Chapter 19

CONCLUSION: FROM RECOVERY TO RENEWAL OF THE AGRIFOOD SYSTEM

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Myanmar's agrifood system is of critical importance for the near-term survival and longer-term flourishing of its diverse population. Prior to the recent crises, the food system accounted for almost half (47 percent) of Myanmar's GDP and almost two-thirds (64 percent) of employment, while primary agriculture accounted for 22 percent of GDP and 49 percent of employment (Chapter 2). Recovery from the multiple crises Myanmar has faced since 2020 will require a combination of effective humanitarian assistance and sustained policy reforms and investment to resolve infrastructure limitations and constraints to sustainable productivity growth. These efforts are necessary to enable the agrifood system to fulfill its potential to improve food and nutrition security and reduce poverty.

Our concluding chapter first reviews the trajectory of the agrifood system through multiple economic shocks, from the onset of COVID-19 in early 2020 through to the end of 2023; and the types of assistance needed to mitigate widespread food and nutrition insecurity. It then turns to longer-term investments and policies required to enable the agrifood system to drive long-term recovery and sustainable economic growth. While many of the shocks experienced by Myanmar since the onset of COVID-19 have also been experienced by other low-income countries, the consequences have been magnified and prolonged due to the military coup of February 1, 2021.

From transient shocks to humanitarian crisis

This section reviews the trajectory and outcomes of successive economic shocks for three overlapping groups of agrifood system stakeholders: consumers, farmers, and intermediary value chain actors.[1]

1 Examples of overlap include farmers who are also consumers and undertake off-farm value chain activities such as trading.

Beginning in March 2020, transportation restrictions to curb the spread of COVID-19 caused significant disruptions throughout Myanmar's food supply chain. During the first wave of the pandemic, these restrictions were often uncoordinated at the local level, hindering deliveries of agricultural inputs ahead of the monsoon planting period. Input retailers reported longer lags in the delivery of fertilizer orders, and mechanization service providers reduced the areas they serviced. Importantly, both sectors recovered quickly through a combination of business adaptations and less stringent travel restrictions. Monsoon crop production declined in some areas, partly because of irregular rainfall and pests, but, in aggregate, there were no clear signs of severe production declines for important crops. National production estimates for rice and pulses had declined by less than 4 percent in 2020 compared with 2019, and maize production had increased by 2 percent (USDA 2021).

Although COVID-19 policy responses had a minimal effect on production, there were widespread disruptions in crop trading (Boughton et al. 2021). Farmers faced challenges in marketing their harvests because crop traders had to contend with closed commodity exchange centers and border crossings. Supply chains adjusted, however, and bottlenecks diminished over time as domestic and international trade resumed. While commodity exchange centers were closed, crop traders relied on mobile phones to coordinate transactions and avoid violating curfews. Additionally, border gates were temporarily reopened for exports, particularly for rice and maize. Ultimately, the prices for most commodities remained largely stable during the 2020 monsoon harvest period relative to previous years. Rice prices increased by 2 percent on average relative to 2019, while farmers benefited from a 5 percent average increase in prices for their monsoon paddy (Goeb et al. 2022). Lockdowns in urban areas were accompanied by only a modest increase of 3 percent in food prices for traditional food retailers in the major cities (Goeb et al. 2022). Rural food vendors also reported relatively small changes in food prices over that period (Boughton et al. 2021).

Shocks to the agrifood system since the February 2021 coup have been larger and longer-lasting than those posed by the first two waves of COVID-19. Initially, disruptions to the banking system related to an internet shutdown and widespread strikes to protest the military coup hindered transactions for all stakeholders, but especially for agribusinesses. Regular agrifood system monitoring surveys set up during COVID-19 and continued following the military coup found that 86 percent of rice millers, 57 percent of crop traders, and 41 percent of input retailers cited the banking sector disruption as the largest they faced in the months following the military coup (MAPSA

2021a; 2021b; 2021c). Even more persistent and damaging for all agrifood system actors were high rates of inflation driven by the depreciation of the Myanmar kyat and compounded by increases in international prices for fuel and fertilizer.

Meanwhile, more than 60 percent of crop traders, agricultural input retailers, and rice millers reported increased transportation costs in March and April 2021. For crop traders, transportation costs increased by an average of 22 percent within their state or region and by 39 percent outside of their state or region. International commodity price increases, especially for fuel and fertilizer, following the Russian invasion of Ukraine drove inflation even higher (Diao et al. 2022). Ultimately, as we show below, inflation hit consumers the hardest.

Poverty and food and nutrition insecurity

This section examines in more depth the status and drivers of food and nutrition insecurity through the lenses of geography, income, and demographic factors. Finally, it examines the role of food price inflation as a key driver of recent increases in poverty.

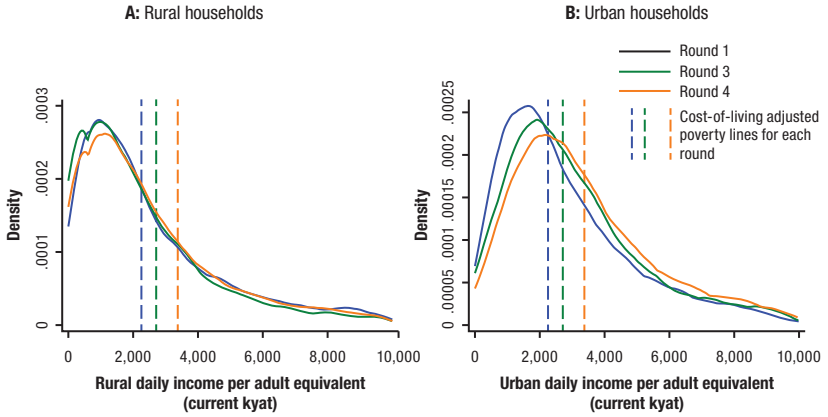
POVERTY, EMPLOYMENT, HOUSEHOLD ASSETS, AND RESILIENCE INDICATORS

By December 2022, two out of every three people in Myanmar were estimated to be poor, based on income poverty estimates, up from one out of every two households at the beginning of the year (MAPSA 2023e). High rates of inflation—19.5 percent year-on-year in July 2022, according to the Central Statistical Organization (CSO and MOPF 2022)—have a powerful impact on poverty rates in the presence of stagnant nominal incomes.

Panel A of Figure 19.1 shows the income distribution and poverty lines for rural households over three MHWS survey rounds between December 2021 and December 2022; while panel B shows the same information for urban households. Poverty lines are adjusted for cost of living using quarterly food vendor survey data for periods when CSO data are not available. The area under the income distribution to the left of the poverty lines represents the share of the population that is poor in each survey round.

Panel A shows that in rural areas the distribution of nominal income changed very little between December 2021 and December 2022. Rather, changes in the share of the population that is poor were linked almost entirely to inflation, that is, the poverty line shifting to the right. In contrast, in urban areas (panel B), both the income distribution and the poverty line shift to the right in each round. Rising income initially tempered rising costs between

FIGURE 19.1 Changes in urban and rural nominal income distributions and poverty lines in 2022



Source: MAPSA (2023e).

Note: MHWS Round 1 = December 2021 to February 2022; Round 3 = July to August 2022; and Round 4 = October to December 2022. Round 2 is not included to simplify figure, as income distribution is similar for all four rounds in rural areas, and poverty increased little between Rounds 1 and 3 in urban areas.

Rounds 1 and 3, resulting in only small changes in urban poverty of about 3 percent. However, between Rounds 3 and 4, the rightward shift in the urban income distribution does not keep pace with the 24.7 percent increase in the poverty line. Consequently, we see the largest increase in urban poverty of 12.5 percent between Rounds 3 and 4.

In terms of socioeconomic characteristics, households dependent on casual wages and asset-poor households were the most vulnerable. More than four out of five households used at least one coping strategy to meet daily needs during the month prior to being interviewed (MAPSA 2023e). The most common coping strategies were spending savings and reducing food and non-food expenditures (Chapter 5). Households in Kayah, Chin, and Sagaing—the states and regions most severely affected by recent conflicts with the military regime—were most vulnerable. Perhaps unsurprisingly in view of the prolonged conflicts there, nearly 80 percent of households in Rakhine were income-poor and mortgaged or sold assets as a coping strategy.

SPATIAL, INCOME, AND DEMOGRAPHIC DIMENSIONS OF FOOD AND NUTRITION INSECURITY

Food and nutrition security deteriorated markedly in 2022 (MAPSA 2023d). The share of households with a low food consumption score increased from

9.4 percent to 15.7 percent during the year. Rural households were much more likely to have a low food consumption score compared with urban households (18 percent vs. 10 percent). Low income and few assets are positively correlated with food insecurity and poor diet quality, with daily wage workers particularly vulnerable (MAPSA 2023a; Chapter 16), while receiving remittances is inversely correlated with dietary inadequacy (MAPSA 2023e). As panel A of Figure 19.2 shows, low food consumption was most prevalent in Chin (48 percent), Kayin (23 percent), and Magway (23 percent), all highly conflict-affected areas.

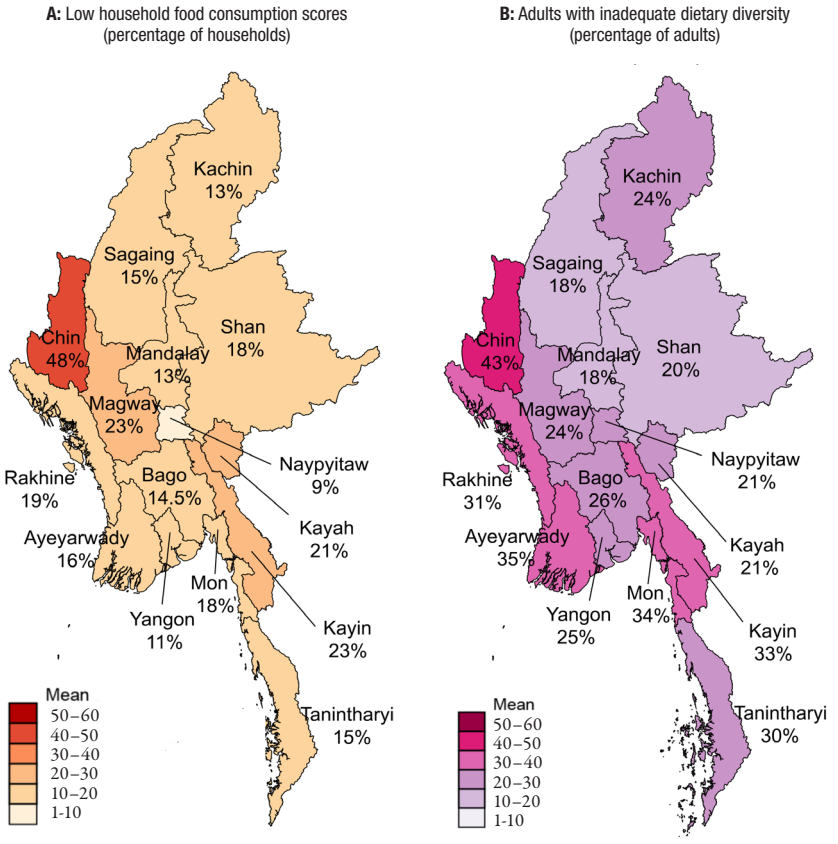
Inadequate diet diversity among adults increased from 21 percent to 25 percent during 2022. Rates were higher for women than men and in rural than in urban areas. As panel B of Figure 19.2 shows, the highest rates of inadequate diversity were reported in Chin (43 percent), Ayeyarwady (35 percent), Mon (34 percent), and Kayin (33 percent). Decreases in diet quality among adults were the result of lower consumption of milk and dairy products, vitamin A-rich fruits and vegetables, meat, fish, and eggs. More than a third of children ages 6 to 23 months and 15.9 percent of children ages 24 to 59 months have inadequate diet quality.

The prevalence of hunger remained relatively constant during 2022; at 4 percent of households, with higher levels in Chin (10 percent), Mon (7 percent), and Rakhine (6 percent). Asset- and income-poor households were more likely to experience moderate to severe hunger.

CONFLICT, DISPLACEMENT, AND MIGRATION

The number of internally displaced persons (IDPs) increased by almost 1.4 million in the two years following the coup of February 2021 (UNHCR 2023). More than half of this number came from the Sagaing Region. While migration was already high before the coup (Chapter 15), the number of migrants during the 18 months between December 2021 and June 2022 was estimated to be almost 3.6 million, according to the Myanmar Household Welfare Survey (MHWS) (MAPSA 2022d). Approximately one in six Myanmar households saw a member leave over this period, and 7.3 percent of households migrated as an entire unit (accounting for approximately half of all migrants). Two-thirds of those who migrated sought better employment opportunities. However, only about half were able to improve their income, implying that their vulnerability may have increased (at least temporarily) as a result. While conflict is also an important driver of migration (along with poverty), it is difficult to estimate the overlap between the number of IDPs and the number of migrants owing to missing panel data observations in the

FIGURE 19.2 Prevalence of low household food consumption and inadequate adult dietary diversity scores, fourth quarter, 2022



Source: MAPSA (2023a).

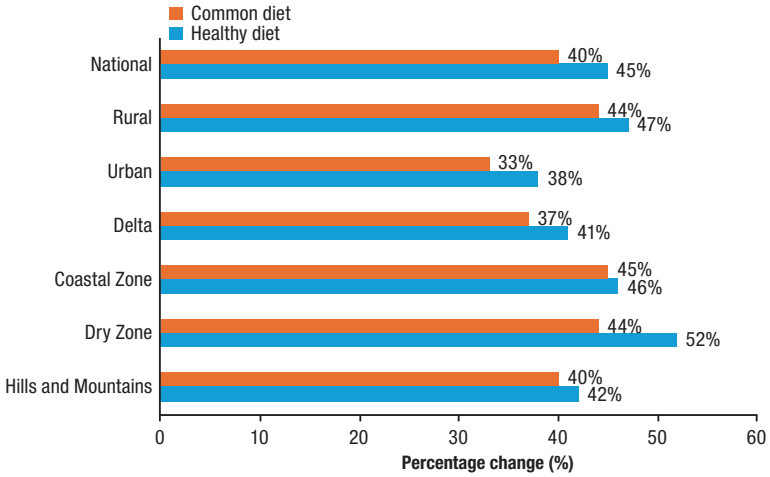
Note: High values represent high prevalence of dietary inadequacy.

MHWS. The widening conflict also affected productivity and retail distribution margins in the rice sector (MAPSA 2023a; Minten et al. 2023).

FOOD VENDORS AND FOOD PRICE INFLATION

While the incidence of hunger and degradation of diet quality is an area of concern, especially for women and young children, it is surprising that the situation at the end of 2022 was not even worse, given the level of food price inflation. The cost of both common and healthy diets (the latter comprising higher calorie shares of protein-rich foods, fruits, and vegetables relative to rice and vegetable oils) rose 45 and 40 percent, respectively, over the 12-month

FIGURE 19.3 Change in cost of common and healthy diets between March 2022 and February 2023, by area



Source: MAPSA (2023c).

period ending February 2023, while the price of rice increased by 62 percent (MAPSA 2023c). Protein-rich dietary components also increased in price over this period: eggs by 67 percent, chicken by 50 percent, and pork by 20 percent. Figure 19.3 shows the spatial pattern of dietary cost changes. Increases were higher in rural and in conflict areas, consistent with spatial patterns of dietary degradation.

Increases in food costs outpaced changes in wages. The food purchasing power of daily wages received by construction and agricultural wage laborers declined by 25 percent and 28 percent, respectively, over 2022 (MAPSA 2023c; Chapter 16). As food grew increasingly unaffordable for wage earners, especially in rural areas where dietary cost inflation was higher, households dependent on daily wages as their main income source became one of the most vulnerable household groups. While the relative decline in purchasing power is the same for male and female workers, the significantly lower wages paid to women further compromise food purchasing power for their families.

Farm production

This section examines the trajectory of the supply side of the agrifood system. We first look at farm-level production and follow this with off-farm components. The depreciation of the Myanmar kyat and increases in international prices for fertilizer and other chemical inputs have had a major impact

on farm input costs. For export-oriented crops such as rice and pulses, higher costs have been offset by higher farm output prices, albeit with a time lag. The transmission of price increases to the farm level has nevertheless been dampened by widening marketing margins and distorted by unpredictable exchange rate regulations for crop exporters. These regulations in 2023 had an effect similar to an export tax of between 19 and 30 percent. The market situation for farmers producing crop and livestock products for the domestic market has also been depressed by the reduction in consumer purchasing power. The rapid expansion of conflict and insecurity in rural areas, especially in the Dry Zone, has further undermined the ability of farmers and traders to adapt to a complex market environment.

CROP PRODUCTION

Rice is a key crop, given its large share of agrifood system GDP (25.8 percent), its role in domestic consumption (half of all urban and 62 percent of rural calories consumed), its importance for employment generation on-farm and downstream in rice milling, and export earnings (Minten et al. 2023). For rice, we consider the response of farmer decisions to changes in input and output prices separately for the monsoon and post-monsoon seasons: improved water control and higher sunshine hours during the post-monsoon allow for the cultivation of higher-yielding varieties, with greater control in crop management operations compared with in the monsoon season.

Input and output prices changed dramatically between the 2021 and 2022 post-monsoon rice production seasons (MAPSA 2022a; 2022b). (Also see Chapter 3.) Urea fertilizer prices increased by 50 percent and tractor plowing services by 29 percent. Farmers adapted to these higher costs by increasing average total farm expenditure on inputs, which rose by 15 percent, and reducing urea application by 10 percent. Despite the reduction in fertilizer use, yields were very similar in both years. In contrast with 2021, when monsoon paddy prices were almost unchanged relative to the previous year, farmgate paddy prices increased by 42 percent in 2022. Overall, the profitability of post-monsoon rice production had improved in 2022 compared with the previous year.

A similar pattern is observed for pulse crops, which are also grown primarily in the post-monsoon season and for which there is strong export demand. Compared with 2021, averaged across all pulse types, farmers increased input expenditures by 11.5 percent, yields were similar, and output prices increased by 34 percent and gross margins by 44 percent.

The outlook among paddy farmers for the 2022 monsoon season was less optimistic relative to the preceding post-monsoon crop. Most farmers anticipated lower production because of substantially lower fertilizer use. Urea prices in July 2022 were almost twice as high as in the previous monsoon season. This was coupled with worse weather conditions (especially higher flood incidence). The surge in paddy prices following the 2022 monsoon harvest, which outpaced increases in the price of rice on international markets, indicates that farmers' predictions of lower harvests were likely correct.

The impact of the widening conflict on rice production is difficult to observe directly. Farmers in communities experiencing conflict are often unable to respond to phone surveys. Nevertheless, spillover effects on nearby communities are likely (e.g., reduction in transportation services or access to hired labor from neighboring villages). Increases in fatal violent events between 2020 and 2021 are correlated with a small reduction in total factor productivity—a measure of the overall efficiency of all inputs used to produce rice—by about 4 percent on average in the short run (MAPSA 2023a).

LIVESTOCK AND FISHERIES

Prior to the COVID-19 pandemic and the coup, Myanmar's poultry, pig, and aquaculture sectors were growing rapidly, particularly in the peri-urban zones around major cities (Chapters 9 and 12). The dynamism evident in these sectors corresponded with a period of rapid economic development that spurred rising real incomes and domestic urban demand for animal-source foods. Production growth was also supported by large foreign and domestic investments in sectors like feed milling, as well as by the investments of small and medium enterprises, such as traders, which also grew rapidly during this period (Fang et al. 2021; Chapter 9).

Movement restrictions during the earliest stages of the COVID-19 pandemic disrupted supplies of production inputs and the distribution of livestock and fish products to market. However, similar to crop farming, these logistical issues were overcome relatively quickly. Longer-lasting impacts were felt in the form of depressed consumer demand caused by the economic downturn associated with the pandemic (Chapters 5 and 13). This trend was intensified by the coup and inflationary pressures, which contributed to substantial reductions in demand for and consumption of nutrient-rich foods, including fish and livestock products (Chapter 4). Reduced demand was transmitted upstream along livestock and fish supply chains, resulting in high levels of temporary or permanent closure among operations such as peri-urban broiler

farms (Fang et al. 2021; Chapter 9). However, the income elasticity of demand for animal-source foods means that demand could rebound quite quickly if economic conditions improve in the future, prompting remaining producers to scale up production or stimulating investment by new entrants.

Capture fishing activities are very important for livelihoods in coastal areas of Myanmar and the Ayeyarwady Delta. However, they face serious governance challenges and unsustainable levels of resource exploitation that require a shift from strategies that favor resource extraction in the short term to those promoting long-term stewardship.

Post-farm processing and distribution

Rice milling is the largest agrifood processing sector in Myanmar, with an essential role in enabling consumers to access the major source of their calories. The widespread disruption of the banking system following the coup for online and in-person transactions was the most important source of business difficulties for 90 percent of millers (Minten et al. 2023). Although milling margins—the wedge between the paddy purchase price and ex-mill rice sales price after accounting for byproduct value—remained stable, the rising costs of transportation as a result of increasing international prices for fuel and depreciation of the Myanmar kyat resulted in a widening gap between mill and retail vendor prices over time. Incidents of violence increased the gap still further. The economic welfare cost of market disruptions to farmers and consumers was approximately $500 million over a year (Minten et al. 2023). Introduced in 2022, the mandatory conversion of a (varying) share of foreign currency earnings from rice exports at the overvalued official exchange rate has had the same effect as a tax on paddy prices estimated at 19 to 30 percent depending on the parallel market exchange rate, thereby imposing additional welfare costs on farmers.

The disruptions in the banking sector, rising transportation costs (up 63 percent in August 2022 compared with a year earlier), and exchange rate regulations inevitably affected crop traders broadly (MAPSA 2022a).[2] Trader margins increased due to higher transport costs but fell as a percentage of (higher) crop buying prices, indicative of competitive market conditions. Rice millers faced additional challenges from frequent and prolonged energy shortages, resulting in higher milling costs for mills using diesel generators and

2 The requirement to convert a share of export proceeds applies to official exports of all crops, including pulses and beans, maize, and sesame. In addition to being an indirect tax on farmers, the requirement creates additional incentives for informal border trade.

contributing to a 20 percent reduction in throughput in August 2022 compared with a year earlier; milling margins increased 40 percent over the year (MAPSA 2022c).

As discussed in Chapter 13, for lower-middle-income countries like Myanmar, expenditures on convenience foods and food consumed away from home typically have high price and income elasticities relative to unprocessed or minimally processed staple foods. Such expenditures rise quickly with urbanization and income growth but can also contract sharply if real incomes fall, as was the case in 2022.

To conclude this section, we note that, for consumers, rapid inflation has been the most important factor driving recent increases in poverty and food insecurity. For farmers, sharp increases in the cost of fertilizer and other chemical inputs have made it difficult to maintain crop yields. At the same time, conflict and rising costs for mechanization services may have resulted in reductions in the areas they cultivate. However, recent increases in farm output prices will have offset, to an extent, increases in input costs. Unfortunately, high levels of inequality in land access dampen the impact of output price increases on poverty. The combination of rising transport costs, widening conflict and insecurity, and electricity shortages has increased the marketing margins between farmers and consumers or buyers. Exporters have had to contend with frequently changing central bank regulations concerning which currencies can be used for trading and what share of earnings must be converted at the overvalued official rate. In terms of ability to adapt, traders and processors in export-oriented sectors appear most resilient to these shocks, at least in the short run, while consumers are the most seriously affected. Farmers have also borne significant welfare losses due to higher marketing costs and increased price uncertainty because of unpredictable export and foreign currency regulations.

Short-term interventions to mitigate food and nutrition insecurity

Given that markets for food in Myanmar are accessible and functioning for most consumers, increasing the purchasing power of poor households through cash transfers is likely to be the most effective way to mitigate food and nutrition insecurity in the near term. Because of limited resources, however, it will be important to carefully target the most vulnerable groups, such as households with pregnant or nursing women, those with several young children or with adolescent girls, or those dependent on daily labor (MAPSA 2023c). Nutrition education for pregnant and nursing mothers and mothers with

young children could be provided either in combination with cash transfers (preferably) or as a separate intervention. Rice fortification in collaboration with the private sector, whether using commercial channels or food assistance, could help address micronutrient deficiencies in the diets of poor people (Chapter 4).

Given the important role of remittances in household resilience, support to legal migration and wraparound services in receiving countries could also help mobilize resource flows. These services could include ensuring correct documentation and access to microfinance for small businesses, along with the provision of tools or equipment, upgrading of vocational skills, and health and childcare facilities.

Support for primary agriculture will also help mitigate food and nutrition insecurity, especially for smaller farmers who depend on their farming activities for a significant share of the food consumption of their household, whether through direct consumption or market exchange. Examples of potential support include finance for local small and medium seed multiplication enterprises to expand farmer access to quality planting material that is foundational for achieving higher crop yields. Strengthening access to extension information through community extension workers (linked to subject matter specialists or service providers using mobile phone services) could help farmers use chemical inputs more effectively in combination with biological options, as well as reduce losses through improved postharvest management practices. The promotion of homestead gardens and small livestock could improve the quality of diets (Chapter 4).

Reducing transportation costs, including reducing conflict-related risks to vehicles and their cargo and rent-seeking at checkpoints, will improve the effectiveness of these interventions.

Longer-term investments and policies to drive long-term recovery and economic growth

Prior to the military coup, the process of structural transformation of the agrifood system was constrained by a lack of investment in drivers of productivity growth, such as infrastructure and agricultural research (Chapter 3). The surge in poverty and food insecurity since the coup has highlighted additional vulnerabilities to economic shocks that may have been masked by the rapid decline in poverty headcounts during the two decades preceding 2020. For example, close to 40 percent of households in the main farming areas are landless. At the same time, the distribution of land among landowning

farm households is highly skewed, with the smallest 70 percent of farm holdings averaging just 2 acres (Chapter 6). A high proportion of rural households are, therefore, dependent on daily wages to meet their needs and, like urban casual laborers, are among the most severely affected by the economic turbulence that has followed the coup (Chapter 16). It is important to identify ways in which livelihoods can be made more resilient if a resolution of the current political crisis is to allow economic recovery to begin. This section highlights key investments and policies to ensure that the potential contribution of Myanmar's agrifood system to economic recovery and broad-based, sustainable growth over the longer term is realized.

Agricultural value chain competitiveness

Competitiveness, a key driver of growth, refers to the ability of actors in a specific value chain to deliver products in the desired form with required quality attributes to domestic and international consumers at lower costs than those at which the products could be obtained from alternative sources. Investments in productivity, quality, and logistics (wholesale markets, cold chains, transport infrastructure) can all improve competitiveness. Given limited investment resources, however, it is important to identify those value chains with the most potential for future growth and improved poverty, food security, and nutrition outcomes. This section first recalls the value chains identified in Chapter 2 and then proceeds to identify necessary investments and policies to resolve constraints to competitiveness discussed in Chapter 3.

Chapter 2 ranked value chains according to their potential contribution to poverty reduction, hunger reduction, diet quality, employment creation, and GDP. The top five are:

- Horticulture (scores highly on all five development outcome criteria)
- Livestock (dietary quality, growth, and poverty reduction)
- Oilseeds (diet quality and poverty reduction)
- Rice (growth)
- Fish (dietary quality, growth, and poverty reduction)

These five value chains accounted for 84 percent of agricultural GDP in 2019, indicating their potential for broad-based impacts on the agrifood system. Improvement in these value chains, especially through promoting higher productivity on farm and expanding value-added processing, can spur agrifood system growth and poverty reduction in all major agroecological zones

of Myanmar. This is an important consideration given the large numbers of IDPs and returning migrants to be resettled once the current crisis is resolved. Improvements to these value chains would also enable the agrifood system to respond to consumer preferences for more diversified diets at lower cost. The ranking confirms that the shift in agricultural development strategy prior to the coup from a rice-centric to a more diversified agriculture sector was correct (MOALI 2018).

Agricultural productivity

Slow growth in primary agriculture productivity has been a drag on overall agrifood system growth and farm incomes (Chapter 8). As Chapter 3 shows, crop yields in Myanmar are among the lowest in the region and showed no improvement in the decade prior to the coup. Investment in agricultural research was minimal compared with that of regional peers, and adoption of improved varieties and access to quality seed are low. Poor genetic material, in turn, limits the returns to improved crop management and chemical input use. Investment in an upgraded and decentralized agricultural research and extension system and increased access to quality seed through local small and medium seed multiplication enterprises are essential to providing a foundation for farm productivity growth across all crop subsectors. As noted in Chapter 8, systems for collecting objective agricultural statistics will also be necessary to measure progress in technology adoption and productivity growth.

Upgrading of irrigation infrastructure is also important for productivity gains and diversification into higher-value crops. Existing public irrigation services focused on rice were designed to flood large plots, giving individual farmers very little control over water management and no incentive to conserve it. Private irrigation systems designed to exploit groundwater reserves have been promoted without regard for recharge capacity, resulting in overexploitation in some areas while others are underutilized. A comprehensive irrigation water management policy and investment strategy will be necessary to facilitate diversification into higher-value and more productive cropping systems, allowing farmers more autonomy in water management and providing incentives for its conservation.

Expanded access to mechanization services over the decade prior to the coup was a game changer for farmers. Access to mechanical land preparation and combine harvesting dramatically reduced labor requirements and allowed greater timeliness in planting and harvesting, thereby increasing yields and avoiding harvest losses. As Chapter 7 notes, the mechanization revolution was also largely scale neutral, as smallholder farmers could access services

from private service providers. Recent evidence indicates that the farm equipment stock of these providers is eroding because of a lack of investment, making it harder for smallholders to obtain timely service (MAPSA 2023b). Early re-capitalization of the small and medium machinery enterprise sector through finance guarantees will be necessary to facilitate rapid recovery.

In addition to investment in irrigation and mechanization services, expanded and modernized private financial services will be needed to facilitate diversification into high-value enterprises, such as horticulture. Doing so will also require investment in grading, processing, packaging, and cold chain facilities to enable the horticulture sector to expand its production beyond the absorption capacity of the fresh produce market.

TRANSPORT INFRASTRUCTURE

The lack of an extensive and high-quality road infrastructure is a major constraint to the competitiveness of Myanmar products and reduces the share of the terminal market value for their produce that is earned by farmers. As Chapter 3 states, 40 percent of the rural population lacks access to all-season roads (World Bank 2024), and more than 9 million people live in villages with only tracks to connect them to a road of any quality (World Bank 2017). Transport costs for farm inputs and products soar under these conditions, farm commercialization is limited, and diversification into higher-value perishable products is often infeasible (Chapter 10). Myanmar ranks 137 out of 160 countries in logistics performance, while peer countries in the region rank between 26 and 44 (Arvis et al. 2018). Reducing the high costs of market access will benefit farmers and consumers by encouraging diversification and reducing the wedge between farmgate and retail prices.

BILATERAL AND REGIONAL TRADE POLICIES

Export markets are important for agricultural value chains that can drive growth and poverty reduction. In the past, unpredictable trade policies implemented by Myanmar's large neighbors have resulted in uncertain market access, large swings in prices, and limited opportunities to add value (Chapter 14). Pulse exports to India epitomize such challenges, with India imposing a variable quota regime according to its domestic supply situation and capturing all added value beyond basic sorting and grading. Consequently, pulses are a gamble for Myanmar farmers, but one many take on because of their low costs of production and lack of alternatives. Exports of rice, maize, and melons to China have also faced frequent disruptions because of unpredictable border delays or closures and exporter registration requirements (Chapter 14). Export market diversification could reduce risks for

exporters, especially for perishable crops, with investment in product traceability and sanitary and phytosanitary systems.

LAND TENURE AND LAND USE SUSTAINABILITY

Inequality of access means that many rural households are highly dependent on casual labor and self-employment in small nonfarm businesses. Furthermore, as Chapter 6 shows, the current system of laws concerning land remains multilayered, ambiguous, and unevenly enforced. This results in weak tenure security for farmers, particularly those working land without land use certificates, including land held under customary tenure. In addition, restrictions on the conversion of land designated for paddy cultivation to alternative uses such as aquaculture or permanent horticulture hinder diversification. The process for obtaining permission to change land use is complex, time-consuming, and fraught with rent-seeking by local officials.

Improved land tenure security should ensure that women and youth are appropriately included in those changes. Land titling efforts should allow for and encourage the recording of both spouses' names. This will also ensure that, when land titles are used as collateral for loans, both spouses give their consent. A revision of land policies should also facilitate young landless aspirant farmers becoming landowners (Chapter 17).

The national land use policy framework developed with extensive participation by civil society under the Thein Sein administration (2011–2016) provides useful principles for correcting many of the flaws in the current system. Implementation of the framework stalled under the National League for Democracy-led government, and an amendment to the law concerning access to vacant land effectively disenfranchised users who did not register their rights within a short window of time. The translation of equitable and sustainable land use policy principles into legal frameworks backed by decentralized and predictable land administration services will require deep consultation with communities and de facto authorities in different regions of the country. These consultations should also cover the identification of land where formerly or newly landless IDPs and returning migrants can resettle. Provision should also be made for communities to benefit from carbon markets in return for natural resource preservation or management improvements on land over which they have use rights.

Climate change adaptation

Myanmar's agrifood system is under threat from the effects of climate change (Chapter 8) and ranks globally among the three countries most vulnerable

to extreme weather events (UNDRR 2015). Climate change is expected to bring increased difficulty and unpredictability to agricultural production in Myanmar. Its increasing effects will be reflected in higher temperatures, changing precipitation patterns, sea level rise, soil and water salinity, and increased risks of pests and diseases. In the absence of a strong national agricultural research system, climate change will result in even higher risks and losses for Myanmar's farmers. Beyond the farm, storage and logistics will be affected, and price volatility is expected to increase.

Climate change adaptation will require ramped-up application of geographic information system tools for spatial monitoring of land use, water tables, land suitability, and precision farming systems. Moreover, in the face of more frequent shocks, flexibility in land use decisions will be essential to ensure the sustainability of agricultural production in Myanmar. Priority areas for investment in climate adaptation and mitigation include research and development of climate-resilient, resource-efficient, and sustainable innovations in food systems, such as new crop varieties that better withstand droughts and floods, solar energy solutions for product storage, and improved digital technologies; holistic, inclusive governance and management of water, land, forests, and energy resources, including no-till farming, agroforestry, and landscape management; the promotion of healthy diets and increased sustainability of food production; and improved value chain efficiency and reduced food losses to help the agriculture sector adapt to some of the worst effects of climate change (IFPRI 2022).

Conclusion

Myanmar's agrifood system has proven surprisingly resilient in the face of multiple crises—COVID-19, the military coup, economic mismanagement, global price instability, and widespread conflict—with respect to production and exports. Household welfare has not been resilient, however. Approximately 3 million people have been internally displaced in three years following the military coup. High rates of inflation, especially food price inflation, have resulted in dietary degradation across all household groups, especially those dependent on casual wage labor. Among household members, young children experience the highest rates of inadequate dietary quality. Expanded social protection to improve access to better-quality diets for vulnerable households and individuals is clearly very much needed.

Turning to the longer term, while much is known about strategies to leverage public and private investment in more efficient and dynamic agrifood systems

for poverty reduction and improved nutritional outcomes in low-income countries, these will not be straightforward to implement in the fragmented governance systems that are likely to evolve from the current situation of political conflict. For example, while new decentralized political administrations will likely want to exploit their regional comparative advantages (Chapter 18), they will often need more administrative capacity and trained personnel to pursue them. Furthermore, there will still be a need for supportive federal policies that address infrastructure, trade, and standards. In sum, the institutions and human capacity supporting Myanmar's regionally diverse agrifood system will need to be rebuilt in the context of a negotiated federal polity. This, in turn, will require a supportive political disposition on the part of Myanmar's neighbors as well as well-designed investment programs from external development financial institutions. The population of Myanmar deserves nothing less.

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