks of June, followed by further easing the direct domestic restriction by 75 percent with restrictions on trade, transport, hotels and restaurants eased by 50 percent.

For both the slow and the fast easing and recovery scenarios in June, the falling in export demand is 50 percent less than in previous months, while the reduction in remittances is the same as in April and May.

Fourth quarter (Q4), July to September 2020

The two stylized recovery scenarios continue in the last quarter of 2020.

- Under the **fast recovery scenario**, we assume that the similar ease in restrictions implemented in June will continue in July and August. Starting in September, all direct restrictions are lifted, although the trade sector will continuously be restricted by 10 percent and transport, hotels, and restaurants by 30 percent. We further assume that falling exports will be 75 percent less than in February–April, and starting in September, falling in remittance income will be 50 percent less than in the previous months.
- Under the **slow recovery scenario**, we assume that the easing in restrictions that started in June will continue through to September. Falling exports will be 50 percent less than in Q2, while the reduction in remittance income will be the same as in the previous months.

Table 3.1 summarizes the assumption in the shocks under the two scenarios applied in the model. More detail on these shocks as used in the model is presented in Appendix Table A3, where the assumed subsector specific shocks due to the two-week lockdown period on production and on export demand of the subsectors in the Myanmar Social Accounting Matrix are listed. Similarly, Appendix Table A4 presents the assumed changes in receipts of foreign remittances due to the COVID 19 pandemic by household group and by welfare quintile within each household group as used in the model simulations.

Table 3.1: Assumptions of the two Myanmar model scenarios for the period October 2019 to September 2020

<table>
<tr><th colspan="2"></th><th>Faster recovery</th><th>Slower recover</th><th>Global shocks</th></tr>
<tr><td rowspan="3">Q1</td><td>October</td><td colspan="2" rowspan="6">No shocks in the pre-COVID-19 period</td><td rowspan="4"></td></tr>
<tr><td>November</td></tr>
<tr><td>December</td></tr>
<tr><td rowspan="3">Q2</td><td>January</td></tr>
<tr><td>February</td><td rowspan="2">• Fall in exports due to COVID-19 outbreak in China</td></tr>
<tr><td>March</td><td></td></tr>
<tr><td rowspan="3">Q3</td><td>April</td><td colspan="2" rowspan="2">• Full lockdown period for 2 weeks in early-April, follow by direct shocks being eased by 25 percent in both scenarios</td><td rowspan="2">• Fall in exports, reduction in remittances</td></tr>
<tr><td>May</td></tr>
<tr><td>June</td><td>• Direct shocks eased by 75 percent in first two weeks; transport, hotels, and bars by 50 percent
• Direct shocks eased by 90 percent in last two weeks; transport, hotels, and bars by 70 percent</td><td>• Direct shocks eased by 25 percent in first two weeks; trade, transport, hotels, and bars by 50 percent
• Direct shocks eased by 75 percent in last two weeks; transport, hotels, and bars by 50 percent</td><td>• Fall in exports eased by 50 percent</td></tr>
<tr><td rowspan="3">Q4</td><td>July</td><td rowspan="2">• Direct shocks eased by 90 percent
• Transport, hotels, and bars eased by 70 percent</td><td rowspan="2">• Direct shocks eased by 75 percent
• Trade, transport, hotels, and bars eased by 50 percent</td><td rowspan="2">• Fall in exports eased by 75 percent under fast recovery
• 50 percent under slow recovery</td></tr>
<tr><td>August</td></tr>
<tr><td>September</td><td>• Direct shocks eased by 100 percent
• Trade eased by 90 percent
• Transport, hotels, and bars eased by 70 percent</td><td>• Remittance shock eased by 50 percent under fast recovery</td></tr>
</table>

Source: Authors' scenario construction.

While the designed shocks in the scenarios run in the model try to take policy, producer and consumer behaviors, and external factors into consideration as much as possible, COVID-19 is an

unprecedented global shock. Consequently, it is presently difficult to understand and project the many factors that could affect either individual national economies or the global economy. The results of the model should not be treated as a projection of the future. Rather, the model allows us to understand the economywide impacts of COVID-19 through interactions within an economy. Such analysis could help to inform the design of coping and recovery policies and strategies.

We also emphasize that the policy measures taken by the Government of Myanmar to contain the transmission of COVID-19 are both necessary and appropriate responses to the pandemic. Unfortunately, policy measures of this magnitude will inevitably have economic costs for firms, households, government, and the whole economy. We find that the economic costs of COVID-19 and the stringent mitigation measures for containing the spread of virus are very large. Together with economic uncertainty for the rest of the year, COVID-19 could substantially affect the economy's performance throughout 2020, leading to either a recession with negative or stagnant GDP growth. Many of the lost nonfarm employment opportunities – including self-employed household businesses – are unlikely to fully return. Employment numbers in various nonfarm sectors could be lower than their respective 2019 levels. Both rural and urban household incomes will fall not only during the lockdown period, but also over the rest of the year.

4. MEASURING ECONOMIC COSTS OF COVID-19 – THE MYANMAR SAM MULTIPLIER MODEL RESULTS

4.1. Economic impacts during the lockdown period

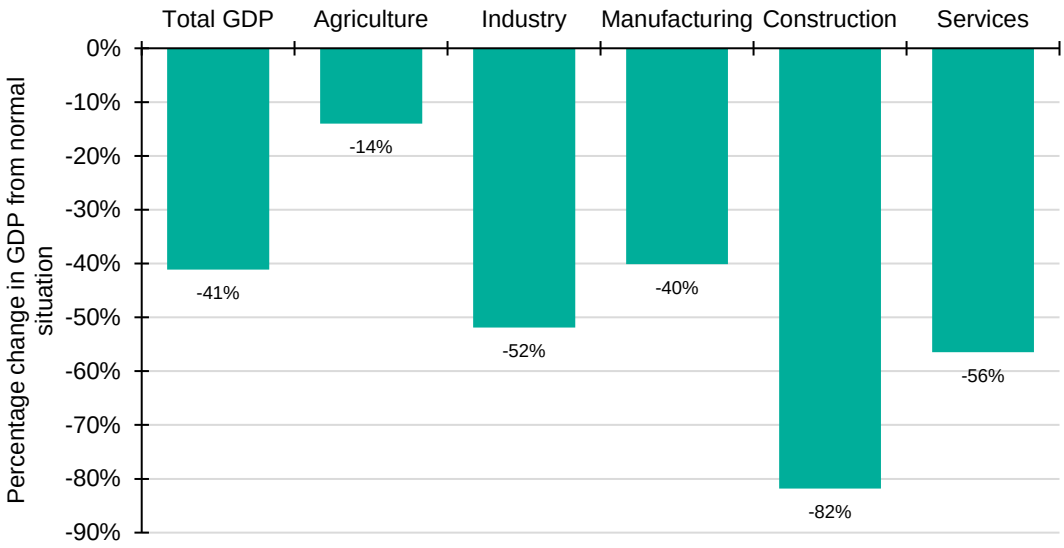
On April 6, the Union and regional governments issued the nationwide stay-at-home order for containing the spread of virus and preventing the outbreak of COVID-19 pandemic in the country. This was just before the seven-day Thingyan water festival which starts on April 10. The government urged all citizens to stay at home as much as possible during the holiday period and the week that followed. The policy measures instituted during this period are detailed in Table 1.1.

We define these two weeks as the "lockdown" period in the model (Table 3.1). As expected, the stringent stay-at-home measures were a significant blow to Myanmar's economy. The resulting economic costs are large. We first assess economic losses during the lockdown period for total GDP and by the three aggregate sectors – agriculture, industry, and services (Figure 4.1). Also included in the figure are estimates of the fall in value-added for the manufacturing and the construction, the two industry subsectors that experienced a shutdown of almost all non-essential activities during the lockdown period.

National GDP fell by 41 percent compared with a normal situation without COVID, with sector-specific impacts as follows:

- **Industry**. Output declined by 52 percent, in which construction and manufacturing fell by 82 percent and 40 percent, respectively.
- **Services**. Output declined by 56 percent.
- **Agriculture**. Although the lockdown policies provided exemptions for most agricultural activities, the economywide linkages significantly affect the sector indirectly via reductions in intermediate demand from Myanmar's nonagricultural sectors, falling exports, lowered consumer demand due to loss of remittance income, and difficulties in operating some agribusinesses. In total, the lockdown period's impact on agriculture is estimated as a decline of 14 percent overall.

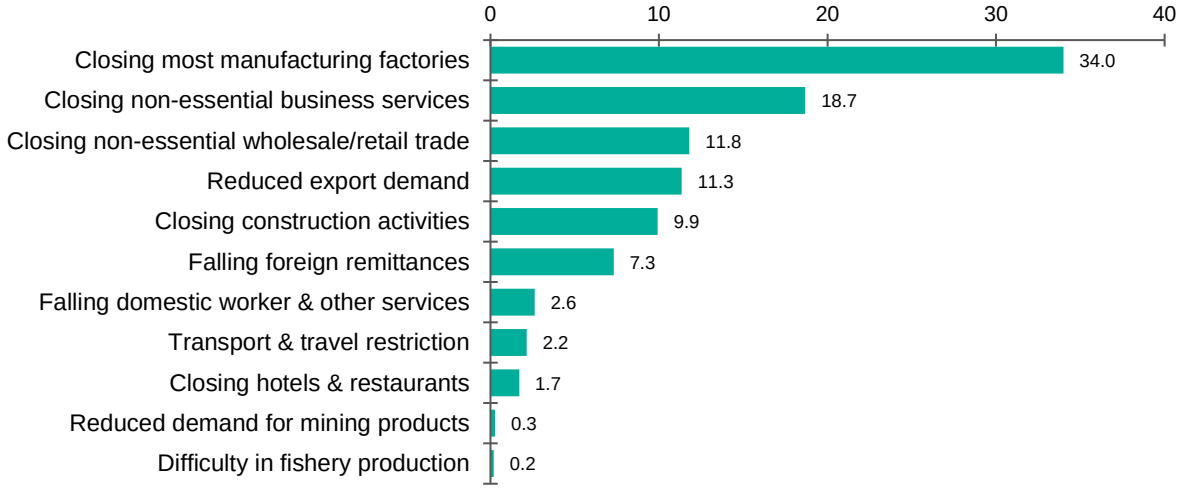
Figure 4.1: Estimated percentage change in Myanmar's GDP during the April 2020 two-week COVID-19 lockdown period, by sector



Source: Results from IFPRI's Myanmar SAM multiplier model

Figure 4.2 decomposes the decline in total GDP into different channels of direct shocks imposed in the model. These channels include policies implemented during the lockdown period, external shocks through falling exports (including service exports that capture part of tourism industry declines), and reduced remittance inflows. The figure can help analysts understand which channels have a larger impact on the economywide losses from COVID-19. We rank the impact channels according to their contribution to fall in GDP.

Figure 4.2: Contributions of specific policy restrictions and external shocks to overall change in Myanmar's GDP during two-week lockdown period, percentage share



Source: Results from IFPRI's Myanmar SAM multiplier model

Figure 4.2 shows that closing many manufacturing factories had the largest economywide impact, explaining 34 percent of the fall in GDP during the lockdown period. With an average annual sectoral growth rate close to 9 percent between 2014 and 2019, manufacturing has been the fastest growing sector in Myanmar's economy (EuroCham 2020a). In recent years, the sector has accounted for more than 20 percent of national GDP, which explains why a 40 percent decline in manufacturing GDP can lead to a 34 percent decline in national GDP during the lockdown period. Export-oriented manufacturing was already badly hit by external factors before the

lockdown period. As noted earlier, many factories were forced to shut down due to the cancellation of export orders and to the disruption of imported raw and intermediate material supplies. Many workers in such manufacturing enterprises become jobless even before the lockdown (Myanmar Times, April 30, 2020).

Closing non-essential business services ranks second among the policy restrictions and shocks causing the decline in Myanmar's GDP. This factor explains 18.7 percent of the fall in GDP. Closing non-essential domestic trade, including that in agricultural and food products, and construction activities are of similar importance in explaining the fall in GDP. The two external channels – reduced export demand and falling remittance inflows – also contribute to the fall in GDP.

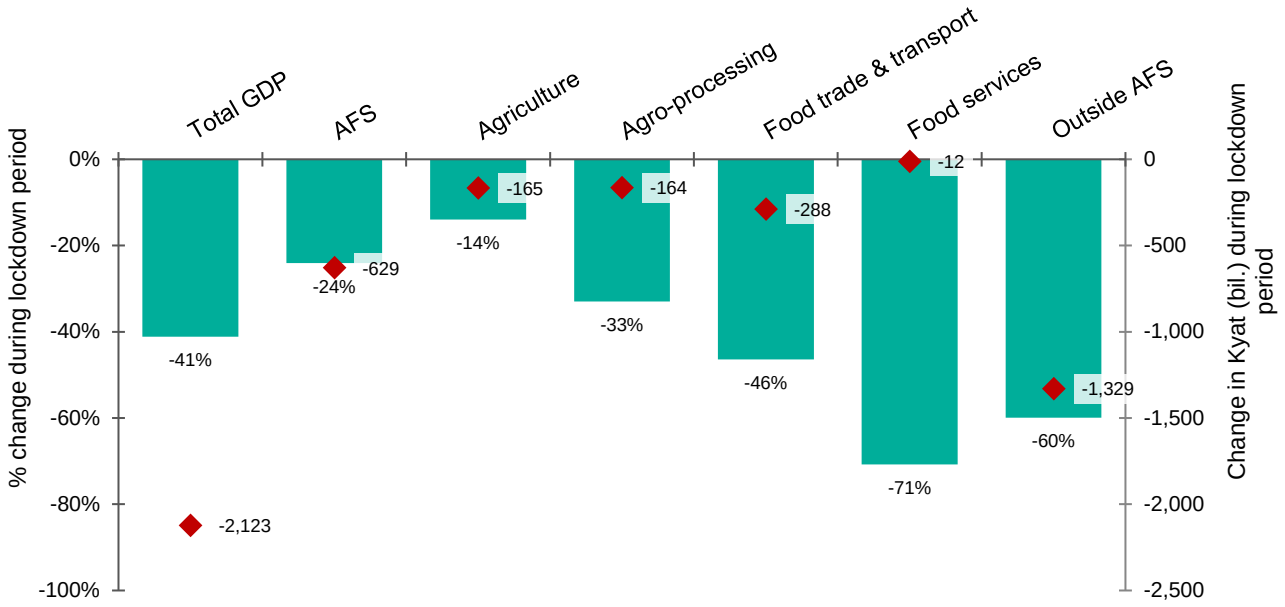
While major mines were exempted from the lockdown measures, exports and domestic demand for mining products both fell, affecting production in the sector (MoC 2020). However, because mining counts for a small share of national GDP with weak linkages to the rest of the economy, mining explains just 0.3 percent of the loss in national GDP during the two-week lockdown period.

4.2. Impact on agri-food system during lockdown period

Next we explicitly measure the lockdown's impact on the agri-food system (AFS) of Myanmar. We adopt the measurement of AFS developed by Thurlow (2020) in which different components of AFS are measured as shares of a country's total GDP and employment. The following sectors or subsectors (or parts of some nonagricultural sectors or subsectors) are considered to be components of AFS:

- The traditional primary agricultural sector, which includes all crops, livestock, forestry and fishing;
- Food processing, which is a manufacturing subsector and includes some non-food manufacturing subsectors that directly use agricultural raw materials as intermediates, e.g., yarn and natural fibers, and wood and timber products;
- Value-added production of inputs used directly by farmers and agro-processors, e.g., fertilizer and banking services;
- Value-added domestic transportation and retailing and wholesaling trade activities that are associated with the movement of agri-food products between farms, firms, and final points of sale (markets); and
- Value-added food services sector and a portion of the value-added in the hotels and accommodation sector, calculated based on the share of agri-food inputs in these sectors' total input purchases.

Figure 4.3: Change in agri-food system GDP during the two-week lockdown period, percentage change relative to normal situation (left axis) and in value (right axis)



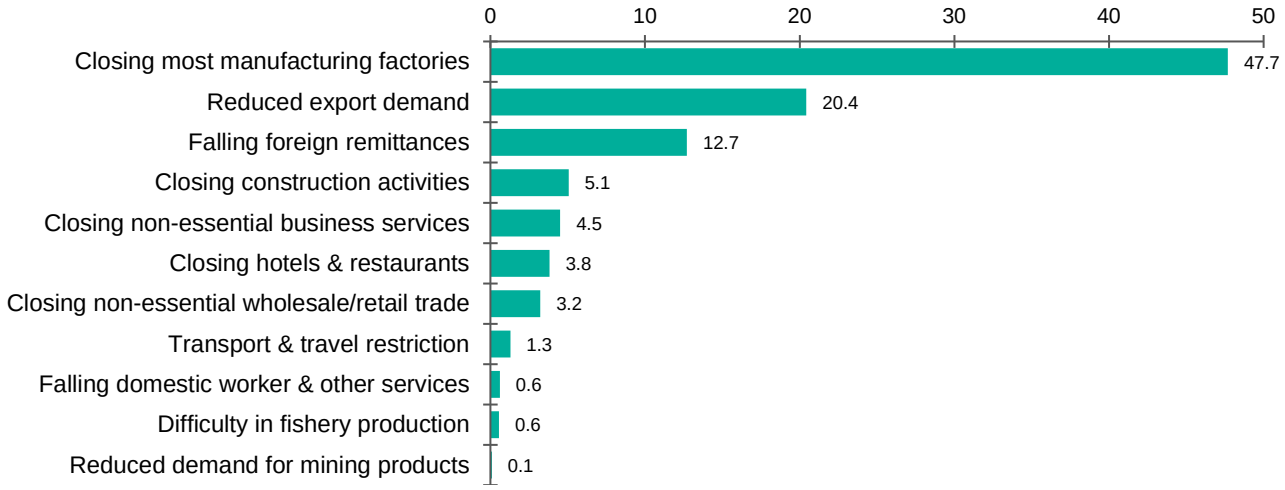
Source: Results from IFPRI's Myanmar SAM multiplier model.
Note: AFS = agri-food system.

Figure 4.3 displays the declines in the total agri-food system (AFS) GDP and its four components. AFS makes up about 44 percent of Myanmar's GDP. Within AFS, primary agriculture makes up about 48 percent by value. Agro-processing, which involves the processing of food and other outputs and of inputs for farmers and agro-processors, makes up about 20 percent. Agri-food related trade and transport activities account for 32 percent. Food services make up less than one percent.

Figure 4.3 shows that the food service component of AFS suffered relatively the most under the lockdown, falling by 71 percent. This decline is largely driven by the closure of food catering services, restrictions on dine-in service at restaurants, and the voluntary closure of restaurants because of lack of customers. However, in absolute terms when measured in Kyat, the loss of value-added in food services is modest because it is the smallest component of AFS. The largest impact of the lockdown on AFS components in absolute terms is on agri-food related trade and transport. This component accounts for almost half of the fall in GDP for AFS overall.

We also measure the contribution of external factors and various policies imposed during the lockdown period to the change in total AFS GDP (Figure 4.4).

Figure 4.4: Contributions of specific policy restrictions and external shocks to change in GDP in Myanmar's agri-food system during two-week lockdown period, percentage share



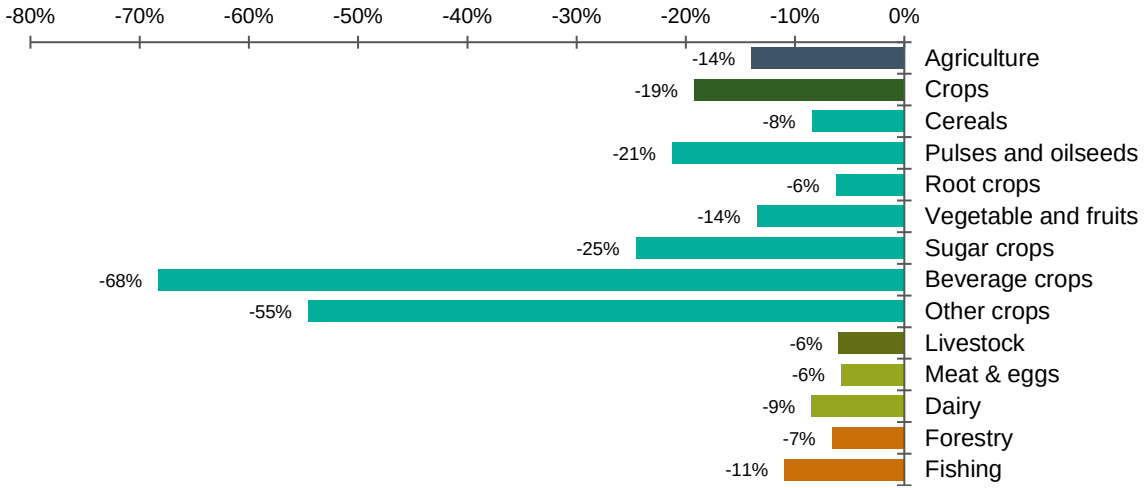
Source: Results from IFPRI's Myanmar SAM multiplier model

Like Figure 4.2, Figure 4.4 shows that the closing of most manufacturing factories has the largest impact in the loss of production in AFS. The impact of this channel on AFS is even larger than on national GDP, explaining 47.7 percent of loss in AFS GDP. Agri-processing is an important component of the manufacturing sector in Myanmar, of which more than 65 percent output is produced by SMEs (Polsaram and Thaw 2010). Agri-processing is also an important component of AFS. This explains why the closing of factors plays such an important role in adversely affecting AFS during the lockdown period.

It is important to notice that, different from national GDP in Figure 4.2, reduced export demand and falling remittance inflows rank second and third in Figure 4.4, explaining 20.4 and 12.7 percent of the losses in AFS GDP during the lockdown period, respectively. Among Myanmar's total exports, agri-food exports are significantly affected by COVID-19 because of their high dependency on the Chinese and Indian markets. In addition, remittances are more important for rural households, accounting for more than 8 percent of total income for an average rural household. These numbers explain why these two external impact channels are so important for the decline in AFS GDP during the lockdown period.

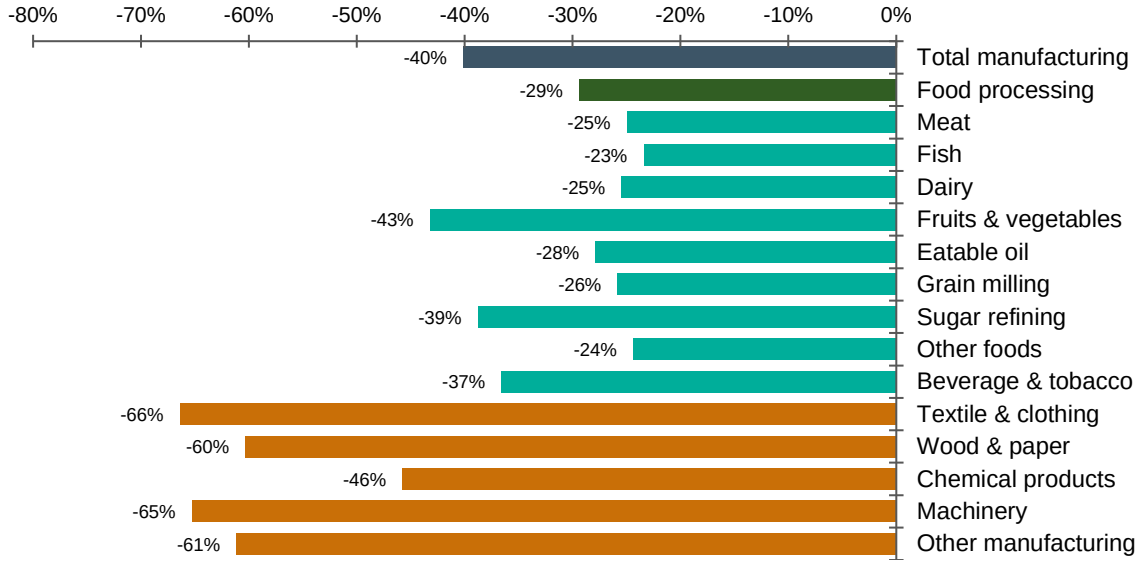
In order to identify the main agricultural, manufacturing, and service subsectors that are most affected during the lockdown period, Figure 4.5 displays the impact of the lockdown for several subsectors in agriculture, Figure 4.6 presents similar information for manufacturing subsectors with more detailed disaggregation for agri-food processing activities. Services subsectors are considered in Figure 4.7.

Figure 4.5: Agricultural subsectors – impact of two-week lockdown on subsectoral GDP, percentage change relative to normal situation



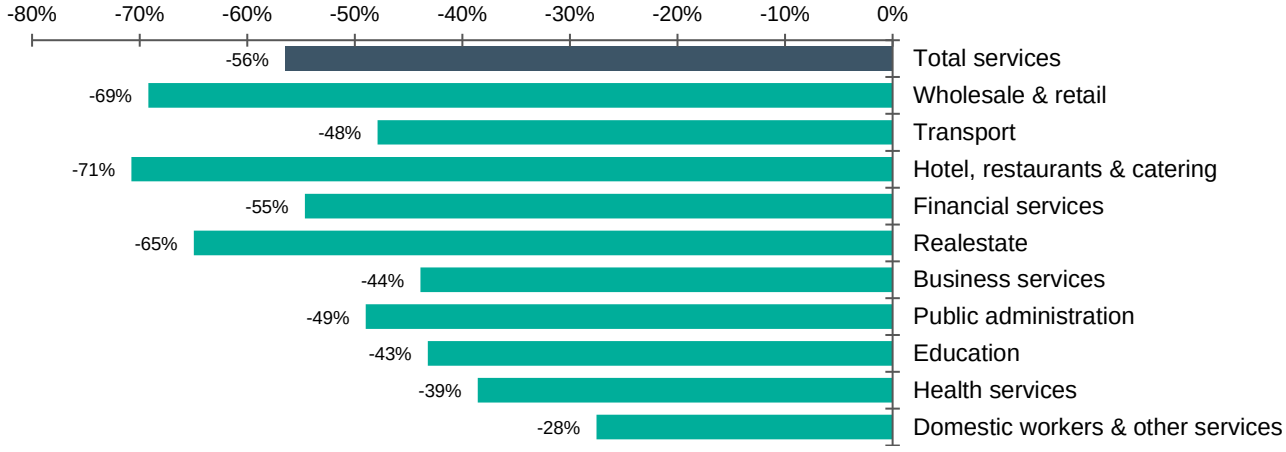
Source: Results from IFPRI's Myanmar SAM multiplier model

Figure 4.6: Manufacturing subsectors – impact of two-week lockdown on subsectoral GDP, percentage change relative to normal situation



Source: Results from IFPRI's Myanmar SAM multiplier model

Figure 4.7: Services subsectors – impact of two-week lockdown on subsectoral GDP, percentage change relative to normal situation



Source: Results from IFPRI's Myanmar SAM multiplier model

4.3. Macroeconomic impact of COVID-19 on Myanmar's economy through 2020

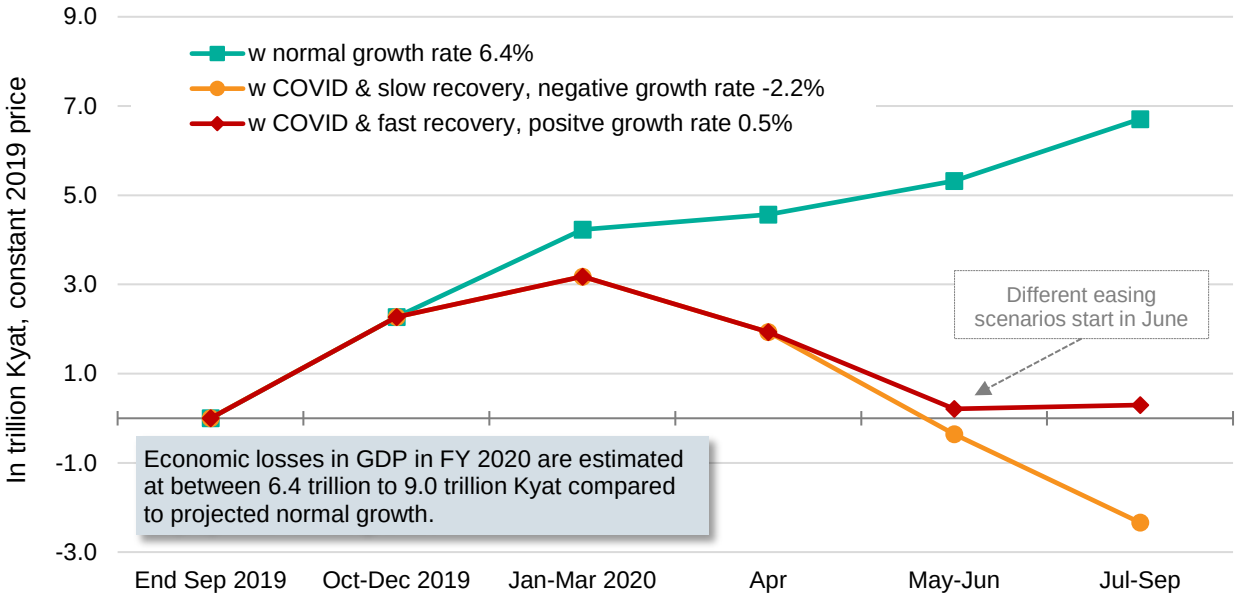
While Myanmar eased the lockdown in late April, restrictive policies were maintained or new ones imposed post-lockdown. Thus, economic reopening is expected to be a slow and gradual process. Moreover, experiences from previous natural disaster shocks in Myanmar and the COVID-19 recovery in China, which started in late February and early March, indicate that almost all countries around the world, including Myanmar, are unlikely to return to a normal situation soon. As a result, many economic activities will continue to be hamstrung for a long period post-lockdown. Thus, it is necessary to assess the economic impact of COVID-19 not only for the rather short lockdown period but also for all of 2020.

We discussed in detail in Section 3.2 the design of the slow and fast easing and recovery scenarios for the post-lockdown period that were used in the SAM multiplier model. We follow Myanmar's fiscal year (FY) for the analysis. This runs from October to September. Thus, in discussing COVID impact in 2020, our assessment covers the period from October 2019 to September 2020. The quarterly weights for national GDP and sectoral GDP for agriculture, industry, and services are calculated using the quarterly data for 2019 published by Central Bank of Myanmar (CBM 2020) (Appendix Table A2).

We first focus on the macroeconomic impact of COVID-19 through 2020. It is necessary to start with a benchmark that represents the economic performance of Myanmar's economy in 2020 under a normal situation. Myanmar has experienced impressive economic growth over the past 10 years. It was higher than 6 percent per year for the period 2016 to 2019, with an average growth rate of 6.3 percent. This is close to the pre-COVID projected annual growth rate for Myanmar's economy in 2020 (World Bank 2019). We use this World Bank projection to represent the performance of the economy under a normal situation without COVID.

The first question we then try to answer is what are the economic losses from COVID-19 in 2020 compared with the expected normal situation of Myanmar's GDP growing at 6.4 percent annually. Losses in GDP are a cumulative process as the impact of COVID-19 will vary over 2020. Figure 4.8 displays the cumulative difference of 2020 GDP from the end of September 2019. This is based on new gains in GDP in 2020 under a normal situation and under the COVID-19 situation for the two different recovery scenarios.

Figure 4.8: Cumulative changes in Myanmar's GDP in FY 2020 with and without COVID-19, by value (trillion Kyat)

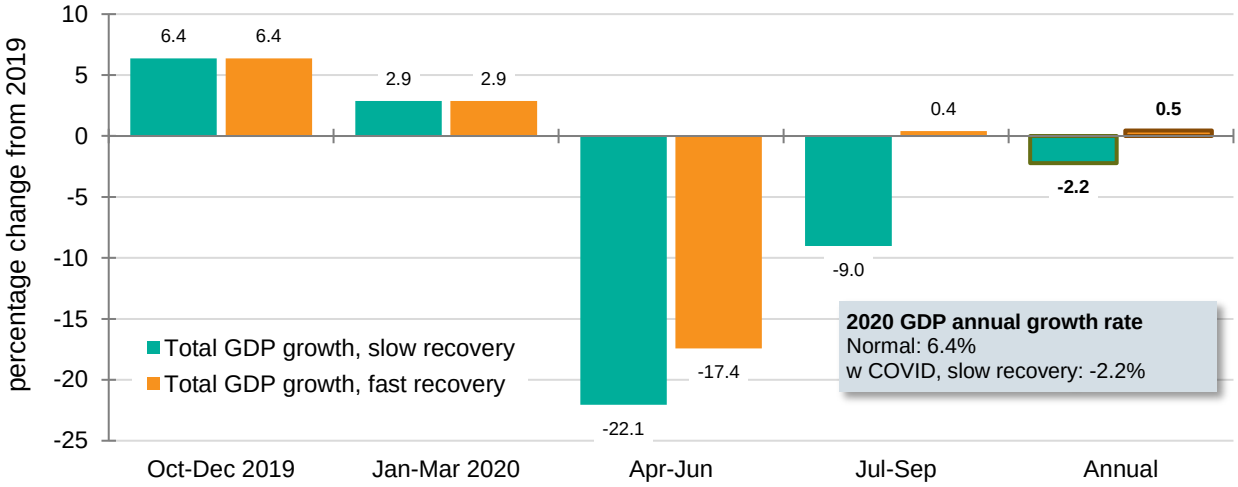


Source: Results from IFPRI's Myanmar SAM multiplier model. Myanmar's fiscal year (FY) runs from October to September.

Projected GDP for 2020 under a normal situation would reach about 118 trillion Kyat measured in constant 2019 prices – about 7 trillion Kyat more than in 2019. COVID-19 started to affect the GDP trajectory in the second quarter between January and March 2020. This was due to falling demand for Myanmar's exports. The growth trajectory significantly reverses in April and continues the downward trend in May and June. Thereafter, the GDP growth trajectories differ significantly under the fast and the slow easing and recovery scenarios. Under the slow recovery scenario, the downward trend will continue to the last quarter FY 2020 (July to September). Under the fast recovery scenario, the growth trajectory turns upward from end-June, but in a much more modest manner than is seen in the growth trajectory under a normal situation. Compared to the normal growth trajectory and depending on the pace of the recovery in the last quarter 2020, the cumulative losses in 2020 GDP for Myanmar's economy will be between 6.4 trillion and 9.0 trillion Kyat in constant 2019 prices.

To understand economic losses across quarters, Figure 4.9 displays the estimated growth rate for each quarter and for FY 2020 under the two different recovery scenarios. The first quarter (October to December 2019) is a COVID free quarter, so the growth rate is the same as the projected annual growth rate under a normal situation. COVID-19 started to affect growth in the second quarter (January to March 2020) mainly due to reduced exports to China, reduced tourism, and interruption of export-oriented manufacturing supply chains in February and March. The effect on the economy in this quarter is the same in both recovery scenarios. The model results show that national GDP could grow about 3 percent, i.e., about half of the normal growth rate.

Figure 4.9: Predicted quarterly and annual growth rates in national GDP for FY 2020 under different recovery scenarios



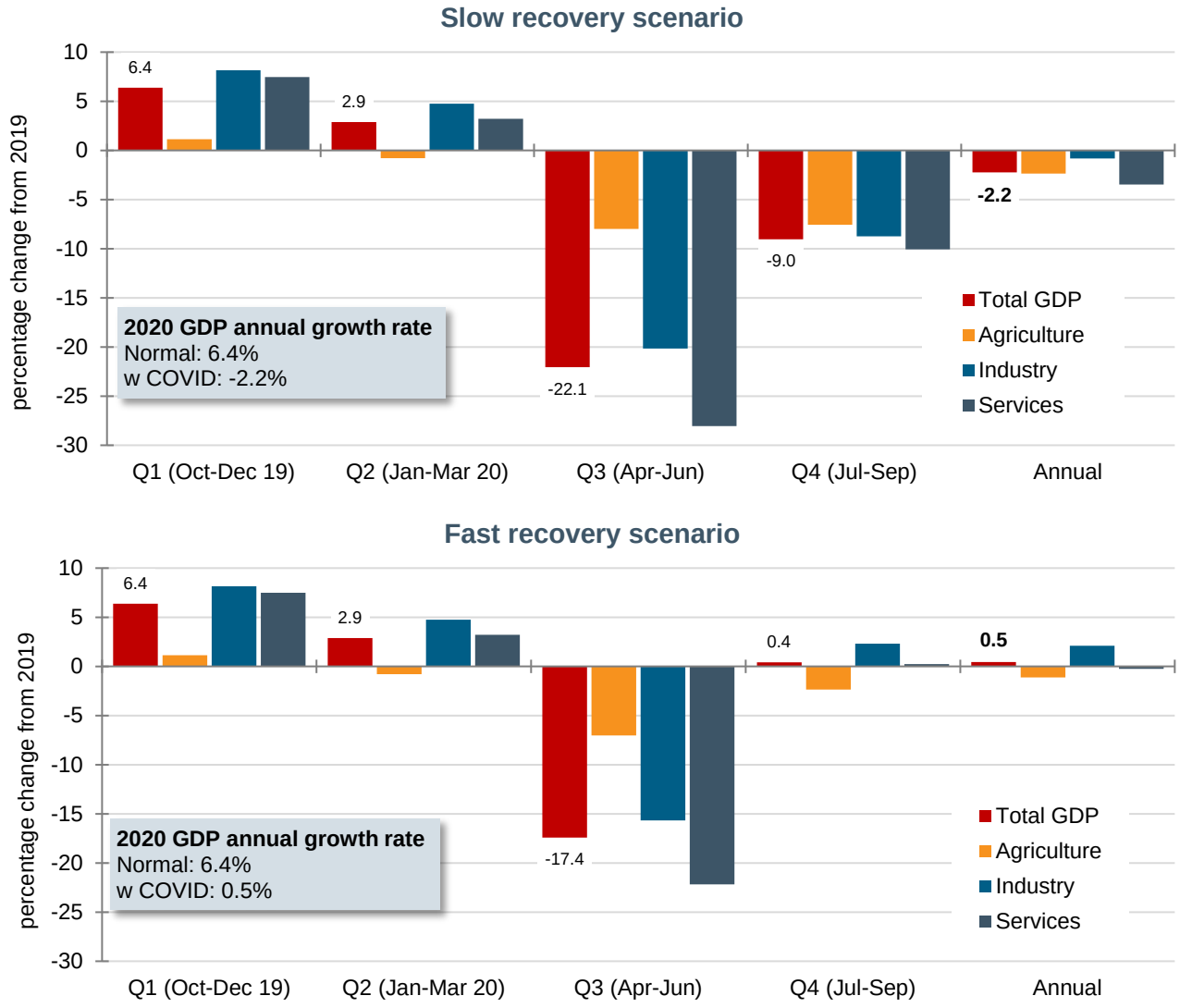
Source: Results from IFPRI's Myanmar SAM multiplier model

The substantial decline in GDP growth occurred in the third quarter (April to June). National GDP is expected to fall 22.1 percent from the same period of 2019 under the slow recovery scenario and fall 17.4 percent with fast recovery. The declines in GDP in April and May are same in the two scenarios. The 4.7 percentage point difference in the fall in GDP is due to the different recovery paces in June only. The two-week lockdown is the dominant reason for such large negative growth rates in this quarter, with the assumed slow ease in restrictions in the second half of April and through May is also a contributing factor.

With different paces of recovery, the economic growth rates in the last quarter of 2020 (July to September) differ significantly under the two scenarios. With slow recovery, the growth rate continues to be negative at -9.0 percent in this quarter. However, under the fast recovery scenario, economic growth turns modestly positive (0.5 percent). Combining the initial normal growth in Q1, declining but still positive growth in Q2, substantial negative growth in Q3, and negative or stagnant growth in Q4, the annual GDP growth rate in Myanmar for 2020 is expected to be -2.2 percent with slow recovery and +0.5 percent with fast recovery. Thus, it is highly likely that the impact of COVID-19 will either push Myanmar's economy into a recession with negative growth or result in stagnant growth in 2020.

Figure 4.10 displays the economic growth effects under the two different recovery scenarios by sector.

Figure 4.10: Predicted quarterly and annual economic growth rates under different recovery scenarios



Source: Results from IFPRI's Myanmar SAM multiplier model

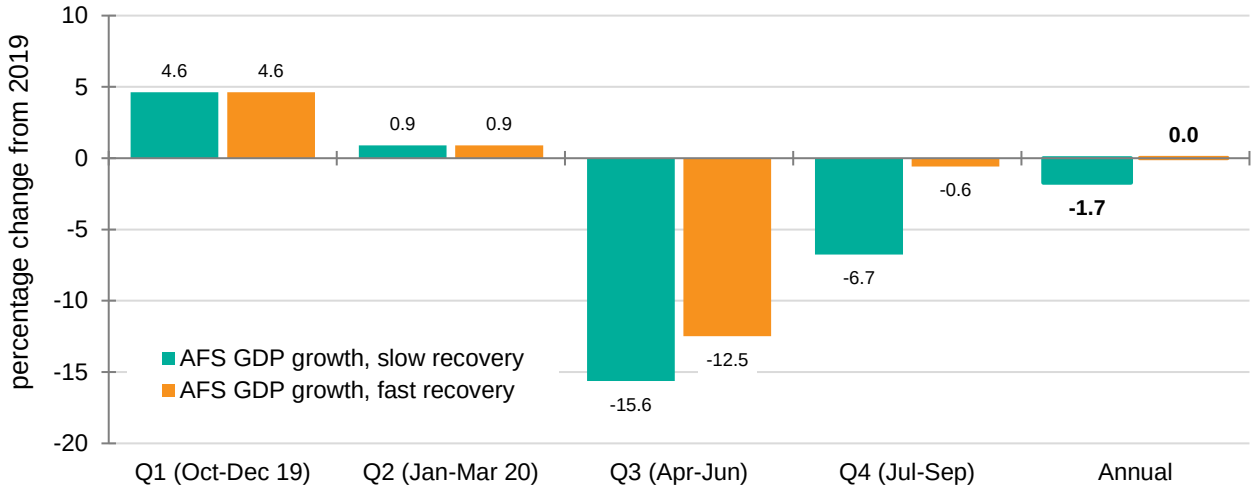
Agricultural growth for FY 2020 is negative under both scenarios: -2.4 percent with slow recovery and -1.1 percent with fast recovery. A few reasons explain this result for agricultural growth. First, agricultural growth is stagnant even under a normal situation. The projected agricultural growth rate in 2020 under a normal situation is based on the annual average of the last four years, which is only 1.1 percent. Second, when agricultural exports are negatively affected by China's COVID outbreak in February and March in the model, the agricultural GDP growth rate becomes negative (-0.8 percent) in the second quarter, while other sectors still grow positively. Finally, although agriculture is less negatively affected by the COVID shock between April and June, the recovery of the sector is slow because there is less room for recovery from the easing of the direct restrictions related to COVID-19. For example, growth in industry and services becomes positive in the last quarter 2020 with fast recovery, but for agriculture growth remains negative.

4.4. Economic impact of COVID-19 on agri-food systems throughout 2020

This section focuses on the economic impact of COVID-19 on the agri-food system (AFS) throughout 2020. Similar as the discussion for the broad economy, we start with a figure (Figure 4.11) for the quarterly and annual growth rates for AFS GDP with different recovery scenarios. Under a normal situation without COVID-19 in the first quarter (October–December 2019), AFS GDP is expected to grow at 4.6 percent. When COVID-19 started to affect Myanmar's agricultural

exports in February and March (MoC 2020), AFS GDP growth rate falls to 0.9 percent in the second quarter 2020. The declines in AFS GDP ranges between -12.5 percent and -15.6 percent in the third quarter (April–June) with fast and slow recovery starting in June, and continues to be negative in the last quarter but much more modest in negative with fast recovery (-0.6 percent) than with slow recovery (-6.7 percent). Taking different impacts across different quarters, AFS GDP annual growth rate in 2020 is either negative (-1.7 percent) with slow recovery or zero with fast recovery.

Figure 4.11: Predicted quarterly and annual growth rates for agri-food system GDP for FY 2020 under different recovery scenarios

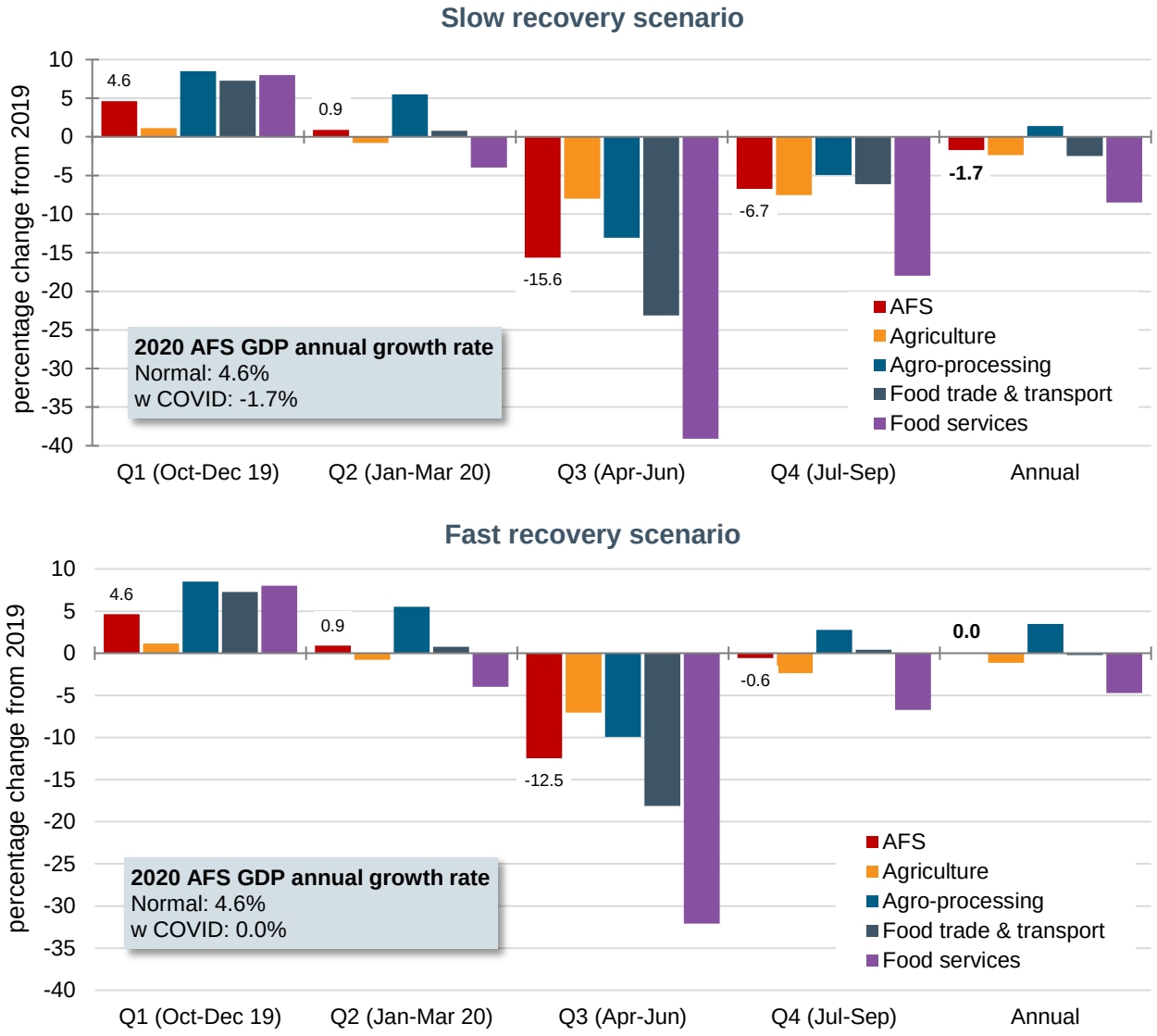


Source: Results from IFPRI's Myanmar SAM multiplier model

Figure 4.12 displays the economic growth effects for the different components of the agri-food system of Myanmar under the two different recovery scenarios.

In addition to negative growth in primary agriculture in both scenarios, growth in the food services component of the agri-food system is negative in both scenarios, i.e., -8.5 percent with slow recovery and -4.7 percent with fast recovery. Slow recovery in food services is due to the slow recovery of the tourism industry and possible behavior changes by domestic consumers post-COVID. These result in it being unlikely that the economic activity of hotels, restaurants, general food catering, and food services will return to normal.

Figure 4.12: Predicted quarterly and annual economic growth rates for different components of Myanmar's agri-food system under different recovery scenarios



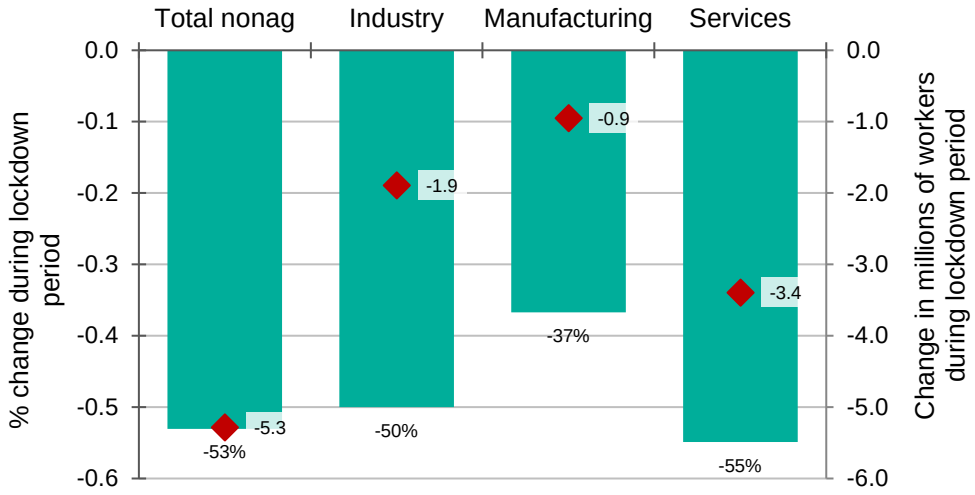
Source: Results from IFPRI's Myanmar SAM multiplier model

4.5. Impact of COVID-19 on nonfarm employment

We now turn to the impact of COVID-19 on employment in Myanmar, focusing on nonfarm employment. The employment situation in the agricultural sector is harder to assess as most farmers are self-employed and many agricultural workers are seasonal. We first assess the impact on employment during the lockdown period and then turn to the employment impact for the third and fourth quarter of FY 2020.

Figure 4.13 displays the predicted changes in nonfarm employment during the two-week lockdown period both in percentage terms and in the actual number of persons for total non-agriculture and for three nonagricultural sectors. (The manufacturing subsector is part of the industry sector in calculating changes in employment numbers). Nonagricultural employment falls by 53 percent during the two-week lockdown period, with 5.3 million people predicted to lose their jobs. While some public employees continued to receive wage payment without working, many small private businesses were forced to lay off their employees. Self-employed nonfarm business people will also lose substantial revenue with their businesses being shut down during the lockdown.

Figure 4.13: Change in nonfarm employment during two-week lockdown period

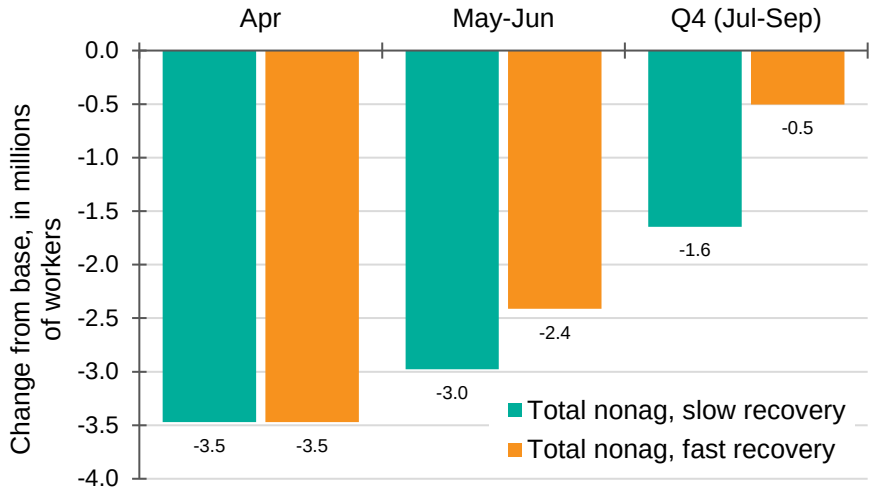


Source: Results from IFPRI's Myanmar SAM multiplier model

While the model cannot accurately estimate the number of unemployed and the number of self-employed businesses that were forced to close during the lockdown period, information from household survey data indicates that the lockdown's impact on rural households is likely to be large and broad. About 60 percent of rural households have nonfarm employment or businesses in sectors that are at risk of layoff and closure.

In addition to temporary job loss and business closures during the lockdown, we also use the model to assess the possible impact on employment in April, May and June, and over the last quarter of FY 2020 under the two different recovery scenarios. Figure 4.14 displays the result for total nonagricultural employment.

Figure 4.14: Predicted change in nonfarm employment over Q3 and Q4 FY 2020 under different recovery scenarios, millions of workers



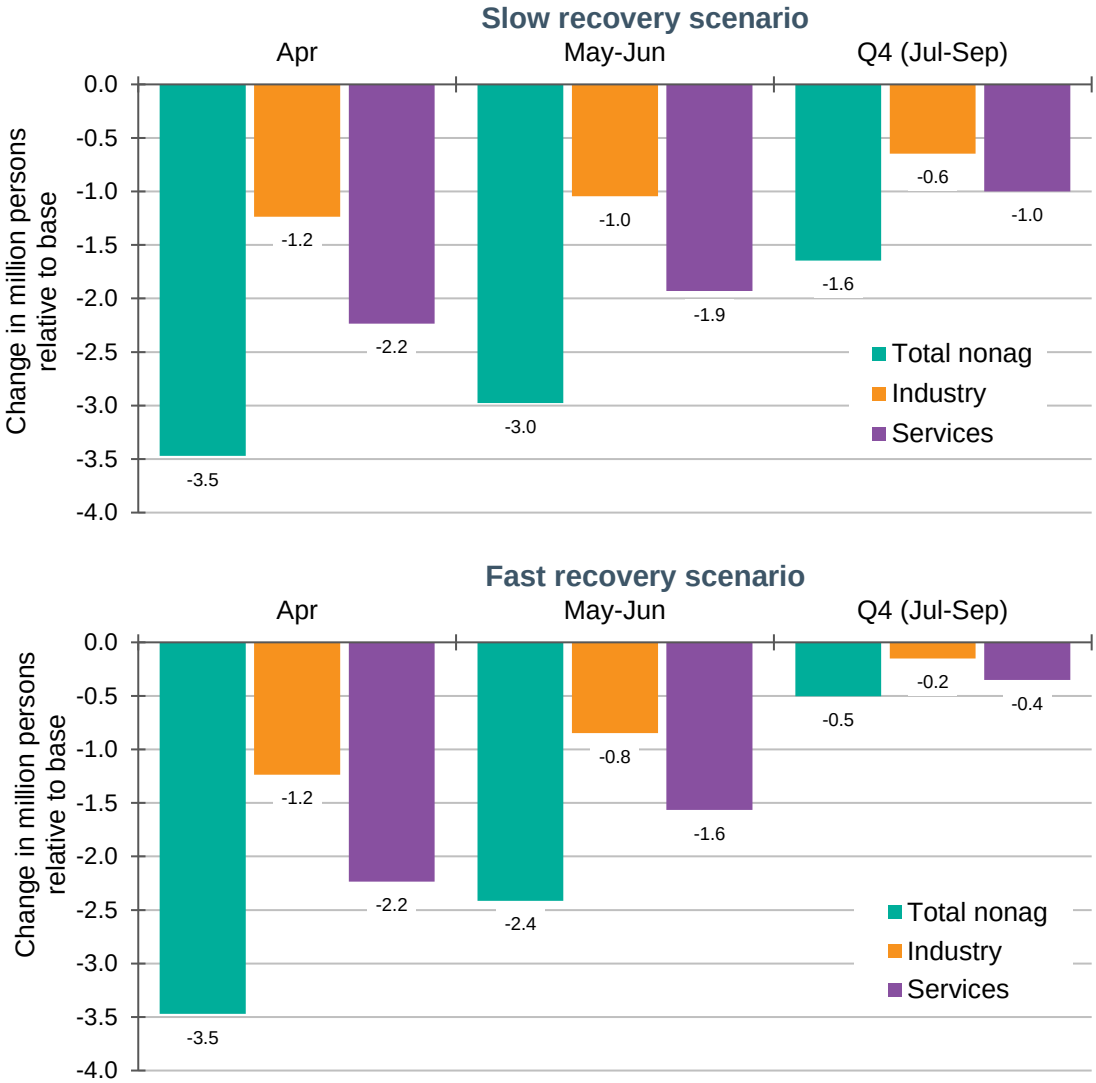
Source: Results from IFPRI's Myanmar SAM multiplier model

Figure 4.14 shows that the pace of economic recovery also affects the number of people returning to their jobs or businesses. One-month fast recovery in June can reduce the number of lost jobs by 500,000, while with fast recovery in the last quarter 2020, 1.1 million more people could return to their jobs or businesses.

However, even with the fast recovery, some lost employment and self-employed businesses will not come back. By the end of FY 2020, the total employment number will be about 500,000 less than that of 2019. In addition, we expect many young people who are seeking to join the labor

force for the first time to not find employment in 2020. With the number of nonfarm jobs being possibly less than in 2019, unemployment in 2020 will possibly be a larger challenge than is indicated by the estimates from the model scenarios, as those scenarios do not take into consideration growth in the size of the economically active population of Myanmar.

Figure 4.15: Predicted change in industry and service employment under different recovery scenarios, millions of workers relative to base



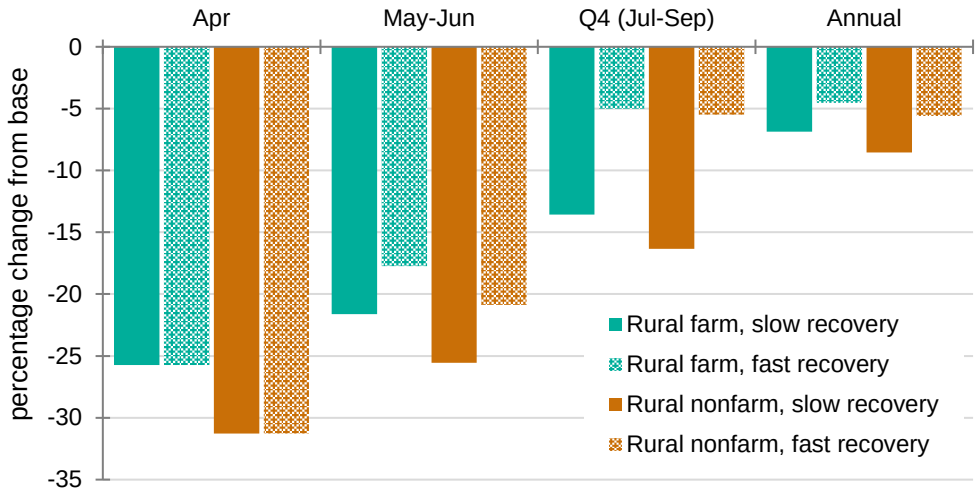
Source: Results from IFPRI's Myanmar SAM multiplier model

Figure 4.15 examines nonfarm employment for the industry and service sectors in April, May and June, and over the last quarter of FY 2020 under the two different recovery scenarios. We find that slow recovery slows down job return in the industry sector more than in services, while fast recovery seems to speed up job return in the industrial sector more.

4.6. Impact of COVID-19 on household income

Finally, the model simulations assess possible impacts of COVID-19 on household income. We group households into three groups: rural farm, rural nonfarm, and urban. However, we focus only on the two rural household groups in this section. Figure 4.16 reports the COVID-19's impact on the two rural households' income under the two different recovery scenarios for April, May-June, the last quarter (July-September) and annually for FY 2020.

Figure 4.16: Predicted change in average household incomes in FY 2020 under two different recovery scenarios



Source: Results from IFPRI's Myanmar SAM multiplier model

With the economy being almost completely shut down for two weeks in April and the slow reopening process post-lockdown, a significantly negative effect on household income for April 2020 is shown in the model simulations. Because lockdown policies mainly target economic activities outside agriculture, the negative income effect is larger for rural nonfarm than for rural farm households. Household incomes are expected to continue falling in May and June, but fall less with fast recovery than with slow recovery. In the last quarter FY 2020 (July to September), fast recovery allows the declines in household income to be much smaller than under the slow recovery scenario. Moreover, with fast recovery rural nonfarm households' income seems to recover faster and by the last quarter the declines in income become similar between rural farm and nonfarm households. Still, even with fast recovery, rural farm and nonfarm household income will be 4.5 percent and 5.6 percent lower than under a normal non-COVID-19 situation, respectively.

5. CONCLUDING REMARKS

The policy measures taken by the Government of Myanmar to contain the transmission of COVID-19 are a necessary and appropriate response to the pandemic. Unfortunately, policy measures of this magnitude will inevitably have economic costs for firms, households, government, and the economy as a whole. In-depth analysis of those impacts is key to designing policy interventions that can mitigate economic losses and supporting a sustained and robust recovery.

The main findings of the analysis are as follows:

- **National GDP** is predicted to fall by 41 percent during the two-week lockdown period. The COVID-19 pandemic will likely push Myanmar's economy into a recession or lead to stagnant growth in 2020.
- The **agri-food system** (AFS) is predicted to fall by 24 percent during the lockdown period. Although the lockdown policies provide an exemption for most agricultural activities, linkages to other sectors affect the AFS sector indirectly. Economy recovery in agriculture is slow and the annual growth rate of the AFS GDP will be negative in the case of a slow recovery for the economy as a whole. Even with faster recovery, it will be stagnant.
- **Manufacturing GDP** is predicted to fall by 40 percent during the lockdown period. However, closure of manufacturing factories has the largest negative impact on both the

agri-food system and the economy as a whole due to its strong linkage effects with upstream primary agriculture and downstream services.

- **Nonfarm employment** is predicted to fall by more than five million jobs during the lockdown period. Fast recovery can allow 1.1 million more people to return to their jobs or businesses by the end of FY 2020 than will a slow recovery. Still, there will be 500,000 nonfarm jobs lost even with a fast recovery.
- **Household income** is predicted to fall across all household groups and fall further among rural nonfarm households and urban households. Fast recovery can reduce the loss in household income, particularly for rural nonfarm households. However, even with fast recovery, rural farm and nonfarm household annual income in 2020 will be 4.5 and 5.6 percent lower than a normal situation, respectively.

The assessed economic costs of the COVID-19 pandemic for Myanmar's economy as described above should be interpreted as plausible predictions based on available information. In practice, the negative economic impacts of the current crisis could be greater than the findings from this model. At the same time, government responses in terms of immediate protection of business and household income and longer-term economic stimulus packages could lower the cost.

An important first-order result of this analysis is that reopening the manufacturing sector is crucial for both Myanmar's broad economy and for agri-food system recovery. The manufacturing sector is one of the fastest growing sectors in Myanmar, accounting for more than 20 percent of national GDP. Many manufacturing subsectors are labor intensive and are important for job recovery. Agri-food processing is an important subsector in manufacturing and is also an important component of the agri-food system. More importantly, through its demand for agricultural raw materials and various logistic services, manufacturing has the strongest linkage effects in the economy both to upstream primary agriculture and to downstream transportation, trade, and other services. Without an almost returned-to-normal manufacturing sector, the economy is unlikely to quickly return to its recent high growth trajectory.

Secondly, many of the negative impacts of the COVID-19 pandemic on agriculture and agribusiness occur primarily through indirect channels as a result of linkage effects in the economy. Because AFS accounts for about 44 percent of GDP, excluding agriculture and some agribusiness from the April lockdown and post-lockdown restrictions helped lower the negative impact of the COVID-19 pandemic not only on agriculture but for the entire economy. Continued policy support to Myanmar's AFS is critical to ensuring that incomes derived from farming and agribusinesses continue as a stabilizing influence on the economy. This means ensuring that policies continue to facilitate farm and livestock management, agricultural input and output market trade, food processing, agri-food-related transportation, and extension and other service provision.

Thirdly, like manufacturing, construction and some service sectors will be affected severely by the pandemic. Many rural households depend on such activities for their livelihoods. Stimulus packages to help small and large businesses in these badly affected sectors will be needed. Not only will such programs protect the livelihoods of workers and entrepreneurs earning income from such activities, they also will advance and accelerate the economic recovery.

Fourthly, there is a high likelihood that Myanmar's current social protection programs will have to be extended. New programs expanding beyond the coverage of existing beneficiary households will be covered under the recently launched CERP. The nature of the economic shock suggests that its income effects may be heterogeneous across households in several dimensions. Notably, the most vulnerable households are the ones that rely on informal nonfarm businesses in both rural and urban areas. The majority of such households are not poor but had relatively low income

levels before the pandemic. Many of them have found their income sources substantially reduced by the pandemic and will possibly fall into poverty traps. Devising programs to help them avoid such traps requires further micro-level analysis using household data.

Finally, the modeling results suggest that efforts to minimize the negative economic impacts of COVID-19 will depend partly on restoring trade, especially trade in agricultural commodities, domestically and with neighboring countries. There is a need to keep markets in rural areas open to the extent that public health and safety measures can allow. This will enable agri-food trade to supply Myanmar's domestic market and to improve the flow of exports through both formal and informal channels.

The Government of Myanmar has recently released a comprehensive and sensible economic relief plan (CERP 2020). According to Myanmar Times (May 10, 2020), the estimated spending of CERP will be around 2 billion USD or 2.8 trillion Kyat, which is equivalent to between 2 and 4 percent of national GDP in 2019. Considering that the loss in national GDP is estimated in our model analysis to be between 6.4 trillion and 9.0 trillion Kyat by the end of FY 2020 with significant reductions in income for low-income households, the size of this economic stimulus package might be too modest to enable all firms, households, and the whole economy return in 2021 to their pre-COVID-19 growth trajectories.

We expect the current analysis and planned new analyses will support the systematic and comprehensive policy response of the Government of Myanmar to the COVID-19 pandemic and subsequent recovery period. Relevant and timely analyses are critical not only to understanding the pandemic's effects on livelihoods and the country's economy but also to designing effective policies and programs to protect livelihoods and return Myanmar to its encouraging growth trajectory.

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APPENDIX

Table A1: Sectors in the Social Accounting Matrix for Myanmar

Agriculture (24)	Industry (28)	Services (11)
Maize	Mining	Wholesale & retail
Sorghum	Meat processing	Transport
Rice	Fish processing	Hotel, restaurants & catering
Wheat	Manufacture of dairy products	Communication
Pulses	Fish processing	Financial services
Groundnuts	Cooking oil processing	Real estate
Other oilseeds	Grain milling	Business services
Cassava	Sugar refining	Public administration
Other roots	Manufacture of other food products	Education
Vegetables	Manufacture of animal feeds	Health services
Sugar crops	Manufacture of soft drinks & beverage products	Domestic workers & other services
Tobacco	Manufacture of tobacco products	
Cotton	Textile	
Fruits	Clothing	
Tea	Leather products	
Coffee	Wood products	
Other crops	Paper	
Cattle	Fertilizer	
Milk	Chemical products	
Poultry	Manufacture of non-metal products	
Pigs, sheep & goats	Manufacture of metal products	
Other livestock	Machinery	
Forestry	Equipment	
Fishery & aquaculture	Vehicles	
	Other manufacturing	
	Energy and electricity	
	Water and urban utility	
	Construction	

Source: Authors' model construction.

Table A2: Quarterly GDP weights, percent share of annual GDP

	Q1 Oct-Dec	Q2 Jan-Mar	Q3 Apr-Jun	Q3 Jul-Sep
GDP	33.9	29.9	15.3	20.9
Agriculture	33.8	34.1	10.3	21.7
Industry	31.6	32.6	15.9	20.0
Services	36.2	25.3	17.3	21.2

Source: Authors' calculation using 2018/19 GDP data published by Central Bank of Myanmar (CBM 2020).

Table A3: Assumed shocks due to the two-week lockdown period on total final demand and export demand of sectors in the Myanmar Social Accounting Matrix, percent change

Myanmar SAM sector	Total final demand	Export demand	Reason for the shock
Maize	(nil)	-5	
Sorghum	(nil)	(nil)	
Rice	(nil)	(nil)	
Wheat	(nil)	(nil)	
Pulses	(nil)	-10	
Groundnut	(nil)	-5	
Other oilseed	(nil)	(nil)	
Cassava	(nil)	(nil)	
Other roots & tubers	(nil)	(nil)	
Vegetables	(nil)	-10	
Sugar crops	(nil)	(nil)	
Tobacco	(nil)	-10	
Cotton	(nil)	-10	
Fruit	(nil)	-50	
Tea	(nil)	-25	
Coffee	(nil)	-10	
Other crops	(nil)	(nil)	
Cattle	(nil)	(nil)	
Milk	(nil)	(nil)	
Poultry	(nil)	-25	
Pigs, sheep, goats	(nil)	-15	
Other livestock	(nil)	-25	
Forestry	(nil)	-10	
Fishing	-7	-30	Difficulty in fishery production
Mining	-6	-5	Difficulty in mining production
Meat processing	-20	(nil)	Closure of manufacturing facilities
Fish processing	-20	(nil)	Closure of manufacturing facilities
Dairy products manufacturing	-20	(nil)	Closure of manufacturing facilities
Fish processing	-20	(nil)	Closure of manufacturing facilities
Cooking oil processing	-20	(nil)	Closure of manufacturing facilities
Grain milling	-20	(nil)	Closure of manufacturing facilities
Sugar refining	-20	-15	Closure of manufacturing facilities
Manufacture of other food products	-20	-40	Closure of manufacturing facilities
Manufacture of animal feeds	-20	(nil)	Closure of manufacturing facilities
Manufacture of beverages	-20	-15	Closure of manufacturing facilities
Manufacture of tobacco products	-20	-8	Closure of manufacturing facilities
Textiles	-55	-90	Closure of manufacturing facilities
Clothing	-55	-90	Closure of manufacturing facilities
Leather products	-55	-90	Closure of manufacturing facilities
Wood products	-50	-50	Closure of manufacturing facilities
Paper	-45	-50	Closure of manufacturing facilities
Fertilizer	-50	-25	Closure of manufacturing facilities
Chemical products	-45	-25	Closure of manufacturing facilities
Manufacture of non-metal products	-45	-15	Closure of manufacturing facilities
Manufacture of metal products	-65	-25	Closure of manufacturing facilities
Machinery	-65	-25	Closure of manufacturing facilities
Equipment	-65	-25	Closure of manufacturing facilities
Vehicles	-65	-25	Closure of manufacturing facilities
Other manufacturing	-65	(nil)	Closure of manufacturing facilities
Energy and electricity	(nil)	(nil)	

Myanmar SAM sector	Total final demand	Export demand	Reason for the shock
Water and urban utilities	(nil)	(nil)	
Construction	-42	(nil)	Closing construction activities
Wholesale and retail	-50	(nil)	Closing non-essential trade
Transport	-50	-90	Transport and travel restrictions
Hotel, restaurants, and catering	-70	-95	Closing hotels and restaurants
Communication	-20	(nil)	Closing non-essential business services
Financial services	(nil)	(nil)	
Real estate	-60	(nil)	Closing non-essential business services
Business services	-10	(nil)	Closing non-essential business services
Public administration	(nil)	(nil)	
Education	(nil)	(nil)	
Health services	(nil)	(nil)	
Domestic workers & other services	-20	-25	Closing non-essential business services

Source: Authors' scenario construction.

Table A4: Assumed shocks on household consumption expenditure due to falling foreign remittances, by household group in the Myanmar Social Accounting Matrix, percent change

Welfare quintile	Rural farm	Rural non-farm	Urban
Poorest	-1.8	-2.5	-4.9
2nd	-1.8	-3.0	-2.5
3rd	-4.8	-5.5	-2.2
4th	-2.0	-2.9	-3.3
Wealthiest	-3.2	-6.2	-2.6

Source: Authors' scenario construction.

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ACKNOWLEGEMENTS

This work was undertaken as part of the Myanmar Agriculture Policy Support Activity (MAPSA) led by the International Food Policy Research Institute (IFPRI). Funding for this study was provided by the CGIAR Research Program on Policies, Institutions, and Markets and the United States Agency of International Development (USAID).

The authors acknowledge the COVID-19 pandemic-related insights and information on the current situation in Myanmar provided by individuals from the public and private sectors whom we interviewed in recent weeks. We also are grateful for the helpful comments and suggestions from colleagues on the MAPSA team.

This Working Paper has not gone through IFPRI's standard peer-review procedure. The opinions expressed here belong to the authors and do not necessarily reflect those of IFPRI, MDI, USAID, PIM, or CGIAR.

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The Myanmar Strategy Support Program (Myanmar SSP) is led by the International Food Policy Research Institute (IFPRI) in partnership with Michigan State University (MSU). Funding support for Myanmar SSP is provided by the CGIAR Research Program on Policies, Institutions, and Markets; the Livelihoods and Food Security Fund (LIFT); and the United States Agency for International Development (USAID). This publication has been prepared as an output of Myanmar SSP. It has not been independently peer reviewed. Any opinions expressed here belong to the author(s) and do not necessarily reflect those of IFPRI, MSU, LIFT, USAID, or CGIAR.