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Working Paper

Revitalized Agriculture for Balanced Growth and Resilient Livelihoods: Toward a Rural Development Strategy for Mon State, Myanmar

by

Multiple Authors from: Center for Economic and Social Development, International Food Policy Research Institute, and Michigan State University



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**REVITALIZED AGRICULTURE FOR BALANCED GROWTH AND RESILIENT
LIVELIHOODS: TOWARD A RURAL DEVELOPMENT STRATEGY
FOR MON STATE, MYANMAR**

by

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The contents are the sole responsibility of the authors, who are affiliated with the Centre for Economic and Social Development of Myanmar, Michigan State University, and the International Food Policy Research Institute. Any errors are our own.

EXECUTIVE SUMMARY

The purpose of this report is to provide national- and state-level policymakers, private-sector investors, civil society, and donors with an analysis of the rural economy of Mon State and pathways to improved prosperity for its population. The analysis is based on a representative survey of rural households, which make up 73% of Mon State's 2 million residents, and extensive interviews with farmers, traders, processors, local leaders, and government officials. Whereas some parts of the Mon State economy are quite dynamic, such as construction, others are stagnant and far from reaching their full potential. Furthermore, the dynamic sectors are heavily dependent on remittances from migrants to neighboring countries. The current pattern of donor investment is heavily focused on necessary infrastructure and energy investments, but with only very limited support to productive sectors, especially agriculture and fisheries. Major investments in education, both formal and vocational training, are also necessary to support the growth of a modern economy. The analysis in this report identifies options for more balanced growth, leading to a vibrant economy in which returning migrants can invest and find employment.

According to the Mon State Rural Household Survey carried out in 2015, the main sources of rural household income are agricultural production (24%) followed by remittances (22%), nonfarm business (18%), wage labor (14%), and fishing (11%). The most dominant factor driving Mon State's economy in the last decade has been outmigration of labor to Thailand and other countries. Agriculture, however, has not performed to its full potential. The two main crop sectors in the state, rice and rubber, have both been hindered by low yields, low prices, and inefficient processing, leading to declining returns. Other promising and potentially profitable activities, such as cultivation of fruits and vegetables or aquaculture, are currently implemented on a relatively small scale. With 31% of individuals aged 15 to 45 migrating (84% of them to Thailand), rising wages are further eroding farm competitiveness and profitability. Low agricultural profitability is thus both a cause and a consequence of high levels of migration.

The poor performance of agriculture can be overcome through appropriate policies and investments that modernize and reinvigorate the state's agriculture, while providing infrastructure and institutions that provide foundations for sustained growth in nonfarm enterprises. We offer specific policy and investment options to achieve balanced and sustainable growth in two broad areas: (1) stimulating growth in agricultural and sustainable management of natural resources, and (2) providing public infrastructure and services that strengthen the enabling environment.

The actions presented below are not intended to be a rigid set of requirements but rather a set of initial recommendations *toward* a rural development strategy for Mon State based on analysis of current evidence. As new information comes to light and the economic conditions change, rural development strategy needs to adapt with new or modified policy and investment options.

Area 1. Growth Opportunities for Agriculture and Resource Extraction Activities

Revitalize rubber, the main cash crop in Mon State. Almost one in five rural households owns a rubber plantation. The world price of rubber spiked during the late 2000s, leading to a significant increase in planted area. The result is that about half of rubber trees in Mon State are too young for tapping. Meanwhile, world prices have fallen to levels roughly 20% below their 10-year average. Squeezed between falling prices and rising costs of labor, the

profitability of rubber farms is now compromised. Profitability is further compromised because of the low quality of processed rubber, resulting in discounted prices from international buyers relative to Myanmar's neighbors. Revitalization of the rubber sector requires a value-chain approach to raise productivity and quality, and thereby, competitiveness on international markets.

Develop high-value fresh produce, an emerging cash crop sector. Fruit and vegetable crops are each grown by about one in 10 farmers in rural Mon State, and each generate a sixth of all crop income. Their high profitability makes them attractive alternatives to rice and rubber, but lack of access to irrigation constrains their expansion. Mon State is famous nationally for certain fruit crops, such as pomelo, mangosteen, rambutan, and durian. However, the lack of consistency in quality as well as reliable certification standards has prevented such crops from entering international markets and competing with neighboring Thailand. Vegetable production volumes remain low, and Mon vegetables hold only a minor share of Myanmar's market. Lack of technical knowledge in terms of input requirements and pest control methods makes vegetable farming somewhat risky. The dissemination of knowledge, improved varieties, water-efficient irrigation techniques, and adequate commercial inputs are prerequisites of further development in the fruit and vegetable sectors.

Improve rice productivity. Rice is cultivated by one in five rural households and contributes about half of all agricultural incomes. The majority of paddy is grown in the monsoon season under a low-intensity production model. Higher-yielding varieties from other parts of Myanmar are not well adapted to Mon State's late and long monsoon floods. Fertilizer use is less than half of the officially recommended amounts. In the coastal areas, a snail infestation has blighted harvests for the past few years. In the short run, the provision of extension and financial services can bolster yields through better input use and pest management. In the medium run, investment in water management infrastructure to prevent against salinization and flooding would be necessary to keep coastal areas productive. Only 5% of the state's 700,000 acres of paddy land is irrigated and able to produce in the dry season. Any investment in large infrastructure should be preceded by careful assessment of long-term economic viability.

Modernize land and input markets, as a key step toward the development of a high-performance crop sector. In 2015, only 30% of farm households held an official title (Form 7 or Form 105) to their agricultural land. Continued effort in land titling is needed to facilitate the emergence of a vibrant land rental market for efficient land allocation. A dynamic seed sector geared toward local agroecological conditions could rely on a network of private seed multiplication farms producing certified seeds and seedlings not just for paddy but also for vegetables, fruits, and rubber. Similarly, developing quality control for fertilizers and other agrochemicals (most of which are imported from Thailand) can promote optimal input use. Effective quality control of inputs is also a step toward adhering to domestic and international food safety standards.

Expand access to loans for machinery and seasonal input purchases. Extending Myanmar Agricultural Development Bank loans and encouraging private banks to lend to farmers cultivating non-paddy crops is essential to encourage farm income diversification. Current loans to rice farmers (150,000 Myanmar kyat per acre for up to 10 acres) are insufficient to cover the costs of recommended input use at current prices, and strict loan repayment schedules leave many farmers reliant on high-interest bridge loans from pawn shops or private lenders. A review of loan cycles and repayment schedules is an appropriate step toward catering loans to farmers' needs.

Strengthen agricultural extension services to ensure dynamism in the Mon State farm sector. For all crops farmed in Mon State, there is a need to disseminate improved varieties that are adapted to Mon climatic conditions and have been tested in the field. In the current changing agricultural landscape, establishing local agricultural research stations and demonstration farms that cater not only to the rice and rubber sectors but also to other crops such as fruits, vegetables, or pulses should be seen as a priority. In addition, delivering business training to farmers can help develop a dynamic and commercially viable agricultural sector.

Improve management of marine capture fisheries. These make a major contribution to the incomes of coastal households that are often landless, asset poor, and with few other livelihood alternatives. With increased fishing effort, the productivity of coastal fisheries and hence the capacity to support fisher livelihoods is under threat. The Myanmar Constitution supports the decentralization of authority over coastal fisheries to states and regions. This leaves scope for Mon State to establish fisheries governance and management mechanisms to sustain the coastal natural resource base, through co-management arrangements with local communities. Further, there is scope for raising incomes through improvements in small-scale processing, food safety, hygiene, and packaging.

Facilitate expansion of aquaculture, still nascent in Mon State. With higher prices for local farmed fish compared to that sourced from the delta, fish farming has the potential to generate high income streams and job opportunities. There exist several well-watered lowland areas suitable for fish farm development. Relaxing constraints on the conversion of paddy land into ponds may give rise to a thriving aquaculture sector.

Area 2. An Enabling Environment for Balanced Growth in the Farm and Nonfarm Sectors

Accelerated economic growth will require an economic and regulatory environment that fosters the development of profitable business activities. This entails a responsive local government able to channel investment in key infrastructure, promote strategic growth sectors, and provide efficient public services.

Improve the budgetary and fiscal process at regional and Union levels to enable locally driven public investment. Although the 2008 Constitution devolves a taxation and budgetary power to regional governments, the budgetary process at the Union of Myanmar level lacks channels for adequate regional participation and leads to inefficient resource allocation and coordination problems at the regional level. In addition, regional governments have not taken full advantage of this devolution framework to take on all responsibilities under their purview. The Mon State regional government may consider building the capacity of its ministries so they may effectively play the new role as provisioned by the Constitution.

Improve access and reliability of infrastructure to support economic activity, including in energy and transportation. Rapidly increasing traffic flows are putting a strain on major national and international road transportation arteries. In addition, many rural areas are not well connected to this network. Commercial links to international markets also need improvement: upgrading the port and the airport with storage, cargo-handling facilities, and adequate safety measures can yield dividends for Mon State's agricultural exporters and tourism industry. Currently, a little over half the rural population in Mon State has access to an electricity connection, and outages are frequent. Electricity supply may substantially

improve in 2017 with a World Bank–financed upgrade of a power plant in Thaton projected to supply 50% of Mon State’s electricity demand.

Expand the formal credit market to enable business growth. In rural Mon State, 60% of loans come from moneylenders or friends and family. Migrants primarily use informal *hundi* channels to transmit remittances. Encouraging formal banks to extend their reach to rural communities should be coupled with disseminating financial education to rural households.

Promote productive investment by the private sector, key to the creation of remunerative employment locally. The existing chambers of commerce and industry and trade associations can lead, with the regional government’s support, in organizing business fairs and networking events, as well as exploring joint ventures with businesses from other regions, states, or countries including Thailand. Registration and licensing requirements can be simplified to encourage business creation. Investments to improve water access would support the Mawlamyine Industrial Zone. With partnership from private firms, technical colleges could be strengthened to focus training on key vocational skills integrated with on-the-job training.

Strengthen regulatory frameworks for the construction sector to avoid jeopardizing the long-term sustainability of this rapidly growing sector. Clear and enforceable laws regarding construction permits as well as sound building codes and regulations are necessary to prevent unlawful land occupations, ensure building safety, and avoid legal disputes.

Exploit the potential for the development of tourism from a long coastline, a tropical climate, and a wealth of historical and religious monuments in relative proximity to Yangon and Bangkok. Currently only Golden Rock at Kyaikto generates significant tourism flows, and the majority of Mon’s potential as a tourist destination remains untapped. There is need to undertake a comprehensive evaluation of the potential for different types of tourism in the state and necessary investment for physical (for instance, a well-regulated airport) and institutional infrastructure (for instance, inspection of eateries).

Improved quality of and access to education and health services is a necessary condition for long-term economic growth. With only 61% of the rural population having access to a local medical facility where they live and only 37% to a secondary school, the existing medical and educational infrastructure needs physical upgrading as well as greater human resource allocation. Public provision of social security programs enabling the poor to access basic medical and educational services is warranted, as is encouraging private sector and donor investment in medical and educational facilities. Strengthening existing social safety nets and creating new ones are requirements to ensure that rural communities and economies are resilient to shocks.

In conclusion, while the Mon State rural economy faces substantial challenges, there is good reason for optimism if the Mon State and Union of Myanmar governments can work together with the private sector, including farmers, to develop a vibrant rural economy that raises rural incomes and improves the welfare of the rural population. Achieving this goal requires the design of a comprehensive rural development strategy for Mon State that adheres to the following principles:

- Inclusiveness: clearly understanding the strengths and weaknesses, and the respective role, of all stakeholders—government, the private sector, and civil society;
- Decentralization: practicing decentralized decision making, bottom-up planning, and co-learning; and
- Sustainability: balancing short-term gains with long-term growth.

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ACRONYMS

ADB	Asian Development Bank
CESD	Centre for Economic and Social Development
FAO	Food and Agriculture Organization of the United Nations
FERD	Foreign Economic Relations Department
K	Kyat Myanmar currency
LIFT	Livelihoods and Food Security Trust Fund
MADB	Myanmar Agricultural Development Bank
MOAI	Ministry of Agriculture and Irrigation
MOALI	Ministry of Agriculture, Livestock, and Irrigation
MRB	Malaysian Rubber Board
MSRHS	Mon State Rural Household Survey
MSY	Myanmar Standard Rubber
NGOs	nongovernmental organizations
RSS	ribbed smoked sheets - rubber
SIR	Standard Indonesia Rubber
STR	Standard Thai Rubber
TSR	technically specified rubber or block rubber
US\$	United States Dollar
USAID	United States Agency for International Development
Viss	unit of weight measurement (1 viss = 1.65 kg).

1. INTRODUCTION

The economy of Mon State is undergoing rapid change. Myanmar's economic and political reforms are redefining economic incentives for creating new opportunities. In addition, Mon State benefits from its proximity to Thailand's dynamic labor market, where migrants can seek higher earnings. The massive inflow of remittances, which now account for 20% of rural incomes, has helped transform the economy of Mon State by stimulating consumption and expanding the service sector, notably the construction sector, as remittances are used to build new houses or improve the existing housing stock. Economically, Mon compares well to the rest of Myanmar, with a poverty rate of 16% compared to 26% nationally in 2010 (IHLCA Project Technical Unit 2011).

At the same time, the state's agricultural sector has largely been stagnant. Declining revenues in rice and rubber production, the dominant crops in the state, are threatening the viability of the agricultural economy and imposing constraints on growth for the 73% of Mon residents who live in rural areas. Though some farmers are finding lucrative opportunities growing high-value crops such as fruits, vegetables, or pulses, the expansion of those activities is still limited.

The opportunities offered by migration to Thailand are both a blessing and a curse for the state. While remittances help boost consumption, heavy reliance on foreign incomes creates an external factor of vulnerability for the Mon economy. A recession or surge of political instability in Thailand could potentially cause a contraction that would ripple through the economy of Mon. In addition, the outflow of working-age Mon residents has created a shortage of labor, putting upward pressure on wages. Businesses struggle to hire workers as high wages squeeze profits. With no local labor available, farmers must resort to temporary workers from neighboring regions, but many cannot afford to pay wage laborers and resort to farming at lower levels of productivity.

Due to the perverse effects of labor shortages and vulnerabilities created by the dependence on foreign earned income, Mon State clearly needs to reduce the degree of its economic dependence on remittances by encouraging more endogenous growth. Modernizing and reinvigorating the state's agriculture and nonfarm enterprise sectors can serve to diversify the economy, and can create additional income streams for growth in other sectors. By generating local economic opportunities for non-migrants and returning migrants, Mon State could reduce its vulnerability to exogenous shocks in neighboring economies.

This report informs a strategy to achieve this goal by providing a diagnostic assessment of the current economic situation of Mon State. It is primarily based on the findings from fieldwork, case studies, and data analysis of the Mon State Rural Household Survey, a representative survey of 1,680 rural households conducted in May and June 2015. It also draws on desk research and a 2015 report on promoting agricultural growth in Myanmar (Tun, Kennedy, and Nischan 2015).

Section 2 presents an overview of the challenges and opportunities in the Mon State rural economy. Thereafter the report outlines a rural development strategy in two parts, corresponding to two areas: generating growth in rural economic activities (Section 3) and creating an enabling environment for balanced growth (Section 4). The conclusion provides a summary of the principles and opportunities for the creation of a more diverse and economically viable Mon State, in both the short and the long run.

2. CHALLENGES AND OPPORTUNITIES FOR THE MON STATE RURAL ECONOMY

The Mon State rural economy generates income from five main sources. Whereas the largest share of household income comes from agricultural production (24%), nonagricultural activities also contribute significantly to rural incomes. Among these, remittances represent the second-largest share of income (22%), followed by nonfarm business (18%), wage labor (14%), and fishing (11%).¹

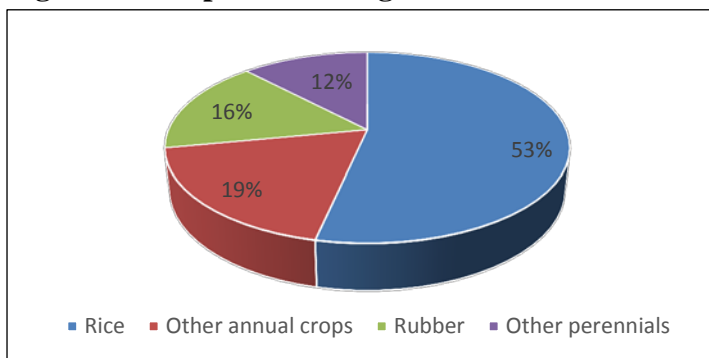
Within the agricultural sector, the two primary crops in Mon are rice and rubber. Rice represents just over half of the value of all agricultural incomes (valuing home consumption of crops at their market value), and rubber, 16%. Other annual crops (mainly vegetables and pulses) and other perennials (mainly fruit trees) account for 19% and 12% of the gross value of agricultural production, respectively (Figure 1). However, as discussed below, the rice and rubber sectors face challenges leading to low profitability, such that other high-value-added crops are increasingly appealing options for farmers.

2.1. Challenges for the Mon State Rural Economy

Because wages are much higher in Thailand (US\$8 to US\$12 per day) than in Myanmar (US\$3 to US\$5 per day), many Mon workers are crossing the border in search of better-paid opportunities. Half of all Mon rural households (49.5%) have at least one member currently abroad, and migrants total about 30% of the population aged 15 to 45. Remittances bolster local consumption and investment, and migrants often return with savings that they use to finance house construction. Migration incomes thus fuel significant economic growth in the state, particularly in the construction sector, as well as other services that contribute to the diversity of the rural nonfarm economy.

Most of the migrants are men and women of working age (45% of them are female), which leads to *labor scarcity* in the state (Figure 2). At times of peak labor demand, such as harvesting and planting, local wages are bid up, raising the cost of production. Mon farmers have been responding to this trend in different ways, such as switching to less labor-intensive practices, relying on machinery, changing the crops they grow, hiring labor from neighboring regions (primarily Bago Region), or sometimes by leaving the land fallow.

Figure 1. Composition of Agricultural Income

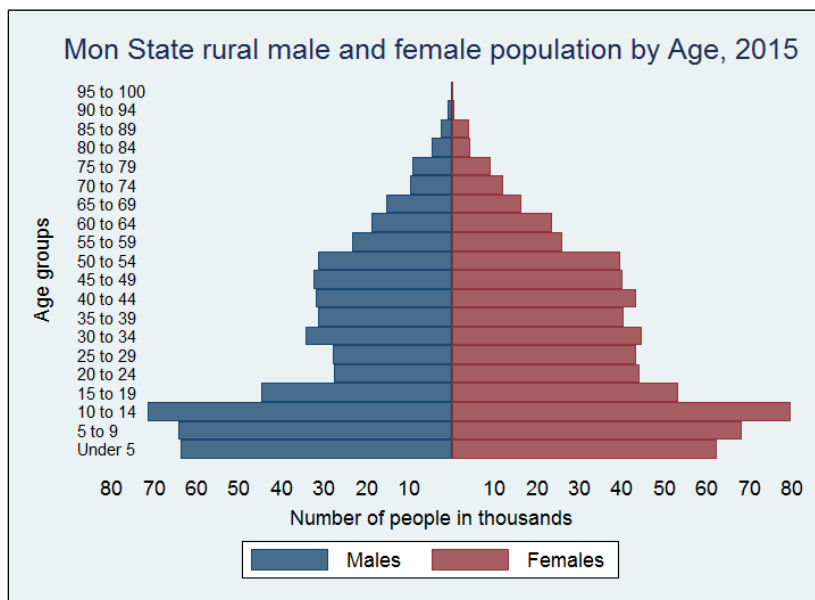


Source: MSRHS 2015 and authors' calculations.

Note: Net negative incomes were removed from the sample to create this pie chart.

¹ The remaining 11% is split between minor income categories including salaried labor, resource extraction activities, and credit.

Figure 2. Population Pyramid for Rural Mon State



Source: MSRHS 2015.

With profits falling, the agricultural basis of the Mon economy, upon which many livelihoods still depend, is critically strained. The policy options outlined throughout the present document acknowledge this overarching constraint.

In addition to the high costs of labor, the rice and rubber sectors are plagued by low productivity and low profitability. Yields are low partly because of underperforming varieties and insufficient input use. Processing technology is outdated, which leads to inferior products and further loss of value-added. In addition, current low prices for both rice and rubber exert downward pressure on farmer incomes.

Some other crops produced in Mon are faring significantly better. Farmers who have diversified into high-value-added crops such as pulses, fruits (pomelo, mangosteen, lime), and vegetables (radish, gourd) are reaping large benefits. However, among these crops, only pulses and betel nut have managed to overcome barriers to export. This suggests that there is still much potential for improvement in terms of quantity and quality.

At the same time, marine fisheries in Mon are being exploited with little oversight, which threatens the long-term sustainability of this activity. Although fishing remains a lucrative occupation, the need for sound fisheries management and regulation is urgent. The potential for alternative activities needs to be assessed: fish farming may hold promise in many areas of the state, but as of now it has seen only very limited development.

2.2. Donor Commitment in Mon State

Many donors have reengaged with Myanmar after a lapse of almost 25 years. Over the January 2015–April 2016 period, development agencies committed grants and loans totaling US\$4.65 billion for investment in Myanmar, of which US\$579.4 million is for Mon State. Almost 50% of the aid in Mon State currently comes from the assistance of the Japanese government (Table 1). The World Bank is the second biggest donor in the state, followed by the United States Agency for International Development. All investment projects supported by this international aid in principle involve close collaboration between the donors and the responsible government agencies.

Table 1. Aid Commitment, by Donor, January 2015–April 2016

Major Donor	Commitment (US\$ millions)
Japan	286.49
World Bank	140.00
United States Agency for International Development	60.00
Swiss Agency for Development and Cooperation	32.77
European Union	25.37
Global Affairs Canada	15.15
Others	19.66
Total	579.44

Source: Mohinga data portal. Data have been provided by the Foreign Economic Relations Department and the Development Partners Working Committee. <http://mohinga.info/en/>.

In the long run, strong growth in the state will require significant public investment to provide the necessary infrastructure-supporting economic activities. Current economic growth is straining the existing transportation, communications, and energy infrastructure, and upgrades will be necessary to support rapid growth in the medium term. One reason for optimism is the willingness of international donors to support investment efforts in the state, particularly toward public infrastructure. Three-quarters of total aid received by Mon State has been for the infrastructure and energy sectors (Table 2).

The three biggest projects currently under way are the East-West Economic Corridor Improvement Project (US\$156.3 million); the Myanmar Electric Power Project (US\$140 million); and Supporting Transition by Reducing Food Insecurity and Undernutrition among the Most Vulnerable (US\$136.6 million) (FERD-DPWC 2016). The economic corridor project, funded by the Japanese government, plans to replace three bridges (the Gyaing Kawkareik, Attaran, and Gyaing Zathabyin bridges) to promote greater trade with other countries in the Mekong region and direct investment in Myanmar. The World Bank–funded Myanmar Electric Power Project has committed to install a power plant at the existing Thaton station. The third-largest project in Mon State, the food security project of the World Food Programme, aims to improve the government’s capacity to respond to food crises in the face of recurrent natural disasters.

Currently, the international community has committed to five main agriculture and rural development projects in Mon State. The projects target select fishing and farming communities and hope to provide basic education, primary health, and basic water and sanitation to the poorest rural communities. They also support social cohesion, nongovernmental organizations (NGOs), and small and poor farmers in the rubber sector (FERD-DPWC 2016).

Table 2. Aid Commitment, by Sector, January 2015– April 2016

Sector	Commitment (US\$ millions)
Transport and storage	286.49
Energy generation and supply	140.00
Health, general	34.69
Developmental food aid/food security assistance	23.40
Secondary education	20.05
Government and civil society, general	13.61
Education, level unspecified	9.16
Conflict prevention and resolution, peace and security	8.28
Other multisector	7.40
Agriculture	5.87
Water and sanitation	5.21
Fishing	2.94
Emergency response	2.40
Basic health	2.11
Construction	1.91
Population policies/programs and reproductive health	1.51
General environmental protection	1.19
Disaster prevention and preparedness	0.16
Support to nongovernmental organizations	0.02

Source: FERD-DPWC 2016. <http://mohinga.info/en/>.

Note: This table includes the bigger projects that are currently in the implementing stage and that report to the FERD. Sum of sectorial breakdown may not be equal to the total aid committed by the donors.

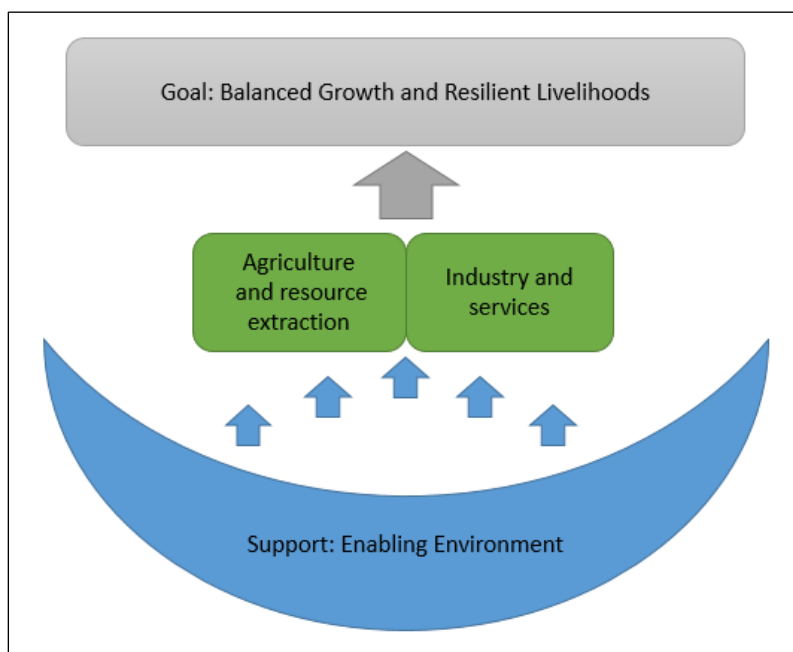
Although Mon State can seize the opportunity offered by increased donor engagement to make dramatic upgrades to its infrastructure and support rapid growth and development, the pattern of donor investment appears unbalanced. Donors may not be doing enough to invest in the productive sectors of the rural economy that this infrastructure is intended to support. It is imperative that the state define a cohesive development strategy to ensure a balanced growth path that meets the current challenges the rural sector faces.

2.3. Overview of the Rural Development Strategy

The remainder of the report provides context and analysis to identify policy and investment options to meet the challenges the state's rural economy faces by promoting vibrant agricultural, resource extraction, industrial and service activities (Figure 3). We organize those options around two focal areas working in synergy toward achieving the goal of balanced growth:

- Area 1: Generating growth opportunities in the agricultural and resource extraction sectors. This section draws mostly from data analysis of the Mon State Rural Household Survey that was reported in *Rural Livelihoods in Mon State* (CESD 2016).
- Area 2: Creating an enabling environment for balanced growth in both the farm and nonfarm sectors, including industry and services. This section draws primarily on desk research and the Tun, Kennedy, and Nischan (2015) report.

Figure 3. Toward a Rural Development Strategy in Mon State



Source: Authors.

For each focal area, we have outlined six specific goals toward achieving balanced growth in the Mon State rural economy (Table 3).

Table 3. Outline of Specific Goals under Each Focal Area

Focal Area	Goal
Area 1: Generating growth opportunities for dynamic agricultural and resource extraction activities	1.A Restore profitability in the rubber sector.
	1.B Promote the growth of high-value-added fruit and vegetable crops.
	1.C Revitalize or reorganize rice-growing areas.
	1.D Develop markets for high-quality inputs and facilitate input financing.
	1.E Build capacity for extension, training, and dissemination.
	1.F Ensure sustainability of marine capture activities and the development of aquaculture.
Area 2: Creating an enabling environment for balanced growth in the farm and nonfarm sectors	2.A Strengthen the local government.
	2.B Build transportation and communications infrastructure for rural growth.
	2.C Develop a dynamic financial sector to promote productive investment.
	2.D Promote the creation of private enterprise and harness growth in high-potential nonfarm sectors.
	2.E Provide social services to rural populations.
	2.F Expand social safety nets.

Source: Authors.

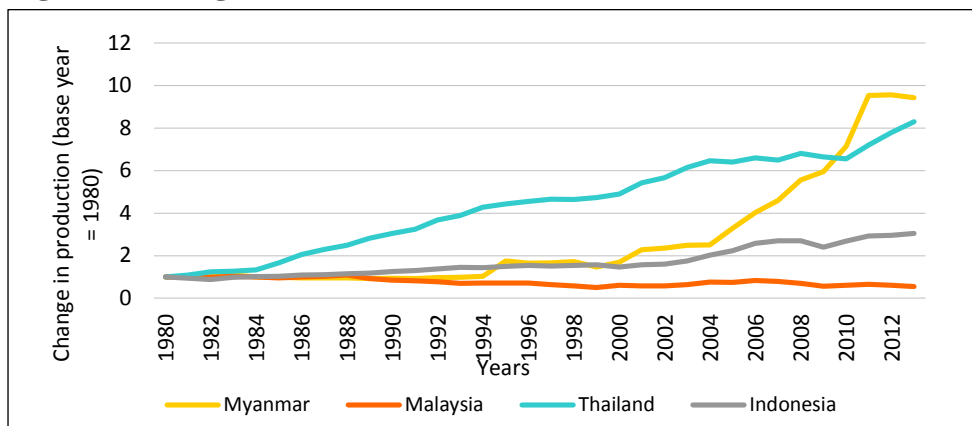
3. AREA 1. GENERATING GROWTH OPPORTUNITIES AND POLICY OPTIONS FOR DYNAMIC AGRICULTURAL AND RESOURCE EXTRACTION ACTIVITIES

This section outlines the challenges and opportunities facing the agricultural and resource sector in Mon State. A revitalized agricultural sector in Mon requires a dynamic private sector upstream that can deliver quality seeds, fertilizers, and other inputs to farmers at competitive prices. At midstream, improved farm technologies complemented by public extension can spur production and lower farming costs, improving farmers’ margins. Downstream, a network of traders and processors are needed to add value to farm outputs and to link farmers to national and international consumer markets. This value-chain approach provides a framework with which to read this report. We start by outlining the specific problems encountered and their potential solutions for the rubber sector, for fruits and vegetables, and finally for rice-growing regions. We then delineate overall needs for improved input provision and extension common to most of those sectors. Finally, we address the issues of the fishing and aquaculture industries.

3.1. Goal 1.A. Restore Profitability in the Rubber Sector

During the last 15 years, Myanmar’s rubber industry has grown exponentially, following the experience of its neighbor, Thailand (Figure 4). The former Ministry of Agriculture and Irrigation (MOAI) estimated that planted acreage in Mon increased from 132,000 acres in 1997/1998 to 504,000 acres in 2010/2011.² However, Myanmar yields saw very little improvement since 1980 and are now less than 40% of those achieved in Thailand (FAO 2016). Given the small absolute size of its rubber industry, Myanmar currently cannot compete for a significant international market share. However, rising rubber prices in the late 2000s led to a significant expansion of land under rubber production. Survey data indicate that fewer than half of plantation owners have mature trees, implying that smallholder production will likely double in the next few years. With movement away from rubber production in Malaysia and Singapore, limited scope for rubber expansion in Indonesia and Vietnam, and increasing global rubber demand, there is room for Myanmar to become a more significant rubber producer on the world market.

Figure 4. Changes in Rubber (Natural) Production in Southeast Asia, 1980–2014



Source: FAO 2016.

² The current Ministry of Agriculture, Livestock and Irrigation (MOALI) was formed following the change in government of 2016.

Myanmar's transition to a market economy has allowed for the establishment of rubber-processing companies, which have in turn invested in the sector. Mon State is the center of rubber growing and processing in Myanmar. There are nine large processors in Mon, two of which have started joint ventures with foreign companies. The processors are already exporting rubber to China, Malaysia, Japan, Korea, and the European Union.

Despite those strengths, Myanmar's rubber sector must overcome many weaknesses to become a large rubber exporter. The productivity and the quality of rubber are low as a result of poor farming, tapping, and processing methods. The costs of rubber production are too high and the profits too low for Mon smallholders to justify investing in producing a high-quality product. Institutional support for rubber production is wanting, meaning that advances in tapping and processing techniques on the farm have been slow.

Further, Myanmar has neither a rubber standard nor a certification process for rubber processors considered reliable on the international market, which means that rubber produced in Myanmar automatically receives a discounted price versus the Thai or Malaysian product. The marketing system has been passive for many years, especially for higher-grade rubber; Mon has struggled to find rubber buyers overseas.

Lastly, an integrated rubber sector strategy is missing. The government agencies responsible for the development of the sector are not coordinated, and the former MOAI's specialized unit for industrial crops was disbanded. Consequently, despite the Ministry of Commerce's recognition in its export strategy of the importance of developing the rubber sector, an implementation plan has not been developed at the Union or State level.

The current low prices for rubber create an additional challenge for the sector. The strategy should therefore focus on supporting the sector through a period of low profitability until the global market environment improves.

3.1.1. Boost Yields and Raise Farmer Incomes

Encourage Fertilizer Use: Mon rubber farmers could increase the quantity of latex produced per tree, and therefore their profits, by applying fertilizer. Mon rubber producers are largely familiar with recommended rubber fertilizer types and application amounts. Despite this, smallholder rubber producers rarely apply the recommended fertilizer amount. In fact, fertilizer is often the first input dropped by cash-constrained smallholders since rubber trees will produce some quantity of latex with or without fertilizer.

Under the current low profitability margins, smallholders are not likely to increase their fertilizer use without encouragement from the government or private sector. Money for inputs could come from a targeted loan program that ties reimbursement to multiple production seasons (impact of fertilizer use will be limited in the first production cycle but will continue to increase as fertilizer is applied regularly). Smallholders could also rely on loans or subsidies from township rubber associations that fund inputs from shareholder money (this model already exists in Mon and could be further encouraged through government support).

Finally, the private sector could encourage fertilizer use, through supplying producers with inputs as a way to guarantee access to quality raw material.

Promote Replanting: In recent years, as a result of low rubber prices, farmers lack incentives to replant their old or underperforming rubber trees. However, as rubber seedling prices are currently low (250 to 350 Myanmar kyat [K] on average), it would be a perfect time for

Box 1. Rubber Research and Development Boosts Thai Rubber Industry

In 1960, Thailand's government established the Rubber Replanting Aid Fund. From 1977 to 1986, with loans from international donors such as the World Bank and the Commonwealth Development Corporation, the Thai government, along with supporting partners such as the Food and Agriculture Organization of the United Nations (FAO), began replanting more than 500,000 hectares with high-yielding clones. Along with replanting, the government focused its energies on continuous research into higher-yielding seeds and low-cost technologies.

Collaboration with international organizations such as the FAO and the United Nations Development Programme played a crucial role. Those organizations provided high-quality training, technical support, and equipment. In addition, they opened and supported a research center and were involved in direct programs implementation ensuring that high-quality rubber varieties were promoted and that the rubber Thailand produced met international standards of quality (FAO 2011). Today, Thailand is one of the largest rubber producers.

producers to replant. Encouraging continued replanting will help guarantee sufficient quantity for export. The government could play a role by setting up an investment fund for replanting. The government could seek the support of a development bank or of other development financial institutions actively looking to invest in Myanmar for replanting. In addition, these efforts need to be linked to the replanting of high-performing varieties, to ensure increased future revenues. In Thailand, the World Bank has funded a project through the Office of the Rubber Replanting Aid Fund to revitalize the rubber sector, including broad support to replanting (Box 1). It may be possible for Myanmar to receive similar support and build the capacity of the key rubber governance and extension institutions.

Promote Diversification through Intercropping or Animal Husbandry: An alternative way farmers can increase incomes from their rubber plantations is to generate other streams of income while their rubber trees are maturing. After replanting or planting rubber, farmers face an income gap for a six-year period when the immature trees cannot be tapped for latex. One way to lessen this burden is to plant other crops in between the rubber trees. Intercropped plants should be adapted to similar conditions as rubber: they must not require irrigation and should not be labor intensive due to labor costs and shortages. Crops such as banana, corn, or pineapple can work well. Another solution to reducing the income gap facing smallholder rubber producers is livestock husbandry (after seedlings are large enough). Raising goats, which eat the weeds surrounding the rubber trees but do not touch the rubber, may help supplement rubber farmers' or rubber tappers' income. The use of dual-purpose breeds of goat could also improve nutrition for rubber tapper families through access to milk.

Farmers are often unaware of these options, seldom know which crops would thrive in rubber production areas, and are scared of the effect that other plants would have on their rubber trees. The government can promote such practices with training on a demonstration farm, information campaigns, and targeted loan programs.

3.1.2. Raise Quality through Improved Rubber Processing

Myanmar currently produces two types of rubber: technically specified rubber (TSR, or *block rubber*) and ribbed smoked sheets (RSS).³ Currently Mon State produces both at quality levels that are low by international standards. The two segments have different processing procedures, and thus, promoting quality improvements in one or the other requires different

³ Worldwide, natural rubber can also be sold as latex concentrate.

approaches. Improving the quality of RSS rubber presents a greater challenge, such that TSR quality improvements may be the more feasible option in the medium run.

Improve Quality and Reliability of the TSR Segment: The processing of TSR rubber involves the following steps. Farmers collect the latex from their rubber trees and mix it with acid to coagulate it in square flat bins. The coagulum is then *sheeted*, usually on the farm, meaning that it is passed through a press several times to thin it out and extract the water. TSR rubber requires less pressing than RSS. It is thicker and less dry at this stage. The farmer then dries the sheets (often in the sun), and sells them to traders for smoking. These thicker sheets are usually sold to a processor, who will chop them up and reprocess them into large blocks of crumb rubber.

Within the TSR segment, there exists a premium grade, but realistically Mon State rubber could not quickly achieve that quality on a large scale. Instead, the goal should be to increase the quality of TSR grade 2 rubber, or what is known in Malaysia, Thailand, and Indonesia as SMR20, STR20, or SIR20, respectively. Quality improvements such as decreasing contamination and standardizing sheet weight and size will help Myanmar develop a better rubber brand and secure higher prices on the world market. For that to occur, Myanmar will have to develop a strategy that encourages producers to decrease contamination. That could be done through on-site farmer training, encouraging processors to pay a premium for uncontaminated sheets, or adopting an industry-developed price standards system that is not purely weight based but values sheet thinness and quality.

Assess Viability of High-Quality Ribbed Smoked Sheet Production: The production of RSS rubber starts the same way as TSR. Latex is coagulated and sheeted, the difference being that the sheets are made thinner, and they need to be free of contaminants before they are smoked and packed for sale. Higher-quality sheets (grade 1) can be sold at a premium, but at this point very few can achieve this quality in Mon. Average-quality sheets (grade 3) are packaged into bundles and sold as a low-end RSS product. Many sheets do not meet this requirement: they are downgraded and sent out for reprocessing into crumb rubber.

Although neighboring Thailand produces high-quality rubber sheets (RSS grade 1), reaching this quality would require significant investments that are beyond the means of most individual farmers, including quality sheeting equipment and formic acid. If Mon were to pursue this strategy, it would require significant coordination to prevent contamination. Rubber associations at the township level can provide the necessary coordination to start this upgrade—though the financial feasibility is yet to be confirmed (Box 2).

Box 2. Paung Township Rubber Association

The Paung Rubber Association is trying to develop the high-quality segment with a shared processing plant. The Paung association was started in 2011 and set up its processing space in 2014. Shareholders invest in the association and in turn make profits from rubber processing and lending (currently not returning a dividend to shareholders). Membership allows access to all of the services. There are currently 41 shareholders and 1,300 members. The association provides credit, extension, subsidized seedlings, rubber processing, and a social fund.

The association has a processing center. It buys liquid latex from farmers at the grade 3 price and processes it into grade 1 rubber, hoping to profit from the quality premium. It has the capacity to process up to 3,000 pounds per day but currently processes only 1,500 pounds. At present it has only two buyers, and it is struggling to find a market to sell its grade 1 rubber.

The World Bank has conducted similar capacity-building projects in Thailand, focused on upgrading of the Rubber Research Institute of Thailand's research centers. The local government should assess the feasibility of a similar initiative for Mon State.

Decrease Contamination throughout the Processing Chain: Processed rubber is of relatively poor quality in Myanmar. This starts at the farm and continues through the processing level, and it plagues both the RSS and the TSR processing. After rubber is tapped it is mixed in containers, often contaminated with leaf or dirt debris. Acid is then mixed with water for rubber sheet making. This mixture is often excessively diluted to save on acid cost. Further, sulfuric acid is used instead of formic or other better substitutes because it is less expensive, but that results in an inferior coagulating material with impurities. After the rubber is sheeted, it is dried in the sand or dirt, further absorbing debris.

Traders will sometimes further contaminate the rubber by mixing in used rubber from other sources. Such contaminated rubber can only end up as low-grade crumb rubber. Further potential for contamination exists in the processing stage, as processors are not held to any defined standards in Myanmar and may use inferior technology. As a result, the crumb blocks originating from Mon State receive a discounted price on the world market.

3.1.3. Modernize Output Supply Chains for Rubber

To become a major exporter of rubber, Myanmar will have to make important changes in its infrastructure and regulatory environment. Those changes include encouraging foreign investment, rubber-grading mechanisms, and rubber sector governance.

Benefit from International Expertise: Under the new foreign investment laws, rubber-processing companies have been able to initiate joint ventures with foreign processors, allowing them access to international rubber experts who are beginning to upgrade Myanmar's rubber-processing technology. The partnership between the Myanmar company Ayeyar Hinthar Holdings and Thailand's Sri Trang is already operating an upgraded processing plant in the town of Mudon. Another joint venture between Fuxing Brothers (Myanmar) and Southland (Thailand) is currently in progress. The government should facilitate this type of joint venture and encourage foreign investment in the rubber-processing sector, as it can accelerate the technological upgrade that is necessary for Myanmar to develop its rubber industry.

Improving Rubber-grading Mechanisms: Myanmar needs to develop a rubber-grading system, as well as a standard payment structure for graded rubber, to improve the cleanliness and consistency of its rubber. Most rubber-exporting countries have issued standards concerning technical specifications for block rubber. Those standards have become recognizable brands on the world market. TSR in Thailand is known as STR (Standard Thai Rubber), in Indonesia as SIR (Standard Indonesia Rubber), and in Malaysia as Standard Malaysia Rubber. These labels comprise different grades—STR10 and STR20, for example. Each grade is tested for dirt, ash, volatile matter, and nitrogen content as well as plasticity and color. Although some factories use the label of Myanmar Standard Rubber (MSR) 10 and 20, the quality of MSR10 or MSR20 varies significantly within the grade, and remains inferior to the qualities of TSR10, TSR20, and equivalents. Therefore Myanmar receives a discounted price for rubber that is presented as the same grade.

Myanmar must brand the MSR grading system and ensure quality control for this label. To do that, Myanmar needs an appropriate pricing system for MSR rubber. The price needs to reflect not just wet weight but also sheet thickness and visual qualities. Grading facilities must be introduced to assign grades before rubber is sold to processors. Quality control needs to be in place post-processing to guarantee the quality of rubber marketed as MSR10 or MSR20. Only by adopting strict grading, marketing, and payment standards across the rubber value chain will the government be able to improve prices to producers and develop the rubber sector.

Improve Rubber Sector Governance: If Myanmar does not improve rubber sector governance, then many other reforms, such as introducing a grading system and allowing for joint ventures, will be fruitless. At present rubber processors do not have to be certified to export rubber. This means that even if processors are trying to use the MSR label, the quality cannot be assured, since processors cannot be held accountable. Myanmar should set up a rubber-specific governance body, similar to the Malaysian Rubber Board (Box 3) or the Thai Rubber Association. The body should focus not only on the manufacture and marketing of rubber and rubber products but also on rubber production from cultivation to extraction. In this way the rubber sector could benefit from a coherent sector strategy and standard policies. Through such a body, rubber processors could become certified. If creating a rubber-specific body is not desired, then Myanmar needs to set up a governing body for the sector under the Ministry of Industry to ensure that processors are certified and producing a quality product. Mon State could initiate such a body at the state level, if the Union government is not in a position to act quickly.

3.2. Goal 1.B: Promote Growth of High-Value-Added Fruit and Vegetable Crops

Income growth will continue to lead to increased demand for fruits and vegetables both in Mon State and in Myanmar in general. Increased health consciousness and the development of the restaurant and hotel sector, partially linked to the rise in tourism, have also raised demand for such crops. Farmers reported that they never struggled to sell their output, but instead often struggled to meet demand. Across Mon, vegetable and fruit sellers have to supplement their stocks by selling products from other regions of Myanmar (mainly Mandalay and Shan) as well as Thailand and China to meet demand. Fruit and vegetable crops can be extremely high yielding in Mon. With the appropriate policy changes and infrastructure improvements, the sector could flourish and become a stable and significant source of income for Mon citizens.

Box 3. Rubber Certification in Malaysia

Malaysia provides quality assurance through product certification, whereby a third party provides an independent assurance that the rubber meets national and international standard specifications. This product certification system operates under the auspices of the Malaysian Rubber Board (MRB), an agency under the Ministry of Plantation Industries and Commodities. The MRB is funded by a combination of a tax on rubber exported from Malaysia and contributions by the Malaysian government. The system grants permits to rubber product manufacturers to use the MRB product certification mark, in addition to a certificate of conformity, for their products that conform to standards or specification. Continued conformance is ensured through regular surveillance auditing of the products and their suppliers.

3.2.1. Invest in Modern Irrigation Infrastructure and Encourage Sustainable Water Use

Water is essential for fruit and vegetable production, and irrigation is currently the most important limiting factor to the further development of these sectors. At present, fruit and vegetable farmers employ flood irrigation techniques. Unlike irrigated rice, most of the Mon State fruit and vegetable production depends on small-scale irrigation. Farmers use diesel motor pumps (generator pumps are preferred if the farm is connected to the electricity grid) to draw water from their personal well or from a river. Such technologies are often inefficient and expensive. Investing in modern irrigation infrastructure would ensure yield and quality improvements for produce in Mon.

Orchard farmers tend to use a water pump, flooding one line of trees on their farm and then shifting the water line. This irrigation technique is highly costly, both because it requires a laborer to operate the pump and because the pump requires diesel or electricity to run. In addition to increasing water supply costs, this method also raises weeding costs since water cannot be applied directly to the roots.

Modernizing irrigation infrastructure, if tailored to soil and climate conditions, will increase fruit and vegetable yields, lower labor costs, prevent fertilizer losses (nutrient solution can be applied directly to the roots through the system), limit salt concentration (key for coastal Mon), and control the spread of weeds. Further, off-season production is possible only if improved irrigation techniques are employed, as water needs to be both delayed and increased throughout the season to force early or late production.

Micro-irrigation systems, such as trickle or micro-sprays or mini-sprinklers, should be adopted. Solar-powered water pumps can be affixed to drip irrigation systems to limit the cost of energy. For these systems to be cost effective (prevent blockages, ensure constant moisture, prevent low-oxygen content), the irrigation techniques should be tested on a demonstration farm to determine how soil, wind, evaporation, and other climate conditions affect the different systems. Mon farmers want to modernize their irrigation techniques but are constrained by budget, borrowing limitations, and lack of knowledge. Modernizing irrigation infrastructure therefore necessitates not only testing to determine the most suitable micro-irrigation system but also training farmers on how to adopt the system, and removing their budget constraints through targeted lending programs.

3.2.2. Stimulate Yields and Ensure Harvest of Reliable Quantity and Quality

Promote Sustainable and Reliable Pest-Control Management: Even before modernizing irrigation, Mon State can make important productivity gains by helping farmers combat the pests and diseases that reduce their harvests. Pomelo farmers in Kyaikto detailed that in the main production season they lose as much as 50% of their produce to fruit flies that consume their fruits once they ripen. Vegetable farmers in Paung described their dilemma of losing their entire radish crop every other year from disease.

Most farmers in Mon use no pesticides as they do not know what type to use. Cash-constrained farmers cannot experiment with pest management techniques given the high pesticide prices and labor costs. Government experts should enlist the help of large-scale farmers who have developed sustainable pest management techniques to train farmers to combat pests. Therefore, training and information dissemination (distribution of informational pamphlets to town halls or radio and television broadcasting) are key to reducing pre-harvest loss. Modernizing agriculture production or improving yields by increasing fertilizer use will be futile if farmers continue to lack recourse to fight pests.

Encourage Diversification and Intercropping: As most orchard plants take at least five years to mature and begin to produce fruit, orchard farmers need to diversify their income, either through intercropping, conserving land for other crops, or both. While diversification is common, intercropping, especially of fruits and vegetables, is rare. In Mon, the intercropping of young orchards with other orchard crops, such as banana, or annual crops, such as pineapple or vegetables, would be lucrative. As trees mature only plants that do not require full sun (radish or leafy greens) should be planted. Unawareness of effective cropping patterns or appropriate crop pairing prevents farmers from intercropping. Extension training should be implemented to educate producers on options to intercrop.

Diversification of vegetable crops is also recommended, in order to preserve soil nutrients and prevent crop loss from pests. Further, diversification allows farmers to spread income and risk. At the same time, however, achieving scale in vegetable production will help small-scale farmers secure higher prices from wholesalers for their crops, and therefore farmers will need to strike a balance between the two schemes (for example, instead of planting eight crops on one acre, plant two and rotate by season).

The key barrier to diversifying for both fruit and vegetable producers is lack of knowledge of *new* crop production. Budget constraints and lack of training prevent farmers from experimenting with crops they have not planted before. Therefore, diversification of crops can be encouraged through extension services targeted at training producers on how to plant crops they are unfamiliar with.

Encourage Fertilizer Use: Increased use of fertilizer would improve fruit and vegetable yields significantly in Mon State. The amount of fertilizer applied by farmers in both sectors is well below standard application recommendations. One issue is the cost of fertilizer itself and the labor for applying it, which is a common issue for farmers of all crops.

However, an issue particular to fruit and vegetable farming is the unawareness of crop nutrient needs. Many farmers in Mon choose to forgo fertilizer because they do not know their farm's soil composition or the crop's nutrient requirements. Vegetable and fruit farmers interviewed in focus groups were unaware of the type, timing, and quantities of fertilizer needed for their crops. This suggests that information dissemination could boost productivity. The government can draw on either local expertise (large-scale farmers have experimented with optimal fertilizer use and amounts), desk research for comparable climates, or direct testing. Regardless of the method used—pamphlet dissemination, trainings, or television and radio programming—it is essential that farmers understand the nutrient requirements of their crops. Additionally, soil testers or services should be accessible to enable farmers to determine more specifically the fertilizer type suited to their farm. Lending programs could also be expanded to encourage fertilizer use.

Improve Access to and Quality of Financial Services: Orchard and vegetable farmers rarely take out loans to expand or intensify their production. Tying a loan to one season of income is risky for producers, since weather conditions and pests could lower yields and make repayment difficult. Microfinance loans are generally too small to be desirable to farmers, and the Myanmar Agricultural Development Bank (MADB) does not make loans for orchard or vegetable production. Targeted loan tools should be developed for orchard and vegetable farmers, and the loans need to be made repayable over multiple seasons and have different repayment schemes depending on loan use. They could include loans for the development of irrigation (digging new wells or installing modern drip systems), loans for production inputs or machinery, and loans for land purchases and expansion.

Promote Mechanization: Farmers can reduce labor costs, which are a key hindrance to increasing production and improving quality, by adopting mechanized methods of planting, weeding, and pesticide control. In horticulture, excavators can be used to dig planting holes. Further, small tractors can be used for weeding instead of weed whackers, the principal tool used in Mon at present. Additionally, the use of automatic sprayers can replace handheld sprayers or by-hand pesticide application techniques.

The high costs of purchasing machines can prevent farmers from mechanizing. Targeted lending can help farmers or farmer groups purchase a machine. Further, few companies lend machinery in Mon State. The encouragement of farm machine rental businesses can help farmers incorporate machines into production at limited cost, a trend seen in some other areas of Myanmar where mechanization is rapidly progressing.

3.2.3. Modernize Output Markets and Supply Chains

Invest in Supply Chain Infrastructure: The earning potential of farmers depends in part on the marketing channels available to them to sell their produce. Orchard and vegetable farmers in Mon have four principal marketing channels. The first channel is local retail markets, where farmers use established connections with retailers to sell their crops. If output is slightly greater, farmers can carry their crops to wholesale markets in Mawlamyine or Yangon, or to wholesalers in their towns (who will sell crops to Mawlamyine or Yangon). If output is even larger, wholesalers will travel to the farm to purchase the produce. Finally, producers set up roadside shops where they sell their own fruits, usually staffed by family members. This is a popular marketing channel for producers who farm in Kyaikto since hundreds of Golden Rock tourists pass through daily. Moving from the first marketing channel to the last generally results in an increase in price-setting power by the farmer.

Wholesalers and retailers set prices based on supply and demand for each product. During peak production seasons when produce saturates the markets, prices drop. In the off-season, when output is limited, sellers increase prices and import vegetables and fruit from other areas of Myanmar, China, or Thailand. Prices are also determined based on how long the fruit or vegetable keeps without cold storage. The longer the fruit or vegetable stays without rotting, the higher the price retailers are willing to pay. Finally, prices differ depending on the qualities of the fruit or vegetable (appearance, disease, freshness).

Investing in supply chain infrastructure will improve prices paid to farmers. Reducing transportation costs through better transport and logistic infrastructure will lead to increases in producer income, not only through a reduction in costs, but also from improved quality due to decreases in transport-related postharvest loss. The expansion of electricity and the Internet along all segments of the fruit and vegetable value chains will also improve prices for producers, through increased bargaining power and the development of cold storage.

Ensure Quality and Safety: Myanmar should introduce fruit and vegetable product standards. After such standards are adopted, quality control measures should be put in place, such as quality grading and reliable conformity assessment testing. With such measures in place, producers will have an incentive to produce higher-quality produce, as they will receive a premium markup for their improved-quality product.

Additionally, the upgrading of food safety standards is necessary to protect Myanmar consumers. The government can take basic steps toward ensuring food safety by, for example, making sure producers are trained in pesticide use. At the market level, simple

changes, such as the use of packaging, use of covers, or reorganization of market stalls can help prevent the spread of food-borne diseases. The development and implementation of sanitary and phytosanitary certifications would also ensure that producers maintain food safety standards and are able to export their produce.

Develop Processed Product Markets and Transformation Industries: To prevent spoilage and waste, and to ensure that farmers have a market for all of their fruits and vegetables, processed product markets should be developed. There is potential for the development of processing factories for juice, as well as for dried, canned, candied, or pickled fruits and vegetables. A processed product market can develop only if there is adequate infrastructure and a conducive business environment. Investing in supply chain infrastructure as well as ensuring food quality and safety will enable processed product markets to develop.

Facilitate Exports: While Mon State vegetables are rarely consumed outside of the state, a large quantity of fruit is supplied to the Yangon market and beyond. Crops such as lime, betel nut, pomelo, mangosteen, jackfruit, and rambutan are traded to wholesalers in Yangon. Fresh betel nut is traded for export to India. Excellent climate and soil conditions make orchard production extremely lucrative as well as create tremendous potential for the development of an orchard export sector. Mon fruits can be high yielding, and some varieties have favorable qualities such as flavor and life span, making them suitable export crops. If producers can increase quantity and consistency of production, the export sector could thrive (Box 4). At the same time, an adequate export infrastructure must be in place to develop the capacity of the sector. Since fruit spoils quickly compared with other exports, a fruit cold chain will be necessary. Moreover, fresh fruit standards and grading centers should be established to enable producers to export their crops at higher prices. Further, the development and implementation of sanitary and phytosanitary certification is necessary for participation in various export markets. Finally, exports need a ready outlet to the rest of the world. That calls for the development of the Mawlamyine airport, seaports, and cold storage capacity (for example, at Mudon and Dawei).

Box 4. Contract Farming Leads to Better Branding and GAP Standards: Pomelo Profits Soar in Vietnam

In the early 2000s, Hoang Gia Company opened a pomelo juice factory in Vinh Long province, Vietnam. To ensure the purchase of consistently good-quality pomelos, the company used a contract farming system. Farmers received training on good agricultural practices, or GAP, as soon as they signed a contract with Hoang Gia. The company also provided credit and training to farmers and bought their produce at a price above the going market price. In return, farmers agreed to use organic fertilizer and specific pesticides to maintain the quality of their produce (Phong 2011). While the company suffered losses in the beginning, it introduced the region to better farming practices, quality control, product consistency, and a potential to reach international markets, which in the end enabled them to become highly profitable. Hoang Gia created a brand for Vinh Long's pomelos, Nam-Roi, which began to be recognized as high-quality pomelos on the international markets.

After the establishment of Hoang Gia Company, value-chain formalization and contract farming gained momentum in Vinh Long province as retailers began to directly connect with the farmers. Farmers' cooperatives also began to flourish in the province, and donors and the state of Vinh Long invested in increasing productivity and developing the branded fruit, and provided training for quality standards (Kien Trung 2013) (Canthostnews 2013).

Since the early 2000s, Vietnam's pomelo export quantity has increased consistently, and pomelos from Vietnam receive a price premium. Vietnam has established a small but renowned presence in the market, especially with its Nam-Roi brand.

3.3. Goal 1.C: Revitalize or Reorganize Rice-Growing Areas

Although rice is one of the main crops of Mon State, in terms of productivity and efficiency the sector has fallen behind neighboring countries, as well as other areas of Myanmar. The vast majority of paddy land in Mon State is not irrigated and at this point can support only one growing season. Lack of water control (floods in the monsoon season) prevents farmers from using the high-yield, early-maturing, improved varieties grown in other areas of Myanmar. Fertilizer use averages 37 kg (kilograms) per acre, well below the recommended 100 kg per acre, and fewer than 10% of rice producers use pesticide or herbicide. Although land preparation has largely become mechanized thanks to the spread of power tillers, planting and harvesting remain non-mechanized. In the lowland areas, snail infestations have regularly blighted harvests for the past five years, affecting approximately 20% of farmers in Mon State. Near the coast, salinization remains a threat in many zones.

The average yield in Mon State, at 1,200 kg per acre, is lower than the national and regional averages of 1,500 kg per acre.⁴ Between such low yields and the rising cost of labor, rice farming is currently not a lucrative option for many farmers. Some have reverted to broadcasting seed (rather than transplanting seedlings grown in seed beds) to reduce labor costs, even though this planting method tends to reduce yields. Many use their harvest only for household consumption, and count on migration and remittances for cash income. While the rice sector in Mon is in difficulty, low yields also mean that current production is far below its full potential, and that there may be gains from modernizing the sector.

Some of the state's rice-growing areas are faring better than others. Almost invariably, those are the areas that grow a second-season crop (rice or other). Dry-season paddy is more productive than monsoon season, with farmers reaching yields of up to 1,800 kg per acre. The solution to bolstering rice-growing areas is therefore likely to involve two different approaches depending on water availability. In areas that can potentially support the development of irrigation at a limited cost, farmers will likely be able to farm their land profitably (growing rice or other annual crops in the dry season). In areas unsuitable for irrigation, on the other hand, the long-term viability of smallholder activities is compromised unless rainy-season yields can be boosted significantly.

3.3.1. Assess Potential for the Development of Irrigation and Second-Season Farming

A large part of Mon paddy land does not retain enough water during the dry season to grow any crop without irrigation. However, no more than 5% of Mon's 700,000 acres of paddy land is currently irrigated.⁵ Developing irrigated areas can be a key strategy to increase incomes for rice farmers, whether for high-yield rice farming or other annual crops such as vegetables or pulses. Currently three types of irrigation solutions exist in Mon State: dam irrigation, river pumping, and groundwater pumping. Six dams in Mon State, managed by the Irrigation Department, collectively irrigate almost 20,000 acres of land. In those areas, farmers can grow a second crop of paddy, substantially more productive than monsoon rice. Others grow vegetables or pulses in the summer season—also lucrative activities. Although this seems a highly effective solution, all dams are currently functioning at capacity and there is little scope for building additional dams. It is not likely that dam irrigation can significantly increase irrigated area in Mon State in the foreseeable future. At present, river pumping may hold more promise.

⁴ 2.96 metric tons per hectare in Mon (survey data), 3.84 metric tons per hectare nationally (MOAI 2015a).

⁵ This figure is a rough estimate based on interviews with the Irrigation Department and the Water Resources Utilization Department. It assumes that private groundwater pumping on paddy land is limited.

Box 5. Irrigation and Double-Season Rice in Yin Nyeing

The Kadaik Dam in Paung township is linked to a network of irrigation canals and a sluice. It provides irrigation to 10,000 acres of land near the village of Yin Nyeing. The catchment area fills up during the rainy months, providing water starting in December until the end of the dry season. The coordinated action between the dam upstream and sluice downstream allows precise control over water levels inside the canals, while preventing salt water intrusion. Villagers meet once a week to decide on the necessary water levels. Most farmers in the area use the water to grow summer rice in addition to their regular crop of monsoon rice, although some also plant vegetables or pulses. All of those are lucrative cropping options that demonstrate the potential economic benefits of developing irrigation in Mon.

A large project was initiated, which if completed would irrigate 33,000 acres of land, allowing farmers to grow rice or other crops in the hot season, including high-value-added pulses or vegetables. However, progress on the project has currently been halted due to lack of budget. The third option for irrigation involves groundwater pumping from tube wells. This strategy is usually used for vegetable crops, which are less water intensive but can be a lucrative dry-season option.

Knowing where irrigation can be expanded, what water source can be used, and how much water can be used is essential to promoting second-season cultivation of rice, pulses, or vegetables. The private sector or a development partner could help the Ministry of Agriculture, Livestock, and Irrigation (MOALI) complete such a study. After that is understood, the MOALI can determine which areas should be targeted for river pumping or groundwater pumping projects.

3.3.2. Improve Yields and Profitability in Non-irrigated Monsoon Rice

Evaluate the Long-Term Prospects of Monsoon Rice in Different Areas of the State: The low productivity of monsoon-season rice, particularly in areas without irrigation potential, limits profitability. In the short run, the provision of extension and financial services can bolster yields through better input use and pest control. In the medium run, investment in water management infrastructure to prevent against salinization and flooding would be necessary to keep coastal areas productive. However, large-scale infrastructure investments are unlikely to be economically viable where conditions allow for just a single production season.

Ultimately, markets will determine whether areas that cannot be irrigated can still support a viable smallholder rice sector or whether consolidation is necessary to keep production profitable. In the meantime, the following recommendations could help support yields in those areas.

Build Drainage And Embankments To Minimize Risks: Many coastal areas of Mon are still subject to the risk of floods and salinization. Both of those risks call for updated infrastructure—the former with drainage canals, the latter in the form of embankments. Such projects are currently under the purview of the Irrigation Department, but lack of funds means that many areas still lack the appropriate infrastructure to mitigate such risks.

The government of Mon State needs to assess the need for additional risk-mitigating infrastructure, as well as the costs and potential benefits. The risk of salinization, due to its

irreversible nature, is of particular concern. Securing funds from the Union government or donors will be necessary to pursue this objective.

Curb the Snail Infestation and Invest in Integrated Pest Management: Pest control is one of the leading issues in Mon State rice farming. The current snail infestation (golden apple snail, also referred to as the Nargis snail) is inflicting great damage to coastal rice-producing areas, although other pests and diseases also reduce yields. Pest and disease control requires specific agricultural practices of which farmers are unlikely to be aware without information campaigns and training. Integrated pest management of the snail infestation requires specific inputs, such as molluscicides, materials for cultural control (bamboo stakes, mesh for water entry points), natural predators (red ants, ducks), natural attractants (papaya leaf traps), and natural repellents (tobacco or citrus leaves). These need to be readily available to farmers at low cost, either through the extension network or private input suppliers. In addition, farmers need coordinated strategies to act in the organized and timely fashion necessary to deliver effective pest control. Extension programs are an indispensable component of pest and disease control, providing information, training, and timely monitoring. The possibility of partnership with the private sector when external inputs are necessary also needs to be considered.

3.3.3. Develop Rural Infrastructure for Large-Scale Mechanization

Build Access Roads and Level the Land: The adoption of large-scale machinery, beyond the investment costs of the equipment, requires a certain amount of landscape engineering. Tractors and combine harvesters need access roads to the fields. Building such roads requires coordination between farmers, particularly in areas with large numbers of smallholders. The state needs to assess the potential for building minor roads for the specific purpose of machinery access needs, with involvement from the Department of Rural Development.

In addition, combine harvesters work best with a homogenous crop in terms of height and timing of maturation. Laser land leveling can help distribute moisture levels and enable the more effective use of harvesters. In other parts of Myanmar, such as Shan State, where mechanization is spreading at great speed, such technologies are becoming the norm. Facilitating farmer coordination and the development of private-sector mechanization services are key for this technological upgrade to take place.

Increase the Reach of Agricultural Mechanization Stations: Mon State is home to four of the country's 117 agricultural mechanization stations set up by the former MOAI, with 85 tractors and 13 combine harvesters (Ei Ei Khin 2015b). The ministry provides mechanization services and leads a land-upgrading program that involves parcel consolidation, land leveling, irrigation and draining, and access road building. Thus far, however, only 645 acres of land have been consolidated (well below 1% of total paddy area). Continued efforts need to be sustained to expand such initiatives. Privatization of agricultural mechanization stations could liberate financial resources that could allow more effort to be focused on land upgrading.

3.3.4. Modernize Processing, Output Markets, and Downstream Supply Chains

The current paddy-milling infrastructure in Mon State is dispersed and outdated. Most mills are small-scale operations using old technology, which leads to low-quality final products (high percentage of broken grains) and high losses during milling. Storage potential is

limited. This diminishes the value added by the processing industry, which in turn lowers the value of paddy for farmers. Investment in modern, high-volume milling operations would generate higher-quality output. Current rice mills are predominantly run by diesel engines, which leads to high operation costs. Connecting mills to the national electric grid would allow for lower processing costs and potentially higher margins for millers and farmers alike. The rationale behind both of these suggestions is contingent on a reliable supply of quality farm output of paddy, which is why they must go hand in hand with the modernization of small-farm production and the input supply markets supporting it.

3.4. Goal 1.D: Develop Markets for High-Quality Inputs and Facilitate Input Financing

A recurrent theme that defines major constraints for most crop sectors in Mon State is that farmers use agricultural inputs of inferior quality or insufficient quantity. Farmers often grow low-yielding varieties, they seldom apply fertilizer at recommended levels, and the few who use herbicides and pesticides often lack instructions for appropriate use. For Mon State to develop a dynamic agricultural sector, it is imperative that farmers be enabled to grow the most profitable crops with optimal input use for their soils.

3.4.1. Strengthen Land Rights, Streamline Land Markets, and Liberalize Land Use

Secure and transferable land rights contribute to the foundation of a dynamic and productive agricultural sector. Farmers need to be able to rent out their land without fear of losing it, which requires land rights to be secure. Borrowers and lenders need to be able to use land as collateral, which, in addition to financial regulatory reform, requires land rights to be transferable. As of 2015, only 30% of farmers held an official title to their agricultural land (Form 7 or Form 105), according to MSRHS (2015). Most relied on contracts or tax receipts to demonstrate their rights to the parcels they farmed. Efforts to formalize land ownership throughout the state are necessary. This also requires clarifying the legal frameworks to settle land transactions and land disputes.

A substantial amount of land is currently owned by large landholders but is not in productive use. Facilitating the functioning of the land market can contribute to reallocation of it into productive agricultural activities.

Finally, farmers need to be enabled to choose the crops they want to grow on their land. A relaxing of the land use regulations, particularly for paddy land, can help farmers make optimal land use choices (including expansion of aquaculture).

3.4.2. Improve Access to Fertilizer, Pesticides, and Herbicides

Access to fertilizer has improved considerably in Mon State. Myanmar has an open and competitive fertilizer market, with the majority of imports coming from China and Thailand. Local production of fertilizer is mainly limited to urea, which is produced in three plants with the capacity of 200,000 metric tons of urea per year.⁶ There are 270 registered fertilizer importers and distributors, selling agro-inputs to 3,093 licensed dealers (Gregory, Tin Maung Shwe, and Naing Oo 2014).

⁶ Five plants exist in Mon State, but two are not operational.

Although Mon State cannot alter import regulations on product registration, policies do exist that the state could implement to guarantee fertilizer quality and ensure producers a better understanding of fertilizer content and use. Mon State needs to enforce regulations on the use of the Myanmar language for product description and instructions. At the retail level, the Land Use Division must sample and analyze fertilizers to ensure quality, as well as compliance to domestic and international safety standards. At present, at the state level, the Land Use Division does not have enough staff to carry out these tasks.

If receiving an appropriate budget for this process from the Union government proves too difficult, Mon State could pass a regulation stating bags should be sold with a stamp or an accompanying document saying they have been controlled for quality. Fertilizer importers or retailers would have a private quality-check institution certify their bags. Prior to passing any law of this sort, the government must ensure there is an adequate private-sector certifying presence, so there is no bottleneck in fertilizer sales. Finally, fertilizer retailers must be educated in plant nutrition and fertilizer recommendations. Extension programs at the Mon State level must focus on training all relevant fertilizer sellers in these areas.

3.4.3. Promote Dissemination of Improved Seeds through the Public and Private Sectors

Improved, climate-adapted seeds will increase productivity of the agriculture sector in Mon. There are 67 research and seed farms under the MOALI; 43 of them are seed farms that are located across Myanmar and are governed by the Seed Division of the Department of Agriculture (ADB 2013). The program, however, has limited resources for variety development, has few personnel trained in plant breeding, and has poor evaluation procedures that limit the release of superior varieties. Moreover, seed farms are unequally distributed across states and regions as well as crop sectors.

Rice seeds are mainly produced by the Department of Agriculture under the MOALI, although some are now being produced by private contract-farming companies (rice specialization companies). Those companies produce the seeds, however, mainly for their contract farmers, and therefore they are not widely distributed. Mon State differs somewhat from the rest of Myanmar in terms of climatic conditions: it tends to flood longer than more northern regions, and thus monsoon rice is harvested later in the year. With no research station to test varieties in Mon State conditions, extension services are ill equipped to find and disseminate optimal varieties or spread the use of best practices. Mon State thus needs to develop local research and extension capacity so as to deliver advice tailored to Mon farmers.

The planting of fruit and vegetable varieties adapted to Mon State's environmental conditions can lead to increased yields. In the orchard sector, the current demonstration farm has been testing varieties and making them available to farmers in the surrounding region. But the farm focuses mainly on pomelo and needs to expand into other potentially high-yielding fruit crops. Similar efforts are needed for vegetable seeds: there exist many vegetable seeds available to Mon farmers, developed in Myanmar or imported from Thailand, but vegetable farmers across Mon State seldom know which vegetables are best suited for their land.

Whereas in the early 1990s one found some 70 rubber varieties in Myanmar, now almost 90% of farmers use one rubber variety. The MOALI, through the Department of Industrial Crops and Orchards, develops, tests, and sells rubber varieties to farmers. The government is currently testing a variety that may be promising, but the department has had limited success in recent years with getting regular yields from tested varieties. Budget cuts led to a reduced number and acreage of model farms. The government must continue to focus on developing and distributing improved rubber varieties to improve yields.

Although without Union funds Mon State will have difficulty improving its seed research and distribution programs, it still can implement policies to enable farmers and private-sector actors to certify and distribute their seeds. Mon State can encourage the private sector to increase production and distribution of certified seeds. Further, Mon State could develop a program whereby farmers can multiply their own improved seeds, even if they do not fully meet seed certification requirements. This would allow for at least some gain in genetic potential.

3.4.4. Improve Access to and Quality of Financial Services for Farmers

About a quarter of all loans taken out in rural Mon State are used for agricultural expenses, with approximately 47% of farming households taking out a loan. The MADB offers loans for agricultural inputs, but they are largely limited to rice production: farmers can borrow K 150,000 per acre for rice, but only K 20,000 per acre for other crops. Many farmers end up relying on private lending. Extending MADB loans and encouraging private banks to lend to farmers cultivating nonpaddy crops would encourage farm income diversification. Making low-interest loans available for all crops may unlock higher profits for farmers.

Although rice farmers can obtain MADB loans of K 150,000 per acre, at current input prices the optimal farming of an acre of paddy would require almost double that amount. In addition, the loans are capped at 10 acres, though 16% of rice farmers have larger plots. Without sufficient funding, rice farmers must thin out fertilizer application, use inferior products, broadcast seeds instead of transplanting, and limit any labor-intensive practices. This contributes to leaving farmers in a low-productivity trap. Further, it forces many farmers to take out high-interest loans from private lenders using their land as collateral, which leaves them vulnerable to debt spiral and eventual loss of their land. Further consideration should be given to the question of whether the acreage cap on MADB loans is hampering the productivity of medium-scale farmers in Mon State.

The price of rice fluctuates during the year. Cash-constrained farmers often have no choice but to sell their output when prices are lowest. Due to abundant supply, paddy prices are lowest right after harvest, yet this coincides with the repayment schedule of MADB loans, which forces many farmers to sell earlier than they would like, or to take out bridge loans at high interest rates, which carries the risk of losing collateral or falling into debt traps. There is need to investigate whether the loan cycle could be improved or loan terms could be tailored to better fit farmer needs.

Promoting the development of loan tools, public or private, to finance not just variable inputs (fertilizers, for instance) but also semi-variable inputs (a tractor, for instance) can encourage optimal production. Although mechanization is expanding, for smallholders renting machines is often the only economical option. Particularly given the current issues of labor scarcity, encouraging private rental services and farmer associations may enable smallholders to mechanize production and reap higher benefits.

3.4.5. Facilitate the Development of Private Mechanized Service Providers

In a country where smallholders dominate agricultural production, most farmers will not find it profitable to invest in their own agricultural machinery. However, through the development of rental networks and agricultural service providers, farmers can reap the benefits of mechanization without needing to make the initial capital investment.

Myanmar has very few policy distortions that affect the adoption of agricultural machinery. Imports of agricultural machinery are open, tariff rates are zero or very low, and the market for agricultural machinery is highly competitive. This makes it easy for entrepreneurs to purchase tractors and harvesters and is helping the rapid spread of mechanization throughout the country. To further facilitate this transition, loans need to be available for investment in machinery: private banks need to be motivated to lend to agricultural entrepreneurs, and property rights need to be secured so as to function as collateral.

Where investment capacity by individual farmers is limited, organization into associations to share agricultural machinery or provide mechanized services can help promote technological change. It also helps solve the coordination problems related to building road access to fields and synchronizing planting times, pest control, and so forth.

3.5. Goal 1.E: Build Government Capacity for Extension, Training, and Dissemination

Mon State needs to make significant improvements to its extension, training, and dissemination programs. Modernization schemes, as detailed above, count on significant government assistance for implementation. As smallholders are cash constrained, they rarely have sufficient resources to try out the effectiveness of different irrigation systems and pest control mechanisms, or even to determine which types of fertilizers are most suitable for their land. Even if loan tools or safety nets are designed and employed to support farm experimentation, the government will still need to develop its extension programs, widen the scope of its trainings, and increase investment in its demonstration farms. Wherever possible this should be done in collaboration with private-sector input and equipment suppliers.

The extension program in Mon State, as in most of the country, is understaffed and under budgeted. Many activities are planned at the Union level, which can leave them detached from the needs of local farmers. Further, the extension offices lack mechanisms for coordination with other relevant government bodies such as research centers or private-sector actors. Mon State should develop a participatory process for identifying and prioritizing agricultural research, extension, and education needs. As a result of this process Mon State should develop an institutional framework for the extension sector, in the form of partnerships and pathways of collaboration between different actors. Moreover, the framework should highlight needs of farmers in Mon State, and develop appropriate training and technical content for the programs. Further, although extension staff may lack knowledge of Mon conditions, the framework should enable staff to learn from large and small farmers in the region to develop expertise. In this way Mon State can improve its extension program, without relying on reallocation funds or development of projects at the Union level.

Given the current evolution of the agricultural landscape toward high-value crops, extension agents need to have knowledge relevant to orchard and vegetable production. The state should develop capacity for training new and existing extension workers who can become subject matter specialists. In that process, the knowledge accumulated by the region's farmers should be drawn on to inform best practices. A demonstration farm should be set up for vegetables, and extension programs should be expanded both on demonstration farms and individual farms. Small improvements in production knowledge can bring about substantial increases in fruit and vegetable yields. Government investment is crucial to making this happen.

Similarly, the state needs to develop and disseminate integrated pest management methods. To publicize optimal pest-control solutions, the government should test different pest-control methods on demonstration farms. The government should learn from experts in the state

(often large farmers). The techniques can also be disseminated through explanatory pamphlets made available to farmers by storing them at township halls or through trainings. Information-sharing networks should also be set up so farmers can learn from other farmers' experiences. Extension programs can also play a crucial role by providing the coordination and monitoring necessary for integrated pest control solutions.

Finally, extension services can also provide more than just technical know-how for production processes. Providing farmers with business skills can be an essential part of developing a commercially viable agricultural sector.

3.6. Goal 1.F: Ensure Sustainability of Marine Capture Activities and Develop Aquaculture

The economic contribution of fishing to the rural economy of Mon State is considerable. Data from the Mon State Rural Household Survey indicate that commercial small-scale fishing accounts for 10% of employment and 11% of income in rural Mon State. That figure does not include income generated by large-scale fishing enterprises, which probably account for the bulk of fish landings and fishing income but are owned and operated by urban households. The activity is particularly important in coastal areas (where there are relatively few viable alternative agricultural livelihood options, and 34% of households are engaged in small-scale fishing) and in the southern part of the state.

A large share of the high-value *export-quality* fish landed in Mon is exported, primarily to China. There are several cold storage facilities that freeze fish for export, but most fish are exported whole, meaning that little value is added and demand for labor in processing activities is limited. Most lower-value fish is consumed on the domestic market, either within the state or in Yangon, making an important contribution to food security.

Large-scale fishing operations have increased significantly in number and capacity over the last decade. The expansion of fishing effort, coupled to limited fisheries management and poor enforcement of the few rules that do exist, has resulted in declining capture fisheries productivity. Well over one-third of small-scale fishing households surveyed by the Mon State Rural Household Survey reported a decline in landings over the last five years. However, a similar percentage reported that yields were unchanged, and around a quarter perceived an increase. These figures offer hope that fish stocks can be rebuilt through better management if action is taken quickly.

Two small clusters of commercial aquaculture farms exist in Mon State—one in a disused brickyard on the outskirts of Mawlamyine, and the other close to Paung in an area where rice fields are deeply flooded. Small ponds are loosely scattered in other areas. Fish farmed in Mon State are generally harvested at smaller sizes than those in the Ayeyarwady (Myanmar's main center of farmed fish production) but fetch a higher market value per viss due to being fresher than farmed fish *imported* from the delta.⁷ Several well-watered lowland areas with good road access suitable for fish farm development exist in the northern half of the state. Farmers interviewed during scoping visits to Mon State reported that many households in these areas would like to enter fish production (which generates much higher returns than rice) but cannot do so because of strict enforcement of regulations governing agricultural land that prevent conversion of paddy land to other uses.

⁷ The viss is a unit of weight measurement (1 viss = 1.65 kg).

Currently no shrimp aquaculture exists in Mon State, although there may be potential for its development in coastal areas in the south of the state currently used for salt production, if access to hatchery-produced shrimp could be ensured.

Each of these opportunities to improve the contribution of fisheries and aquaculture to the state's economy and the welfare of its population is discussed in more detail below.

3.6.1. Develop a Sustainable Fisheries Resource Management Strategy

Small-scale coastal fisheries support the livelihoods of 31% of citizens living in Mon State's coastal zone. Many of those are asset poor, are landless, and have few other livelihood alternatives. Large-scale offshore marine fishing operations are capital intensive and fewer in number, but they generate a large share of the state's fish landings and rents. The capacity of coastal fisheries to support fisher livelihoods and make a significant contribution to the state economy is under threat from extremely limited management of the fishery for sustainable utilization of fish stocks. This has resulted in their over-exploitation, limiting the scale and scope of the benefits derived.

An enhanced and sustainable contribution of coastal fisheries to the economy, livelihoods, and food security in Mon State will require putting in place governance and management frameworks that secure the future viability of coastal fisheries and the communities that depend on them. The Myanmar Constitution supports the decentralization of authority over coastal fisheries (those within 10 nautical miles of the coastline) to the states and regions. This means that there is scope for Mon State to establish fisheries governance and management mechanisms that can achieve a balance between meeting human well-being and sustaining the coastal natural resource base.

This goal is most likely to be met through co-management arrangements—partnerships between communities and government to share the responsibility and authority for fishery management. Fisheries co-management arrangements have been successfully implemented in many coastal settings around the world. Co-management ensures greater participation by communities and local institutions and integrates traditional or customary laws, thereby enhancing community awareness and acceptance of and compliance with fishery regulations. A reformed set of fisheries policies will need to place greater emphasis on implementing sustainable fisheries management mechanisms, and a lesser emphasis on revenue collection, which is the primary function performed by the Department of Fisheries at present.

To improve livelihoods in coastal communities, which are some of the remotest and least developed in Mon State, will require the development of new livelihood options such as small-scale aquaculture and ecotourism, as well as providing technical support for improving traditional practices such as small-scale fish processing and value addition, food safety, hygiene, and packaging. In this regard, core infrastructure for postharvest preparation and marketing of fisheries products will be critical (for example, better access to ice-manufacturing facilities and coastal roads). Rural finance schemes can also support livelihood diversification in coastal communities and reduce fisher reliance on traders for advances of working capital bearing high rates of interest.

3.6.2. Evaluate Potential for Sustainable Fish and Shrimp Farming and Develop a Value-Added Processing Sector

To increase the value of Mon State's seafood industry beyond the capture segment of the marine fishery value chain it will be necessary to unlock the potential of aquaculture (the

farming of fish, shrimp, and other aquatic animals) and create more value-added in postharvest processing activities.

Stimulate the Growth of Fish Farming: Aquaculture is a high-value activity, capable of generating higher farm incomes than almost any other form of agriculture. This makes it an extremely attractive option for rural farm households. Unfortunately Myanmar's Land Law prohibits farmers from converting paddy fields into ponds without formal approval of a change in land use classification. Application of regulations has been uneven at the state and regional levels. Whereas large numbers of fish farms have developed in Ayeyarwady Region, enforcement of these regulations at the local level in Mon State has historically been very strict. This has severely limited the development of freshwater aquaculture in the state, despite fresh fish farmed in Mon State fetching a higher market value than fish imported from the delta, and many farmers in Mon State expressing high levels of interest in entering production. Although the Mon State government cannot formally override Union of Myanmar law on land use, it could negotiate a local provision allowing limited paddy land conversion to fish ponds. A specific example of a limited provision would be for local authorities in Mon State to automatically allow permits for up to 1 acre of paddy or 20% of an individual farmer's paddy land holdings. Doing so has the potential to result in a rapid supply response from farmers, giving rise to higher incomes for rural farm households, additional off-farm employment in supporting value chains, and greater availability of fresh fish to consumers.

Evaluate Potential for Sustainable Shrimp Farming: Farmed shrimp is an extremely high-value crop produced mainly for export to developing countries by many tropical nations, including Thailand, where many migrants from Mon State are employed in the shrimp farming and processing sectors. Mon State previously had a small number of shrimp farms, but those failed after Cyclone Nargis. Reviving the coastal shrimp sector in Mon has considerable potential for a number of reasons: (1) the existence of seafood processing operations; (2) areas suitable for shrimp pond development in the south of the state (unprofitable salt farms); (3) availability of skilled labor to staff processing and farming operations; (4) ongoing construction of a deep sea port that would enable direct export of processed product; and (5) lifting of trade restrictions to major importing markets (for example, the United States and the European Union). A major constraint to the development of shrimp farming in the state is a lack of hatchery-produced shrimp postlarvae (juvenile shrimp needed to stock ponds). This is a prerequisite for development of the industry. The Mon State government could consider establishing a shrimp-farming research and development center to close this gap. If Mon State is to rebuild the shrimp sector it must do so in an environmentally sustainable and socially responsible and organized manner through the implementation of internationally recognized best management practices to ensure that some of the problems associated with the industry elsewhere in the world are avoided.

3.6.3. Support Value-Added Seafood Processing

Mon State's seafood processing sector currently produces little, if any, value-added products, and most seafood is exported to Asian markets in the form of whole frozen fish. The processing sector thus currently creates little employment and limited income for the state. Accessing diversified markets for seafood products such as the European Union and the United States presents an opportunity to minimize reliance on dominant regional fisheries markets and attain higher value for Mon State seafood. Those markets are increasingly

demanding sustainable, high-quality fishery products from well-regulated fisheries with legal and safe working conditions for workers at all segments of the value chain. Targeting such markets thus offers the prospect of maximizing the economic value of Mon's fisheries, while ensuring that they remain environmentally and socially sustainable. Development of a shrimp-farming industry in Mon State would also support the growth of a value-added processing sector by increasing the volumes of raw material available.

4. AREA 2: CREATING AN ENABLING ENVIRONMENT FOR BALANCED GROWTH

4.1. Goal 2.A: Strengthen Local Government

Myanmar's government previously acknowledged the need for participatory budgeting at the local level in the *Framework for Economic and Social Reforms* (Republic of the Union of Myanmar 2012). In addition, Schedule Five of the Constitution allows more opportunities to raise revenue locally through various taxes and fees and Schedule Two allows for state and regional legislative authority over eight key sectors (Republic of the Union of Myanmar 2008).⁸ In spite of the overtures made to decentralization in the Constitution and the *Framework for Economic and Social Reforms*, power in Myanmar remains concentrated at the Union level.

The current budgetary process, similarly, remains relatively top-down. All entities under the state domain prepare individual budgets that travel up the state and national bureaucracies, receiving final approval from the president. Once all allocations from the Union government are made, the money is dispersed directly to the state budget department for distribution to other subnational entities.⁹

The current centralized process of budgeting and planning limits the effectiveness of local government for several reasons. First, the fact that most state budget allocations are made by the relevant Union-level line ministries hampers the state governments' ability to gain efficiency by coordinating across ministries when there are overlapping mandates or complementary projects. This process also limits the ability to be flexible to changes in the local situation. Second, the system of budgeting based on negotiations at the top leaves the process vulnerable to personality politics. Lastly, funding from the Union government covers the difference in total costs of the budget and the Schedule Five revenues collected in the state, which weakens the incentive for states to be diligent about collecting those revenues. All of these issues limit the ability of states and regions to tailor their planning and administration to local needs. Strengthening the role of the local government can help alleviate those issues and lead to more effective policymaking.

While some effort has been made in the last five years with respect to transferring authority to the state level, not many states have taken advantage of the reforms. Years of top-down government have discouraged taking initiative. In addition, state government officials may not be familiar with the new tasks required of them. Through effective capacity strengthening, state-level governments may successfully take on new responsibilities in response to devolution and deconcentration.

In addition, with the exception of some education and health positions, most staff at the state- and region-level ministries are hired at and responsible to the Union level (Nixon et al. 2013). Staffing decisions need to include State participation to ensure accountability as well as ability and experience consistent with responsibilities.

⁸ The eight sectors are: "1. The Finance and Planning Sector; 2. The Economic Sector; 3. The Agriculture and Livestock Breeding Sector; 4. The Energy, Electricity, Mining and Forestry Sector; 5. The Industrial Sector; 6. The Transport, Communication and Construction Sector; 7. The Social Sector; and 8. The Management Sector" (Dickenson-Jones, De, and Smurra 2015, 9).

⁹ Further details on the budget process are presented in Appendix A.

Box 6. Community-Driven Development: Enabling Communities to Help Themselves

The World Bank's Myanmar National Community-Driven Development (CDD) Project began in 2012 with initial funding of US\$80 million. In 2015, the project was scaled up with additional funding of US\$452 million. The CDD project aims to build capacity and enable target communities to identify and implement basic infrastructure or service projects to enable economic progress. The project targets towns with high levels of poverty, lack of external funding, and limited support by regional government. There are five main components of the program: (1) community block grants for small-scale projects; (2) facilitation and capacity building for participatory planning and project management; (3) knowledge and learning; (4) implementation support; and (5) contingent emergency response (World Bank 2015).

The World Bank considers the project model to have been a success in Myanmar. Other donors have adopted this model for their projects. For instance, the Japan Fund for Poverty Reduction also approved a US\$12 million project for enhancing rural livelihoods and income in Myanmar, based on a CDD model, similar to the World Bank project (Wong 2012).

Mon State will thus need to strengthen local government and enhance community participation in order to realize the economic growth opportunities. The government must adopt key principles as underlying requirements for development, and take an active role in applying those principles to development planning and implementation. The dialogue between policymakers and the private sector must be an integral part of this process, with feedback mechanisms to facilitate bottom-up planning and policy. In light of these principles, donors are adopting models of community-driven development (Box 6), which can be a step toward enhancing local involvement.

4.2. Goal 2.B: Build Energy, Transportation, and Communications Infrastructure for Rural Growth

4.2.1. Facilitate Access to Energy

Access to electricity is one of the core requirements for development of industry. In rural Mon State, 56% of the population has access to an electricity connection, which is an 85% increase compared with five years ago and which is much higher than the national rural average (18%) (IEA 2015; MSRHS 2015).

Within Mon State, there are considerable spatial disparities to access to an electric connection. Households in Mawlamyine district enjoy a 61.3% rate of connection, whereas only 48.3% of households in Thaton district (where the main power plant is located) are connected to the electricity grid. In addition, access to an electric connection itself does not guarantee reliable electricity availability throughout the day. An overreliance on hydropower in a country that gets 90% of its annual rainfall in the wet season leaves the country short on electricity in the dry season. Investments are needed for maintenance and repair of the existing infrastructure in addition to grid expansion.

Expanding electrification is on the Union government's agenda. The World Bank is currently funding, through a US\$140 million loan, the expansion of a gas-fired power plant in Thaton. The goal is to increase generating capacity at the Thaton facility from 40 megawatts to 106 megawatts while substantially improving efficiency by 2017 (World Bank 2013). The electricity will feed into both the local and national grids, supplying 50% of the demand for energy in Mon State and 5% of demand in Myanmar (Mahtani 2013). In addition to the efforts by donors and the government of Myanmar, meeting Myanmar's energy demands will also require private investments into energy production (Zayar Nyein 2016). This is already

starting to happen, as in 2014 a new private combined-cycle on-grid power plant started operations in Mawlamyine, with a capacity of 230 megawatts. (Aung Shin 2016). A big concern is the price of publicly supplied energy in Myanmar, which is below regional averages per unit due to heavy subsidization (Posner Ross 2015). The cheap supply of energy may lead to the inefficient use of publicly sourced energy and may be the cause of past underinvestment in the maintenance of government-owned energy infrastructure.

Private businesses offer off-grid electricity in areas in Mon State without access to the national grid or where the national grid provides inconsistent power. Off-grid providers tend to provide a reliable service but charge a higher rate than the government-provisioned electricity. The Department of Rural Development also has a program to set up solar home systems and minigrids in remote communities and border areas. In 2015–2016, the Department of Rural Development installed 6,600 solar home systems in Mon State (director, Mon State Department of Rural Development, personal communication, April 1, 2016). If the rapid expansion of the national grid continues, off-grid electricity options may soon become redundant. Hence, these solutions may best be reserved for the most remote areas.

The Foreign Investment Law (2012) made possible investment into gas-fired power production to 100% foreign ownership. However, hydroelectric and coal-fired must either be structured as a build-operate-transfer project or be a joint venture with the government (Norton Rose Fulbright 2015; Vanderbruggen and Evans 2013). Such agreements are negotiated with the government and contain restrictions on rates and percentages sold outside of Myanmar (KPMG 2013). Foreign companies are not allowed to administer the electricity system, so foreign firms producing for the domestic market sell their energy back to the government of Myanmar to be distributed through the national grid (Posner Ross 2015). Myanmar's electricity sector has benefited vastly from foreign investments, and Mon State should encourage such investments. At the same time, care should be taken to avoid foreign investments geared solely toward foreign markets, particularly if they require the displacement of people or have serious environmental externalities.

4.2.2. Invest in Transportation Infrastructure

Infrastructure in Myanmar is relatively poor, as the country ranked 145 out of 160 countries in the World Bank's Logistics Performance Index in 2014.¹⁰ However, Mon State's road infrastructure is somewhat superior to that of the rest of the country: 95% of rural Mon State residents have access to a paved road in their village, and 94% of villages are accessible by car in the monsoon season. Further, two branches of the Asian Highway Network cross the state.¹¹

Nevertheless, given that many areas are still poorly connected and that traffic is rapidly increasing, the state's road infrastructure needs improving. Aware of this, the State Ministry of Construction, which is in charge of 40 primary and secondary roads, is engaging in several road construction projects. Several of these donor-funded projects expand and augment the

¹⁰ This index ranks countries based on the performance of customs, infrastructure, international shipments, logistics competence, tracking and tracing, and timeliness.

¹¹ The Southeast Asian branch of the highway network, called AH112, runs north-south through the state. One branch of the Asian Highway Network, called AH1, runs from Thaton to Kayin State and the Thai border.

branches of the Asian Highway Network that run through Mon State.¹² Such road improvements will facilitate trade in the Greater Mekong subregion.

Mon State has only one port, located in Mawlamyine. The facility is not advanced and lacks container facilities and other advanced equipment. Mon State's economy can benefit from access to a centrally located port with the capacity to handle containers and with the facilities available for cold storage. This is especially true considering the potential gains from agricultural exports.¹³ Mon State should promote private investment into upgrading the current port, or into investments into a port elsewhere in the state. The only airport in Mon State, the Mawlamyine airport, is similarly lagging in terms of technology and safety.¹⁴ As of now, the airport receives only one commercial flight per week. The airport is in need of major investments for infrastructure upgrade to meet international standards of safety. Further, if the airport were to start targeting cargo flights, additional runways and storage facilities would need to be built.

4.2.3. Advance the Development of Communications Infrastructure

The telecommunications law was changed in 2013, opening up the country for foreign investment into the telecommunications industry. Currently, three cellular carriers operate in Myanmar—Myanmar Post and Telecommunications, Norway's Telenor, and Qatar's Ooredoo. Cell phone use has expanded in the country as access has spread rapidly: approximately 97% of rural Mon State residents live in a village with cell access (MSRHS 2015). Starting in 2014, these companies began to roll out 3G Internet access, paving the way for a more connected Myanmar. Yet access to cellular service does not necessarily translate into use, as only 58% of households in Mon State have a mobile phone.

Approximately 3.9% of the population had access to the Internet at home in 2015 (MSRHS 2015). Given that Mon State has cheap and widely available cell phone connectivity and, in many places, 3G Internet, consideration should be put into how the state government can leverage technology to solve policy problems. Innovative ideas, such as using information and communications technology to disseminate extension information, share market prices, or create accountability in government service delivery, should be considered as Mon State moves into the future.

¹² The largest is the expansion of the Mawlamyine-to-Ye section of AH112 highway, from 12 feet to 18 feet using the BOT (build-operate-transfer) system. In an interview, the Mon Ministry of Construction stated that it will eventually bring this road to 24 feet. The goal is to expand the corridor from two to four lanes in the next two to three years. An Asian Development Bank-funded project, due to be completed in 2016, is reconstructing and widening the A1 road, covering the 70-kilometer length of road needed to complete the East-West Economic Corridor running from Myanmar to Vietnam. This A1 highway will also upgrade three bridges through a Japan International Cooperation Agency-funded project, due for completion in 2023 (JICA 2015).

¹³ The port currently does not have a congestion issue, with an arrival-to-berthing average wait of two to three hours. Customs clearance takes approximately one day. There is one private warehouse for cargo storage nearby. However, there are no facilities for bagged cargo or refrigerated cargo. There are also no security services or guards at night (Logistics Capacity Assessment 2015).

¹⁴ The airport has a short, 1,645-meter runway. The safety of the airport infrastructure remains a concern (Deboonme, A., Khine Kyaw, and Myanmar Eleven 2015).

4.3. Goal 2.C: Develop a Dynamic Financial Sector to Promote Productive Investment

4.3.1. Promote Access to Credit

Approximately 42% of households in rural Mon State borrowed money in the 12 months prior to the survey. An indication that the credit markets are not overheated is that only 14% of the loans were bridge loans (MSRHS 2015). However, 65% of loans are from informal sources, suggesting that more needs to be done to open up access to affordable credit in rural Mon State.

In Mon State, the most available sources of lending, other than family and friends, are the MADB, private moneylenders, and cooperatives (administered through the MOALI Department of Cooperatives), with 66%, 50%, and 41% of rural Mon State residents living in a village with nearby access to each of the three sources, respectively. Only 6% of rural Mon State residents have access to a microfinance bank and only 5% of all loans are generated from such institutions. Most loans, 60%, are sourced from moneylenders or friends and family. Such informal loans carry a median interest rate six times higher than formal sources (60% versus 10%), putting a strain on borrowers' incomes. Efforts should be made to attract more diverse and formalized lending options in Mon State to allow residents to make productive investments.

One recent area of policy transformation that may help the expansion of formal credit options is the change made in the Farm Land Law (2012) that allowed Form 7 to be used as collateral for loans. Unfortunately, only 25% of agricultural plots owned in Mon State are covered by the Form 7 documentation. Anecdotal evidence from interviews in other parts of Myanmar and a recent news article indicate that banks in other regions are already testing out the profitability of lending to farmers using Form 7 as collateral (Htin Lin Aung 2015). To prepare for and promote the use of Form 7 to gain access to credit, the Department of Agricultural Land Management and Statistics should sensitize landholders on the need for registering their farmland use rights. Ongoing efforts to liberalize banking regulations at the national level also hold promise for promoting access to credit in Mon State.

4.3.2. Promote the Use of Legal and Secure Platforms for Remittances

In 2012, Myanmar joined the SWIFT network. Currently at least 21 banks in Myanmar have SWIFT capabilities, thus enabling the safe and secure transfer of money in and out of the country (Bank SWIFT IFSC Codes 2016). While the benefits of formal transfer services may seem obvious, Myanmar's migrant population still heavily depends on informal *hundi* services for the transfer of remittances back to relatives in Myanmar. *Hundi* services are convenient, are cheap, and were previously the only method to transfer funds back to the country.

The major constraint of formal remittance services is that they are more expensive than the *hundi* system and, depending on the service, the sender and receiver must have a bank account. In a state where only 13% of residents think that the best way to keep savings is in a bank (as opposed to, for instance, purchasing gold) this is a major barrier. To capitalize on the gains in safe and secure methods of transferring money in the country, Mon State would need to motivate banks to invest in expanding access to formal banking and sensitize Mon State residents to the benefits of the new transfer methods. Mobile money transfers may be a more viable solution, but as of yet, no bank or financial institution has the ability to transfer from overseas.

4.4. Goal 2.D: Promote Private Enterprise Creation and Harness Growth in High-Potential Nonfarm Sectors

In 2016, Myanmar moved up 19 places to rank 160 (out of 189) in the World Bank’s “Doing Business Indicators” category “Starting a Business,” a measure of the difficulty of starting a new business in terms of number of procedures, time it takes, cost, and capital requirements (World Bank 2016). Although that is an improvement, the score is low for the region. The United Nations Development Programme highlighted a perceived lack of transparency in licensing in Mon (UNDP 2014). Recent efforts have been made to devolve the issuance of many licenses to state or region capitals, rather than Nay Pyi Taw, which greatly increases efficiency in licensing (Director, Mon State Division of Trade Promotion and Consumer Affairs, personal communication, March 31, 2016). Mon State officials in Mawlamyine should continue to minimize the burden of establishing and maintaining registrations and licenses.

Mon State has an active chapter of the Union of Myanmar Federation of Chambers of Commerce and Industry. Mon State also has several branches of the various national commodities associations. The chief executives of these associations act as advisers to farmers and represent farmer, trader, or processor interests at the Union level or with the chief minister of Mon State. (See the example of the Paung Township Rubber Association in Box 2.) The Office of Trade Promotion and Consumer Protection of the Ministry of Commerce provides training to small and medium-size enterprises (SMEs) and farmers and promotes development of the private sector by helping businesses navigate the process of formalization and licensing. These efforts contribute to providing an enabling environment for the development of small businesses and should be promoted.

4.4.1. Promote Reinvestment of Remittances in Productive Assets

Remittances make up almost a quarter of the economy in Mon State. However, slightly over a third of all returning migrants reported that the largest expense their earnings went toward was either house construction or land purchase for housing, and another 14% reported spending most on ceremonies and donations to monasteries (CESD 2016). Only 9% reported their largest remittance-financed expense to be an investment in a productive asset (machinery, fishing equipment, and so on). Although household spending on housing or consumption stimulates demand for goods and services in the local economy, some consideration should also be made to leveraging remittance flows into income-generating activities. The Mon State government could consider providing business training and facilitating investments in the start-up of SMEs.

An innovative example of leveraging remittances into productive assets is the Tres Por Uno program in Mexico, which relies on hometown associations, that is, clubs established in the United States by migrants from the same village or town in order to raise and remit funds for infrastructure and social investments. Under that program, each dollar of migrant donations to the hometown association can receive matching grants from each of the national, state, and local governments (threefold matching) (Agunias and Newland 2011). Mon State may want to consider a similar initiative based on the existing Rural Development Funds (Robertson, Joelene, and Dunn 2015).

4.4.2. Capitalize on Foreign Investment

Mon State should capitalize on recent changes in investment rules enacted by the Foreign Investment Law (2012), which allows 100% foreign ownership in a wide array of industries. While some restrictions exist in terms of how investments are structured, investments in the power, telecommunications, infrastructure, services, agriculture, nonfood manufacturing, and hospitality sectors are currently among the business activities available to foreign investors (Vanderbruggen and Evans 2013). Land laws have also been loosened allowing for extended, more secure leases to foreign firms, but issues remain with contested land rights and speculation.

The Mon State Ministry of Commerce, the Chamber of Commerce, and local trade associations and businessmen can work together to build stronger linkages with foreign companies to generate more export revenue and perhaps even enter into joint ventures and partnerships. Some initiatives exist already, such as the Myanmar–Thailand trade fair organized twice a year in Mawlamyine by the Mon State and Kayin State chambers of commerce, together with several business clubs. The Mon State Ministry of Commerce should continue to work with business entities in Mon State and key export areas in Thailand to further facilitate networking for the purpose of enhancing trade and promoting investment in Mon State.

Improve Facilities in Industrial Zones: The township of Mawlamyine has two industrial zones: the Mawlamyine Industrial Zone and the newly inaugurated Kyauk Tan Industrial Zone (since April 2016). The Mawlamyine Industrial Zone hosts more than a hundred businesses, including several rubber processors, rice processors, and an antimony-processing facility (recently shut down due to health concerns). It also hosts a technical college where 344 students are currently being prepared for careers in civil and industrial engineering. The zone is electrified but currently suffers from a water shortage, which creates constraints to business operations. The Kyauk Tan Industrial Zone, funded privately and led by the Mon State Development Committee under the oversight of the Mon State government, is targeted toward SMEs that are not large enough for the nationally planned special economic zones. It currently has 59 investors, who pay a fee per acre to the implementation committee to support the development of the land and another smaller amount to the industrial zone grant fund (Gaung 2016). The zone’s proximity to the main highway in Mon State and short distance from the Mawlamyine airport means that viable options exist for transportation of inputs and outputs of the factories. The government of Mon State should continue to promote the success of industrial zone projects and find ways to build upon their momentum.

4.4.3. Harness Growth in the Construction Sector

Two sectors in particular stand out as having high potential to generate employment and income: construction and tourism.

Like much of Myanmar, Mon State is experiencing a rapid construction boom. While urban Mawlamyine is seeing a large influx of investment into hotels and residential and commercial buildings (a high-end shopping mall, Ocean Center, was recently inaugurated), the rural sector is also experiencing rapid remittance-fueled growth in house construction. Domestic and foreign investors alike are looking for opportunities to invest their capital in Mon. These developments generate economic activity and employment opportunities, which provide a basis for the livelihoods of many rural Mon inhabitants. Construction workers are in high

Box 7. Brickworks Cluster in Muyang

The town of Muyang, in Kyaikmaraw Township, is home to a dozen brickmaking enterprises. They are small-scale operations relying on low technology, but the quality of bricks from the area is recognized nationally. Clay is extracted from the soil by hand (with shovels) and pressed into bricks in a diesel-powered machine. The bricks are dried in the sun, then assembled into ovens for a six-day baking cycle, using firewood. The process is highly labor intensive. One such operation employs 100 workers full-time during dry-season months and produces more than 20,000 bricks a day.

Growth is rapid in the sector. The number of such enterprises has multiplied in recent years, as has the size of each operation. One brick maker reported having increased six fold since 2005. Most of the demand comes from Mon State, where house construction generates much demand, as does industrial

demand, as are construction materials. Brickmaking enterprises are growing fast to meet this demand (Box 7), and a large cement factory is being built in Kyaikmaraw. Due to migration, labor is scarce in Mon State, skilled labor in particular. Unskilled construction workers are often migrants from Bago or Ayeyarwady. While unskilled workers get paid K 4,000 to K 6,000 per day, more skilled construction workers are paid K 7,000 to K 10,000, or up to K 15,000 per day for trades such as welding or electric installation.

Many of the skilled workers in construction are Mon laborers who spent time in Thailand. Though they started out as unskilled migrant laborers, they gradually acquired knowledge and experience allowing them to return to Mon State as skilled workers. Relying on return migrants from Thailand is a slow and inefficient way to source labor for the construction industry. Mon needs to encourage local training of workers. The high wages the construction industry offers rival those that can be earned in Thailand, so skilled construction workers in Mon State are less likely to turn to migration. Local training of the labor force can thus help retain labor in Mon and generate local growth.

Despite all the benefits of a growing construction sector, unbridled construction growth poses risks that can jeopardize the long-term sustainability of this growth. There is need to enforce the legal framework for residential and commercial construction. Myanmar has a new building code, designed in 2014–2015 to meet ASEAN standards (Noe Noe Aung 2014). That is a step in the right direction, although interpreting and enforcing it will require coordination at the township level, with various government agencies as well as professionals from the private sector such as the Association of Myanmar Architects.

4.4.4. Enable the Development of Tourism

Certain features of Mon State make it a place suitable for the development of tourism: a long coastline, a tropical climate, a wealth of historical and religious monuments, and relative proximity to Yangon and, to some extent, Bangkok. However, currently only Golden Rock at Kyaikto generates significant tourism flows. Mawlamyine is only a minor stop on the backpacker trail, and the vast majority of Mon's potential as a tourist destination is untapped.

The first step should be a thorough evaluation of the potential for tourism in the state. What are the tourist attractions, and what types of investment would help those attractions generate the kind of appeal needed to attract enough tourists? What types of tourism present the most potential? Coastal tourism based on beach resorts (similar to Ngapali); ecotourism combining coastline and mountain treks; and historical and religious tourism centered around the

Buddhist monuments in the state—all are options that need to be evaluated and compared. The state can then take steps to attract the types of investment needed to help tourism flourish. The regional government could rely on zoning to help develop target areas for tourism and recreation, such as for instance the Mawlamyine waterfront.

Nevertheless, the uncontrolled development of tourism carries with it many risks that threaten its viability as an economic activity. Hotels are necessary for the development of tourism, but a proliferation of hotels can make an area less appealing to potential tourists. Where tourism is based on the appeal of natural sites, those sites can suffer from the strain of excessive visitors. A lack of enforcement of environmental protection regulations can quickly degrade the sites themselves, which not only has negative environmental consequences but also ends up driving tourists away. Reviewing and enhancing the legal framework for the protection of environmental and cultural assets is an essential step for sustainable development of a viable tourism sector.

4.5. Goal 2.E: Provide Social Services to Rural Populations

4.5.1. Expanding Access to Rural Public Health

Myanmar's healthcare system is one of the most underfunded in the world. In 2013, the country spent only 1.8% of its gross domestic product (GDP) on healthcare (Phyu Phyu Thin Zaw 2015). This underinvestment in healthcare is historical, leaving the country without the proper infrastructure to guarantee access to medical care. In addition, medical care is often privately funded, with over 93% of all healthcare expenditures paid for out-of-pocket in 2011 (Oxford Business Group 2015). In fact, medical expenses were the third most frequent use of remittances, according to the Mon State Rural Household Survey. Nevertheless, the government of Myanmar has a goal of reaching universal health coverage by 2030. Two main obstacles stand in the way: poor access to and quality of healthcare infrastructure and the absence of professional emergency medical transport.

In Mon State only 61% of the rural population have a public hospital, rural health center/subcenter, private hospital, or private clinic in their village, and only 10% have access to a public hospital in their village. Of the 39% without local access to a medical facility, 91% have to travel to the township capital for medical services and 81% have to travel to the township capital to reach a public hospital, and some have to go even further (MSRHS 2015). The far distances rural residents of Mon State have to travel to receive medical care puts an onerous burden on households with sick family members, as they may need to take time off from work to accompany their relative to a treatment facility. A good sign that Mon State is on the right path to solving the shortage in health infrastructure is that 86% of the villages that have at least one medical facility built at least one medical facility within the last five years (MSRHS 2015). Nevertheless, the Mon State government should consider making efforts to attract donor funding for the purpose of improving and expanding medical infrastructure in the state. Another option worth exploring is whether opportunities exist to capitalize on the recent foreign investment law changes that allow up to 80% foreign ownership of private clinics and hospitals (Vanderbruggen 2016).

Transportation to healthcare facilities, including emergency transportation, constitutes a major constraint on access to quality healthcare. Ambulance systems in Mon State are run as volunteer organizations set up by villages with donated funds. Even in Yangon, NGOs and charity-run ambulance services operate to bolster the fleet of state-run ambulances in order to provide emergency medical transport (Jha 2015). As volunteers often staff these systems, the training of the emergency medical responders and equipment on board the ambulance craft

are limited. Instituting a reliable emergency medical response system may be out of reach for the government of Mon State at the moment. However, the state may be able to appeal for donor-funded training for the volunteer staff, as well as request funds to pay for upgrades of the ambulances and to purchase the life-saving equipment needed to sustain patients until a proper medical facility is reached.

4.5.2. Promote Educational Attainment

In 2015, only 53% of the rural Mon population 16 years of age and older had completed primary school and only 11% had received a high school diploma. Approximately 77% of school-aged children were enrolled in formal schooling at the time (MSRHS 2015). The three main barriers to educational attainment in Mon State are access, costs, and misaligned incentives.

Mon State needs to work toward universal primary and secondary education access. While 80% of rural Mon residents live in a village with a primary school, this percentage drops to 37% for secondary schools, and 30% for high schools. To achieve universal access, the Mon State government must prioritize building or rehabilitating schooling infrastructure.

Another issue to contend with is the cost of education. While primary and secondary education attendance is free of charge in Myanmar, parents must often cover additional costs of education to continue enrolling their children in school (Save the Children–Myanmar 2016). The government should also consider how to help struggling households keep up with schooling costs.

Finally, another barrier to educational attainment is that rural and poor households may rely on school-aged children for supplementary income or on-farm labor, which creates pressure on students to drop out early. Further, the prospect of high-paying jobs in Thailand often prompts teenagers (sometimes under 14 years old) to migrate and neglect education. Incentives that discourage educational attainment may lead to a poorly educated population that could constrain long-term development prospects in the state. The Mon State government should evaluate the options available to promote schooling, such as collaborating with international NGOs to provide schooling incentives.

During Myanmar's years of isolation, the country's vocational education system has not kept up with rapid global changes in technology. Most of the vocational and technical schools, institutes, colleges, universities, and training centers are located in the delta, central, and dry zones. Mon State is home to one technical university located in Mawlamyine. Technical universities have a greater focus on higher-level technical training, leaving a vocational skills gap in Mon State. A new project funded by the Swiss Agency for Development and Cooperation launched the Vocational Skills Development Program in January 2015 with the aim of providing "market oriented short-term vocation training courses to disadvantage women and men" in Mon and Kayin states (Swisscontact 2015). The project expects to train 3,000 people between 2015 and 2018. If successful, it could serve as an example for attracting donor funding or private investment into developing a modern and comprehensive vocational and technical training program in the state.

4.5.3. Water, Sanitation, and Hygiene

Water, sanitation, and hygiene are immensely important in maintaining health and well-being, and by extension economic growth. A 2010 study of six countries in Southeast Asia showed that improper sanitation had economic impacts ranging from 1.3% to 7.2% of GDP

annually, due to missed work and schooling, malnutrition, and loss of life (Water and Sanitation Program 2010). Given the lower level of development in Myanmar, the economic impacts may be even greater in Mon State. For that reason, developing quality water, sanitation, and hygiene infrastructure and protocols needs to be on the government's agenda.

Only 39% of households have access to improved toilet facilities, and approximately 12% of rural households have no access to a toilet facility at all (MSRHS 2015). Proper toilet facilities provide a hygienic barrier that prevents the spread of diarrhea and other communicable diseases. Mon State's government should encourage donor investment in improved sanitation facilities at the household level in rural Mon State. In addition, adopting safe hygienic behaviors such as handwashing with soap and water after using toilet facilities and before eating has been shown to reduce incidences of diarrheal infection by 31%, among other benefits (Aiello et al. 2008). The government should consider adopting an awareness campaign about proper hygiene practices in the home.

Approximately 10% of rural households in Mon State have indoor or outdoor piped water. The majority of households report sourcing their drinking water from private wells (65.2%) and public wells (12.5%). Safe drinking water access in rural areas is one of the priorities of the Department of Rural Development and in the 2015–2016 budget year, 200 water projects were completed under the department (director, Mon State Department of Rural Development, personal communication, April 1, 2016). The government should continue to focus its efforts on providing safe and stable drinking water sources, particularly ones that are available in the dry season.

In Myanmar, the only water treatment facilities are located in Yangon city and Nay Pyi Taw. In other municipal areas wastewater is either captured in pit latrines or septic tanks or released untreated into water bodies (Logistics Capacity Assessment 2015). The latter practice likely has health implications that should be avoided through proper water treatment. Considerations should be made into how to attract donor or private investment into the proper treatment of water in municipal areas. For the rural population, this may be less of a problem as the population is much less dense. The Mon State government should consider investigating whether proper wastewater disposal is an issue affecting rural residents.

Waste collection and disposal falls under the purview of township development committees. Budget provisions for waste disposal are typically quite low. Currently, only six dumping sites exist in Myanmar for solid waste, none of which serve Mon State. The lack of proper garbage disposal affects hygiene and well-being, while also hampering economic activities such as the development of tourism. The Mon State government needs to put pressure on the township development committees to identify the failures in their garbage collection protocols and come up with solutions to maintain a landscape free of refuse. This objective may also require creating some awareness of the negative effects of littering through an information campaign, as that behavior is pervasive throughout the state.

4.6. Goal 2.F: Expand Social Safety Nets

Myanmar has suffered several weather events in the last 10 years that have devastated the livelihoods of its people. However, it has little by way of services to provide a social safety net to the population.

Farmers are particularly vulnerable, and financial institutions seldom extend agricultural loans and insurance. The Mon State government has some ability to mitigate weather risks through the use of development funds and constituency funds, and while such events are hard

to predict, the government should be sure to earmark funds annually to blunt the devastation of crop damage due to weather events. The government may also consider attracting private investment or a donor-funded project to provide insurance to farmers to mitigate the economic impact of weather calamities.

Similarly, there is need to promote safety nets for health care. Medical spending is currently the third-most-common use of remittances (MSRHS 2015). The development of a health insurance scheme for rural populations, such as China's New Cooperative Medical Scheme, could significantly reduce the financial burden of healthcare and ultimately contribute to health and productivity in the state.

5. CONCLUSIONS

5.1. Potential Areas of Growth

The analysis we present in preceding sections reveals that important opportunities exist for the economic development of rural Mon State. Although the rural economy faces substantial challenges, there is good reason for optimism if the Mon State and Union governments can work together with private-sector farmers and enterprises to develop a vibrant rural economy that raises rural incomes and improves the welfare of the rural population.

There is ample room for raising the productivity of agriculture, not only in the traditionally dominant rice and rubber sectors but also in high-value crops that hold promise in the domestic and export markets. While long-term growth in the agricultural sector might require significant infrastructural investments, there also exist potentially quick wins at relatively small cost. In the short run, facilitating investment in agriculture, disseminating best practice information, relaxing land classification constraints, and enabling foreign investment in agricultural processing can help set the foundations for renewed agricultural growth.

Further opportunities lie in the development of markets, both agricultural and nonagricultural. Mon State needs to provide a strong enabling environment for the expansion of SMEs in commerce, food processing, construction, tourism, and other high-potential growth sectors. In particular, incentives for the productive investment of remittance incomes have the ability to generate momentum in private-sector development.

Mon State can leverage the current favorable investment climate and increase in donor commitment to generate growth. Foreign direct investment can enable the state to quickly install modern industrial facilities or upgrade existing ones, for instance in rubber processing. Large donor investment toward the development of public infrastructure in transportation and energy can create the right conditions for businesses to thrive. However, while public infrastructure is undoubtedly an essential component of economic growth, the current donor investment portfolio is imbalanced relative to the sectoral composition of investments our analysis identifies as necessary for balanced growth. Specifically, agriculture, natural resources, water and sanitation, and education receive low levels of investment by donors.

5.2. Key Principles for the Design of a Rural Development Strategy

The following key principles are essential to designing a rural development strategy for Mon State:

- **Inclusiveness**—clearly understanding the strengths and weaknesses, and the respective roles, of stakeholders, including government, the private sector, and civil society. Civil society may be most effective in terms of mobilizing public opinion and support for investment and policies, and filling in the service delivery gaps, where government or the private sector alone cannot adequately provide. The private sector is often most effective in achieving efficiency in terms of resource allocation and use. The government, on the other hand, has a key role to play in providing public goods and services in areas where private provision does not exist or is inadequate; widely disseminating information, know-how, and technology; and coordinating with the private sector and civil society in areas where partnership is currently lacking.
- **Decentralization**—practicing decentralized decision making, bottom-up planning, and co-learning. In planning investment projects and making public decisions, the input of stakeholders—players along the entire agricultural and nonagricultural value chains,

civil society, and rural population generally—is desirable to ensure that intended investments and policies effectively address needs, use public coffers efficiently, and enhance equity.

- Sustainability—balancing short-term gains with long-term growth. Investments and policies should consider not just securing quick wins but also laying platforms for long-term growth and sustainability. The latter activity should be broadly conceptualized to encompass political, social, environmental, and economic spheres.

5.3. Early Actions: Investments and Policy Options in the Short Run

Our analysis offers insight into the functioning of the Mon State rural economy and allows us to identify some of the key friction points where immediate targeted action can deliver quick wins. To be feasible, early actions need to satisfy two conditions. First, due to budgetary constraints, they must require limited investment from the state government or easily accessible funding (from the Union of Myanmar, donors, or private investors). Second, they must involve only the legal or regulatory framework that falls under the purview of the state government. Table 4 on the following page summarizes some of the options for such next steps.

5.4. Medium- to Long-Term Actions

In addition to the aforementioned short-term actions, which require limited regulatory changes and rely on limited or easily obtainable financing, the government of Mon State needs to identify long-term evolutions that should take place if growth in the state is to be sustained. Some of those involve large-scale investments in economic and social infrastructure requiring substantial time and funding. Others depend on the slow process of building institutional infrastructure. Others require changes in nationwide laws or regulations that would be feasible only through coordinated action at the Union level.

Economic infrastructure is important in revitalizing Mon State’s rural economy and sustaining growth. Public authorities should invest in physical infrastructure that promotes productivity and income growth in the agricultural sector such as modern irrigation schemes and rural access roads. Such investments are more difficult to engage in than the large-scale road or energy projects favored by foreign donors, and they will require substantial planning on the part of the local government. With government support, private investment can lead in upgrading port and airport facilities, as well as investing in processing, storage, and logistics infrastructure and cluster development.

Social infrastructure, such as health and educational facilities and programs, is important in ensuring that Mon State has a steady supply of healthy and educated workers for sustained growth. Existing public medical and educational facilities need urgent and sustained upgrading, whereas new ones need to be installed to extend their access to a large share of the rural population. The same is true for water, sewage, and garbage collection systems. Both public and private investment and coordination are necessary to avoid overlaps and to close gaps. Donor funds have until now been applied sparingly to these areas, and the state should seek further commitment from the donor community. Public–private–civil society partnerships can also be most effective in labor-training and technical-upgrading programs. Further, strengthening and expanding social safety nets can promote the participation of the poor and the vulnerable in all-inclusive growth.

Table 4. Options for Early Actions and Next Steps

Area 1: Generating Growth Opportunities and Policy Options for Dynamic Agricultural and Resource Extraction Activities	
Item	Action
Rubber (Goal 1.A)	<ul style="list-style-type: none"> - Develop rubber producer associations to coordinate processing and upgrade the quality of latex sheets. - Promote mixed cropping systems with small ruminants (goats) or vegetable intercropping. - Improve rubber-grading mechanisms and branding of Myanmar Standard Rubber. - Enable joint-venture initiatives with foreign investors for the upgrade of rubber-processing facilities.
Fruits and vegetables (Goal 1.B)	<ul style="list-style-type: none"> - Draw on existing knowledge to identify best practices and disseminate information. - Define a reliable set of quality and safety standards in accordance with international norms.
Rice-growing areas (Goal 1.C)	<ul style="list-style-type: none"> - Identify existing improved seeds for Mon conditions and find a partner (private or nongovernmental organization) to organize distribution. - Coordinate the fight against snail infestation in affected areas. - Commission an assessment of state groundwater resources to determine viability of tube-well irrigation.
Inputs (Goal 1.D)	<ul style="list-style-type: none"> - Land regulations: Modify land use restrictions to enable conversion of one acre or up to 20% of paddy land per farm to other uses, including fish ponds (aquaculture). - Agrochemicals: Enforce labeling requirements in Myanmar/Mon language.
Extension (Goal 1.E)	<ul style="list-style-type: none"> - Establish training programs for extension agents in high-value crops.
Fishing and aquaculture (Goal 1.F)	<ul style="list-style-type: none"> - Implement a closed season during which no fishing is allowed. - Introduce bans on fishing boats and ecologically damaging practices. - Enable farmers to convert part of their land to fish ponds (see Goal 1.D).
Area 2: Creating an Enabling Environment for Balanced Growth	
Item	Action
Local government (Goal 2.A)	<ul style="list-style-type: none"> - Organize training and capacity strengthening for government staff on the division of responsibilities and authority, and mechanisms for coordination between the Mon State and the Union of Myanmar government. - Partner with donors around projects following the community-driven development model.
Infrastructure (Goal 2.B)	<ul style="list-style-type: none"> - Pursue further donor-funded investments to fill critical road, energy, and communications infrastructure gaps.
Financial sector (Goal 2.C)	<ul style="list-style-type: none"> - Promote the use of formal banking and secure transactions (including remittances).
Private enterprise (Goal 2.D)	<ul style="list-style-type: none"> - Organize training for the creation of small businesses. - Pursue application and enforcement of a national building code. - Define zoning and regulations for sites with tourism potential.
Social services (Goal 2.E)	<ul style="list-style-type: none"> - Seek donor funds for the purchase of emergency vehicles and life-saving equipment.

Source: Authors.

Note: Goal 2.F (Expand Social Safety Nets) is hard to implement as an early action and so is not included in this table.

Institutional infrastructure, however, must go hand in hand with physical infrastructure development. Continuous improvement of the business environment for both farmers and nonfarm entrepreneurs is necessary. This includes, for instance, continued efforts in strengthening land tenure security, building government capacity for agricultural research and extension, or the implementation of institutional arrangements for protection of environmental and cultural assets. Here, again, it is important to recognize the potential for private-sector involvement. Whereas the government needs to improve institutional design in seed research and dissemination, extension services, and credit provision, in the long run private innovation and investment are also critical for vibrant markets in these sectors.

Overall, sustained investment in social, institutional, and economic infrastructure at the state level will be necessary to ensure that rural populations and businesses are adaptable and continuously able to take advantage of changing economic conditions.

In addition, policies at the Union of Myanmar level can be game-changers for the Mon State economy. At the micro level, land use policies, business taxation, and regulation define opportunities for economic actors. In the long run, it will be necessary for Myanmar to revise its agricultural land use policy so as to enable farmers to respond effectively to market conditions. At the macro level, laws governing international trade, foreign direct investments, banking regulations, and monetary policy all influence local economic outcomes, particularly in Mon State, which relies heavily on exports and remittances. For instance, maintaining a competitive real exchange rate through effective macroeconomic policy management is essential to enhance the profitability of rubber and other agricultural exports. Although such decisions are made at the Union level, there is scope for state and region governments to influence such decisions through coordinated advocacy.

5.5. Summary

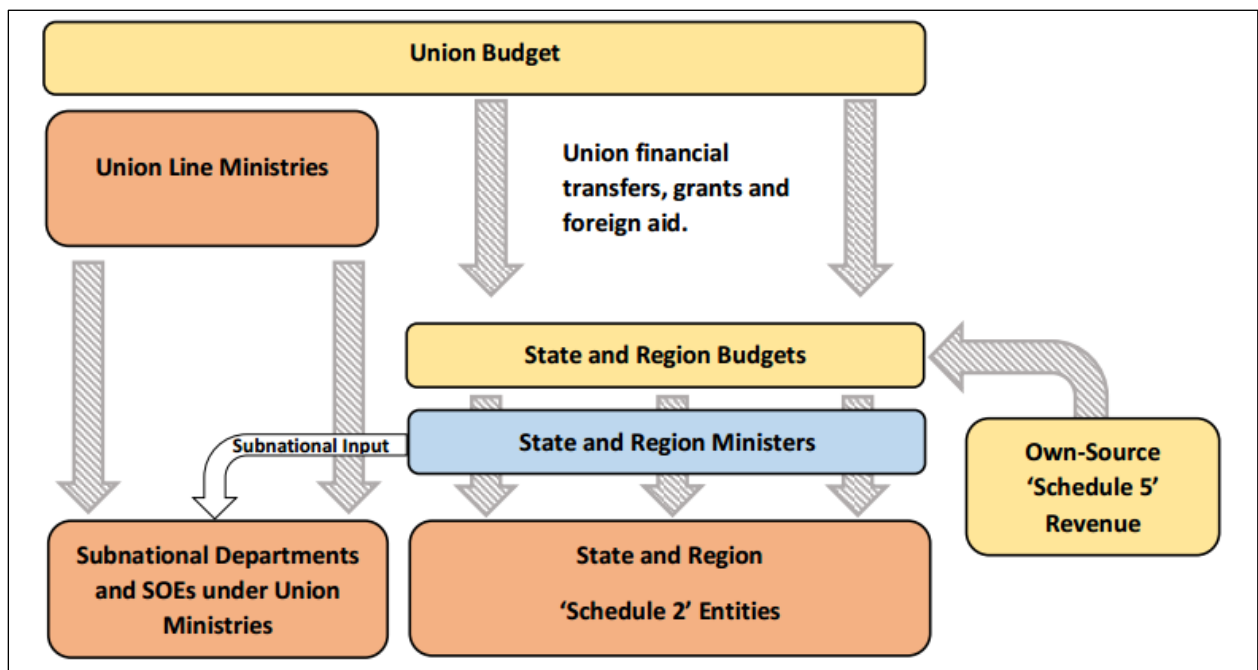
The analysis this report provides identifies key challenges and opportunities facing the Mon State rural economy today, based on extensive fieldwork, research into secondary sources, and statistical analysis of a representative rural household survey. This diagnostic assessment was used to provide a set of policy and investment options designed to help promote balanced growth in the state, both in terms of short- and long-term actions. However, they should not be read as a master plan or rigid set of requirements, but rather as recommendations *toward* the preparation of a rural development strategy for Mon State, and an outline of the principles that can guide the future evolution of such a strategy. As new information comes to light and the economic conditions change, the list of possible policy tools will evolve and the rural development strategy will need to be adapted. As that refinement takes place, an emphasis on the outlined principles of inclusiveness, decentralization, and sustainability remains of the essence.

APPENDIX A. BUDGET PROCESS

Figure A.1 diagrams the main planning and budgetary process at the state (or region) level. Expenditures for the state are dispersed in two ways, through line ministries at the Union of Myanmar level to their state-level units or through the state chief ministries with the state-level budgetary process. The latter process is the main source of decentralized funding to states and regions in Myanmar, yet it accounts for only 5% of total public spending taking place in states or regions (Zaw Oo et al. 2015). The budgetary process starts with all of the entities under the state domain preparing their individual budgets. The budgets are consolidated by the budget department under the direction of the finance minister. Finally, the state chief ministry prioritizes them and submits to the state *hluttaw*, a partially elected unicameral assembly created under the 2008 Constitution.

Once approved, the budget is sent on to the Union financial minister who passes it on to the Union financial commission, which comprises the president, two vice presidents, the auditor, the attorney general, the minister of finance, the Nay Pyi Taw council chairman, and each of the 14 chief ministers (Dickenson-Jones, De, and Smurra 2015). The Union financial commission reviews the budget and decides on final allocations and sends them on to the Union *hluttaw* for approval, and then to the president for final approval. Once all allocations from the Union government are made, the money is then dispersed directly to the state budget department for dispersal to other subnational entities.

Figure A.1. Structure of State and Region Public Finances



Source: Dickenson-Jones, De, and Smurra 2015.

Note: SOE = state-owned enterprise.

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