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The U.S. Government's Global Hunger & Food Security Initiative



INFRASTRUCTURE RATE Summary

This document presents the findings of the Regional Agricultural Trade Environment (RATE) assessment conducted in the ASEAN region in 2012 by the Maximizing Agricultural Revenue through Knowledge, Enterprise Development, and Trade (MARKET) Project.



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Infrastructure

Regional Agricultural Trade Environment (RATE) Summary

USAID Maximizing Agricultural Revenue through Knowledge, Enterprise
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On the cover: Ships lined up at an ASEAN port.

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In Brief

INFRASTRUCTURE

Why Infrastructure? Soundly planned, well-executed, and inclusive infrastructure projects offer many potential rewards, among them increased opportunities for domestic trade, better access to regional and international markets, and, in the long run, greater food security and reduced poverty. In recent years, ASEAN Member States have strengthened their domestic infrastructure significantly with large investments, including for improvements in transport facilities, especially roads, highways, ports, and airports, as well as in dams and telecommunication networks. Considerable demand remains, however, for infrastructure projects that more directly support agricultural value chains, including improvements in rural roads, electricity, water, and storage facilities. Better infrastructure can reduce both transport costs and spoilage of products, and allow for greater producer access to extension services and other productivity-enhancing opportunities.

ASEAN's Approach

The ASEAN Economic Community (AEC) Blueprint presents strategic visions and actions to be taken in transport cooperation; land, maritime, and air transport; information infrastructure; energy cooperation; mining cooperation; and financing of infrastructure projects. In terms of land transport, the blueprint names completion of the Singapore-Kunming Rail Link, connecting Southeast Asia with China, and ASEAN Highway Network as top priorities. The Rail Link project, providing an alternative mode of cross-border cargo transportation, is expected to have a large impact on efficiency. The AEC Blueprint also calls for the creation of a regional infrastructure development fund. In response, the ASEAN Infrastructure Fund, spearheaded by the Asian Development Bank, was launched in 2012.

Regional Findings

Policymakers in the ASEAN region have strengthened their commitment to long-term infrastructure planning, which strengthens the confidence of investors and businesses. A wide infrastructure gap remains between rural and urban, however. Postharvest loss by small agricultural producers is one of the most complex problems facing the agricultural sector in Southeast Asia, with as much as 30 percent of agricultural production lost across the region each year. Cold chains are not available to most producers, especially for those operating at a small scale. Public confidence in transparency of infrastructure projects is low, and some suspect that infrastructure concession awards and management are being compromised. But ASEAN Member States increasingly engage in public-private partnerships, and some countries report favorable experiences.

Opportunities for ASEAN and Regional Entities

- Explore opportunities in the ASEAN Infrastructure Fund and other sources for funding for infrastructure activities that connect agricultural products to markets and Member States with one another
- Encourage greater study and understanding of the links between infrastructure and postharvest loss
- Formulate a regional transport policy, incorporating the establishment of transnational corridors passing through locations that are centers of agricultural and industrial production
- Encourage regional initiatives to strengthen cold storage opportunities
- Establish a shared definition of PPPs in the region along with a network for sharing standards and guidelines for protecting investors' rights

Opportunities for Member States

- Create Infrastructure Accountability Websites to track public expenditures on physical infrastructure projects
- Incentivize infrastructure development for agricultural trade

AT ISSUE: STRENGTHENING THE ENABLING ENVIRONMENT FOR INFRASTRUCTURE IN SUPPORT OF TRADE IN AGRICULTURAL PRODUCTS

Soundly planned, well-executed, and inclusive infrastructure projects offer many potential rewards, among them increased opportunities for domestic trade, better access to regional and international markets, and in the long run, greater food security and reduced poverty. In recent years, ASEAN Member States have strengthened their domestic infrastructure with large investments, including many that are financed by foreign governments and donor institutions. Across the region, improvements have been made in transport facilities, especially roads, highways, ports, and airports, as well as in dams and telecommunication networks. Some projects, such as those improving Mekong region transport, focus on subregional connectivity. At the same time, vast opportunities remain to build transportation and communication networks across ASEAN.

Among ASEAN Member States, the largest, most visible infrastructure projects—many of which are based in cities—do not necessarily make the most impact on agricultural value chains.¹ Although dynamic infrastructure construction across ASEAN Member States is promising, many immediate problems at the lower end of agricultural value chains have yet to be addressed. As the Asian Development Bank notes, “On a per capita basis, ASEAN nations have only a fraction of the roads and railways found in [Organization for Economic Cooperation and Development] nations, with dramatically lower electricity and clean water coverage.”² Indeed, investment in roads, particularly ones that connect rural areas with markets and other resources, represents an important means to increased agricultural productivity.³ Moreover, access to electricity makes a threshold difference for farmer and traders of products that require preservation, chiefly through cold storage, on their way to markets.⁴ Proper management of water resources not only is fundamental toward ensuring public health, but also makes a critical difference in productivity and in the ability for food products to meet health and safety standards for trade.⁵

RATE country assessments reviewed the following kinds of infrastructure:

- Road networks (quality and coverage of roads, extent of feeder roads)
- Railway network coverage
- Inland waterway transport
- Public and private commodity storage facilities, including cold storage and drying facilities
- Access to and adequacy of irrigation facilities and wastewater management
- Access to electricity for producers, processors, and traders.

Infrastructure financing has evolved substantially around the world, including through public-private partnerships (PPPs). “PPP” broadly refers to arrangements between the public and private sector organizations, whereby part of the work that falls under the responsibility of the public sector is conducted or paid for by the private sector, with clear agreement on shared objectives for delivery of public infrastructure and/or public services.⁶ Although certain ASEAN Member States have developed innovative new financing options, PPPs are still at nascent stages in most. To date, few PPPs in rural infrastructure projects have been used. With commitment, capacity-building, and facilitation from Member States, PPPs can be instrumental in accelerating infrastructure development for agriculture.

Infrastructure projects are prone to corruption in many parts of the world and several ASEAN Member States are vulnerable to this problem. Political favoritism in awarding public contracts compromises the quality and expected benefits of infrastructure projects, which often cost more than objective sources believe is reasonable. A factor feeding into the problem is the recurrent practice of closed, non-competitive bidding for infrastructure projects. There have been favorable developments in several ASEAN Member States in terms of fighting corruption; however, opacity in awarding infrastructure contracts remains endemic and the losses are still very large. Political integration across ASEAN, including the regional commitment to anti-corruption initiatives, could be influential and a positive pressure on increasing transparency within countries.⁷

Postharvest loss represents another infrastructure-related challenge for ASEAN Member States' agricultural value chains. Slow roads, a lack of adequate storage facilities, and similar problems can result in spoilage or abandonment of significant portions of farm production, which threatens the livelihoods of farmers and small-scale traders. The problem is multidimensional, caused by lack of financing to build storage facilities; lack of resources for research and use of technology; and inadequate training for workers and traders to handle vulnerable crops. The problem of postharvest loss demands a wide range of solutions, including many that are geographically specific or commodity specific.

This analysis summarizes selected issues pertaining to the infrastructure underlying trade in agricultural products in ASEAN Member States. In addition to summarizing ASEAN's approach to regional infrastructure development, this paper suggests opportunities for action, including policies that may link the benefits of large-scale infrastructure projects to agricultural value chains, so that the infrastructure benefits farmers and small agribusiness more tangibly.

Road infrastructure can reduce transport costs and make remote areas more accessible through transit routes in neighboring countries, while new roads bring new economic activities, helping development to spread. A rural road, if complemented by other investments, can boost agricultural productivity and employment and therefore rural income. And transport corridors can reduce poverty by opening up development opportunities, especially if feeder roads are developed. By contrast, a lack of adequate access to transport facilities implies high transport costs, limited market access for agricultural produce, and losses due to spoilage, resulting in low incomes. Inadequate road connections and communication facilities imply poor agricultural extension services and low awareness of modern cropping practices and technology, resulting in low agricultural productivity.

—P.V. Srinivasan, Regional Cooperation and Integration through Cross-Border Infrastructure Development in South Asia: Impact on Poverty, Asian Development Bank (November 2012)

ASEAN'S APPROACH TO INFRASTRUCTURE FOR AGRICULTURAL TRADE

While many of the infrastructure issues affecting agricultural producers, processors, and traders are centered at the Member State level, stakeholders also look to ASEAN to coordinate major infrastructure initiatives that can strengthen regional connectivity. The ASEAN Economic Community (AEC) Blueprint (2008)⁸ sets forth a plan to make ASEAN more competitive by increasing the free flow of goods, services, and investment. The AEC Blueprint presents strategic visions and actions to be taken in transport cooperation, land transport, maritime and air transport, information infrastructure, energy cooperation, and financing of infrastructure projects.

In terms of land transport, the blueprint names the completion of the Singapore-Kunming Rail Link (SKRL) connecting Southeast Asia with China and the ASEAN Highway Network as top priorities. Because railway networks and operations are deficient in the region, the execution of the SKRL project is expected to greatly improve the efficacy of this alternative mode of cross-border cargo transportation. The railway line is 7,000 km long and will link major cities in Thailand, Cambodia, Vietnam, Laos, Burma, Malaysia, Singapore, and China.

The ASEAN Highway Network aims to construct and upgrade roads connecting ASEAN countries and China. Part of the ASEAN Highway Network overlaps with the Trans-Asian Highway network. Time targets for the completion of certain stages, including the upgrading of roads to Class III international standards, have not been met.

Since 1996, regional initiatives pertaining to transport infrastructure have been overseen by the regular Meeting of ASEAN Transport Ministers. The portfolio of this group is broad, including transport by road, rail, river, air, and other modes. The transport ministers monitor regional initiatives arising from the Master Plan on ASEAN Connectivity (MPAC), which seeks to improve physical connectivity (infrastructure) and institutional connectivity. The ASEAN Strategic Transport Plan (2011–2015) aims to create an efficient, secure, and integrated transport network to increase ASEAN region's attractiveness as a production and investment destination.

The regular Meeting of ASEAN Energy Ministers, along with its supporting activities and institutions, is also relevant to infrastructure-related issues of agricultural trade, with its work affecting the cost of fuel for transport of goods and the availability of cold storage. The ASEAN Plan of Action for Energy Cooperation (APAEC) 2010–2015 addresses many aspects of regional cooperation and ASEAN's overriding interest in sustainable, environmentally friendly energy practices throughout the region.

The AEC Blueprint does not address directly certain agriculture-specific infrastructure issues, such as irrigation or cold storage facilities, because these resources do not lend themselves to cross-border usage. Still, on-farm infrastructure issues such as irrigation and storage relate to the overall agenda of the ASEAN Ministers on Agriculture and Forestry (AMAF), which in recent years has embraced food security as a matter of permanent high

Greater Mekong Subregion (GMS): A Powerful Regional Infrastructure Initiative

The GMS includes four ASEAN member countries—Cambodia, Laos, Thailand, and Vietnam—plus the provinces of Yunnan and Guangxi in [People's Republic of China] PRC. Its major goal is integration, and its main functional areas are trade and infrastructure, with a focus on improving connectivity in the subregion by improving transport, energy, and telecommunications. Cooperation in the energy and telecommunications sector began in 1992 with power transmission lines linking Laos and Thailand. In 2001, a 10-year strategic framework was adopted to enhance connectivity, competitiveness, and a sense of community; eleven flagship programs were identified, including three economic corridors: East-West, North-South and Southern (ADB 2005). In 2008, the GMS cross-border transport agreement (CBTA) was signed and ratified. The CBTA is a compact and comprehensive multilateral instrument that covers all the relevant aspects of cross-border facilitation including single-stop/single-window custom inspections; cross-border movement of people; transit traffic regimes; requirements for vehicles making cross-border trips; exchange of commercial traffic rights; and issues related to road and bridge design standards, road signs and signals.

—ADB Institute, Infrastructure Development in ASEAN: An Overview (2009)

priority. The ministers adopted the Statement on Food Security in the ASEAN Region, which commits to the implementation of the ASEAN Integrated Food Security (AIFS) Framework and the Strategic Plan of Action on Food Security in the ASEAN Region (SPA-FS) (2009–2013).⁹ The AIFS Framework sets goals and objectives and defines terminology and guiding references and principles, which are supported by the Strategic Plan of Action on Food Security in the ASEAN Region. The strategic plan aims to improve the livelihoods of farmers in the ASEAN region. One of six core “thrusts” of the plan is to promote sustainable food production, including by improving “agricultural infrastructure development to secure production system[s], minimize postharvest losses, and reduce transaction cost[s].”¹⁰

The AEC Blueprint also calls for the creation of a regional infrastructure development fund. In response, the ASEAN Infrastructure Fund, spearheaded by the Asian Development Bank (ADB), was launched in 2012. The fund is an innovative financing mechanism for unlocking the region’s own resources (including foreign exchange reserves and private savings) through debt issuance. It is expected to serve ASEAN by matching resources with needs. The fund will help structure viable infrastructure projects, incorporating private-sector participation and public-private partnership modalities. It will leverage the region’s savings pool to finance up to 30 percent of infrastructure projects, with the amount available estimated to be more than US\$13 billion by 2020. The ADB and ASEAN Member State governments have agreed to contribute the core equity, while institutional investors such as pension funds will be invited to participate, and down the road, senior bonds will be sold. Framers of the fund envision supporting a range of infrastructure projects, including rural development initiatives. (An ASEAN high-level working group appears to have been established to provide guidance or support to the fund, but there is little public information about the status of this group.)

In its 2012 midterm review of ASEAN’s progress in achieving the commitments in the AEC Blueprint, the Economic Research Institute for ASEAN and East Africa (ERIA) reiterated “An efficient, secure and integrated transport network in the ASEAN is an important underpinning for AEC’s agenda toward a



For countries along the Mekong, the river remains the most important infrastructure for trade.

single market and production base in the region.”¹¹ In support of the “way forward” on transport and other infrastructure initiatives, ERIA recommended redoubled commitment to the AEC Blueprint, noting that the need for regional infrastructure improvements will continue well past the AEC establishment date in 2015.

INFRASTRUCTURE IN ASEAN: RATE ASSESSMENT HIGHLIGHTS

The RATE assessment reviewed selected aspects of infrastructure in ASEAN using a four-part methodology: legal framework, implementing institutions, supporting institutions, and social dynamics. Questions covered legal and institutional frameworks for infrastructure in step with international best practice, as well as other aspects of infrastructure affecting agricultural producers, processors, and traders. The findings are set forth below.

Infrastructure is increasingly part of holistic, long-term planning for development

Policymakers in the ASEAN region have devoted a great deal of effort in recent years to long-term domestic planning in infrastructure. The governments of ASEAN Member States have increased their commitment to planning, strengthened their human resources, and created a more coherent vision throughout the region of what the future holds. Although plans invariably change, planning itself is an indispensable aspect of sound public policy.¹² Long-term infrastructure planning across the ASEAN region strengthens the confidence of investors and allows businesses (large and small) to devise their own strategies for growth.

The 2011–2016 Philippine Development Plan calls for a comprehensive long-term national transport plan to guide the restructuring of the transport sector into a well-coordinated and integrated multimodal transport system. The national transport plan is expected to establish the government’s policies on resource generation and allocation; criteria for the preparation of agency plans, programs, and projects; cost recovery and subsidies; regulations for passenger transport services; urban transport and settlements; transport logistics; and governance. In the interim, the national transport plan is operationalized through an executive order, and in the medium term, through legislative enactment. National and local coordination aims to provide the necessary transport infrastructure to link production and agricultural areas to major roads leading to markets and population centers. The Philippine Development Plan calls for separation of the operational and regulatory functions of transport agencies and the port, rail, and air transport organizations.

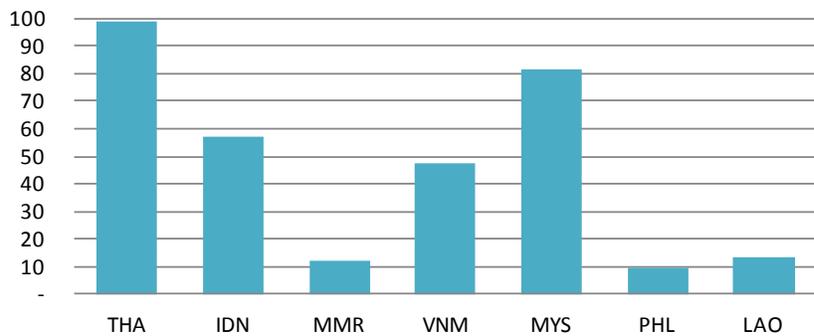
The government of the Philippines recognizes that the institutional framework for transport is characterized by weak coordination, regulation, and oversight for transport policies and plans. The government has recommended studying the institutional structure of the transport sector to determine the most efficient institutional setup (and corresponding reforms) to improve the quality of transport service and to prevent conflict between different modes of transport that serve the same purpose. Execution of the national transport plan is regarded as a threshold step toward improving the accountability of decision makers in the transport sector and developing a multimodal approach to infrastructure investment planning, programming, and prioritization.

The 10th Malaysia Plan (2011–2015) calls for the country to establish world-class infrastructure to support growth and enhance productivity in all sectors. The government plans to spend 2.7 billion RM (about US\$872 million) to build roads and rail to key ports and airports and an electrified double-track rail to Johor Baru. It will spend 1 billion RM (US\$32 million) to deepen port channels and 6 billion RM (US\$1.9 billion) for upgrading Westport, Port of Tanjung Pelepas, and Penang Port. The plan also calls for improving rail service to rural areas in the east coast of Peninsular Malaysia and Sabah by modernizing facilities and technologies. The plan further promotes the growth of cities. Because cities need resources to grow, the government will improve the connectivity and linkages between them and surrounding rural areas to facilitate movement of the resources, goods and services, and people that are critical to the development of cities. Addressing a chronic unmet need throughout the region, the government aims to promote IT infrastructure, with a target of 75 percent of households having broadband Internet access by 2015. Finally, the 10th Malaysia Plan highlights the importance of providing adequate and specific infrastructure, facilities, and

logistics to support value addition in agricultural industries based on availability and proximity of resources, particularly in Permanent Food Production Parks and Aquaculture Industrial Zones.

Thailand has framed much of its long-term infrastructure planning in terms of logistics for trade.

Roads, paved (% of total roads)



Source: World Bank WDI, 2010



A lack of paved roads is a barrier to growth in rural areas throughout the ASEAN region.

Thailand's Logistics Development Strategy (2007–2011) was created to enhance trade facilitation with the aim of increasing cost efficiency, customer responsiveness, reliability, and security, as well as creating added value for the logistics and other supporting industries. The strategy emphasizes a multimodal approach and promotes railway development and a national single window model for trade across borders. The strategy has five areas of focus: business logistics improvement, transport and logistics network optimization, logistics service internationalization, trade facilitation enhancement, and capacity building. This strategy underscores the importance not only of physical infrastructure, but also of oversight and management of its use. The strategy also emphasizes ports, supporting deep seaports on the west coast and an economic corridor linking ports with the region's major transport bloodlines.

Since 2000, Indonesia's legal framework for infrastructure, including transport, has been strengthened significantly. Responsibility for national transport systems is split between the Ministry of Public Works and the Ministry of Transport. Weak private sector investment in transport and storage infrastructure is attributed to regulatory uncertainty at the national and local levels. Local institutions in particular are considered lacking in capacity, especially with respect to project design and development. According to the OECD, one survey found that 85 percent of local regulations are incomplete, inconsistent, or "distort local economic activities."¹³ Since 2005, however, the Ministry of Public Works has been implementing a plan for developing the national road network. The government has committed to national investment not only in commercially profitable infrastructure initiatives, but also in resources that will assist less-privileged communities that do business chiefly in the agriculture sector.

In Vietnam's five-year strategic plan submitted in 2009, the Ministry of Transportation identified five core transport sector problems: (1) incomplete and disintegrating institutional system and development plans; (2) unsatisfactory quality and capacity of transport service; (3) poor quality and insufficient quantity of transport infrastructure in both urban and rural areas; (4) insufficient state budget and other financial sources; and (5) complications from the regional and global economy. There is wide consensus that these problems—arising mainly from insufficient resources and inputs and policy, institutional, and operational inefficiencies—cause environmental and social degradation and hamper socioeconomic development. Vietnam therefore emphasizes separating the policy, regulatory, and operator roles with respect to infrastructure. Private sector observers say that a multimodal orientation is still lacking, resulting in imbalances and integration problems between subsectors.

Throughout the ASEAN region, public officials are aware that, in the absence of transparent planning, confidence in the future diminishes, and that when plans are not realized, their own credibility suffers. The increase in regular planning for infrastructure in the region—just a sample of which is described here—is an important step toward improving the accountability of institutions.

The impact of infrastructure projects: How far up the value chain?

Large-scale infrastructure projects, including ports, dams, highways and airports, have been implemented throughout the ASEAN region in the last decade, but infrastructure for small agricultural producers, processors, and traders is still lacking. The infrastructure needs of small-scale enterprises—feeder roads, irrigation facilities, inland waterway infrastructure, storage facilities, electricity for remote areas and villages, and intermediate means of transport—are often not met. A lack of adequate rural infrastructure results in high transport costs, including high trucking tariffs due to the poor quality of roads; postharvest

loss during transport or due to lack of storage facilities; and inability to connect producers at lower ends of value chains to markets, which hampers value-chain development.

In many ASEAN countries, especially poorer ones, farms and villages are not connected by asphalt roads to markets. There are considerable differences, however, across the region: Thailand is advanced in this regard, emphasizing rural road construction since its third economic development plan (1972–1976). Between 1977 and 2000, Thailand’s rural road density grew faster than local and national roads. Consequently, the infrastructure needs of rural communities are mostly met.

Laos lies on the other end of the scale, with rural feeder roads connecting farms to markets excluded from infrastructure improvements. In fact, Lao agencies with authority over transport and roads are said to demonstrate little appreciation of the needs of farmers and distributors. The small fees, bribes, and other inconveniences transport authorities routinely seek cause substantial costs to farmers, processors, and distributors. In

Total area equipped for irrigation			
Subregion	Area (ha)	% of region	% of cultivated area
East Asia	65,362,926	36	48
South Asia	93,139,770	51	46
Mainland Southeast Asia	13,773,866	8	31
Maritime Southeast Asia	8,999,719	5	16

Source: “Irrigation in Southern and Eastern Asia in Figures- AQUASTAT Survey 2011,” FAO Water Reports.

Indonesia, severe road congestion on the island of Java, especially in the greater Jakarta area, together with poor road quality outside Java, make trucking costs higher in Indonesia than the average for Asia.

In Vietnam, rural road penetration has increased significantly in the last decade. Vietnam’s topography is challenging and distances are long, so agricultural products typically go through many middlemen in moving along the value chain. In 2009, sector assessments prepared in support of Vietnam’s Social Economic Development Plan 2011–2015 recognized that rural areas need feeder roads. Vietnam aims to spend US\$7 billion on roads, highways, bridges, and general transport infrastructure between 2012 and 2014. The Asian Development Bank has supported additional infrastructure initiatives, including for irrigation projects.

In Cambodia, because of years of internal conflict and weak investor confidence, the country lacks the infrastructure it needs to support a thriving agricultural trade. Not only roads, but also irrigation facilities are needed, and the cost of electricity is extremely high. Besides restoring reservoirs, the most cost-effective irrigation projects reportedly involve the rehabilitation of long-abandoned canals. The presence of operative irrigation canals can make an enormous difference in a farmer’s livelihood; farms in Cambodia that have access to irrigation can grow at least two seasons worth of rice a year, producing a surplus that can be used for commercial purposes.

In Indonesia, most irrigation systems are weak or even failing. They usually consist of small systems with less than 1,000 hectares under district government authority. The law on regional autonomy, enacted in 1999, passed authority for irrigation and public agricultural storage facilities on to provincial and local governments. At the national level, several ministries are involved in setting policy (National

Development Planning, Public Works, Agriculture, Internal Affairs, and Finance), while local authorities have primary authority over regulating and implementing new projects.

Beyond the farm, Indonesia also suffers from poor “connectivity”—that is, the ability to connect junctures along agricultural value chains that ensure prompt delivery of products to markets and ports. For example, as the World Bank notes, “The high cost of transporting high-quality goods such as shrimp from eastern Indonesia to processing centers in Java makes them too expensive to export, or similarly it is cheaper to import oranges from China than ship them from Kalimantan to Java.”¹⁴ Examples of high intra-island logistics costs include severe road congestion on Java, especially in the greater Jakarta area, together with the poor road quality outside Java, both of which make trucking costs higher in Indonesia than the average for Asia. During the RATE assessment, interviewees confirmed that intra-Indonesian shipping costs are much higher than international shipping costs, due to quality and size of ports, limited shipping schedules, a lack of competition at the domestic level, and the need to pass some commodities through the “international” ports.

Railways are in poor condition across ASEAN and are rarely used for transporting agricultural products. Railroad feasibility depends largely on the geographic landscape, but in many areas in ASEAN, improvements in railroads could significantly decrease the transport costs of agricultural products, such as between Bangkok and northern Thailand. Notwithstanding the high priority given to rail in the country’s Logistics Development Strategy, Thailand lacks a well-functioning railway network. Yet rail presents an opportunity for agricultural traders to send products to Bangkok more efficiently than current conditions permit. Moreover, railways would enhance trade with Malaysia, and a rail network would be crucial to link with the Dawei port in Myanmar, for which plans are underway.

Postharvest loss: Undermining achievement in agricultural production

Postharvest loss is the one of the most complex problems facing the agricultural sector in Southeast Asia. Every year, as much as 30 percent of agricultural production is lost across the region during various processes in the value chain.¹⁵ Postharvest loss can occur in any stage of production, processing, and trade, including threshing, harvesting, handling, drying, storage, transport, processing, and crossing borders. Where the loss takes place depends largely on the location and commodity, and different aspects of the problem implicate different solutions. If spoilage or deterioration occurs, for example, during the harvesting stage, it may mean the farm needs other techniques, such as newer technology, to reduce the loss. If it happens during handling, the workers may need to be better trained. If it happens

View from Cambodia: A long-term vision for infrastructure

The Ministry of Public Works and Transport (MPWT) is responsible for developing sector plans for major infrastructure in the transport sector and in public works in urban areas such as wastewater management, drainage, and flood control. The MPWT’s responsibilities encompass 11 international airports, 5,263 kilometers (km) of national roads, 6,441 km of provincial roads, the railway, a deepwater seaport at Sihanoukville, and various river ports. The railway is being developed with ADB assistance from its public sector operations and will link Cambodia to Thailand, and rehabilitate the line from Phnom Penh to Sihanoukville. The PRC has assisted the government in preparing a feasibility study for constructing a new railway line from Phnom Penh to Viet Nam, which is currently under review for financing options. If constructed, it would complete the missing Phnom Penh–Ho Chi Minh City link in the Singapore–Kunming Railway Line. The Sihanoukville port is being assisted by the Japan International Cooperation Agency (JICA) and it will service the emerging oil industry, and provide bulk cargo and container handling services. The state-owned Phnom Penh Port has been scaling up its operations and has plans to expand, acting as a feeder port to the Cai Mep deepwater port in southern Viet Nam.

—Asian Development Bank, *Assessment of Public-Private Partnerships in Cambodia* (July 2012)

during storage, this is usually an indication of insufficient storage facilities. Solutions therefore can point to better extension services, more financing for storage and technology, or better infrastructure. Transfer of innovation and best practices between regions, especially with similar geographic and climactic conditions, could contribute to addressing the problem.

Postharvest loss leads to market inefficiencies; faced with the possibility of losing a major part of their harvest, farmers often rush to sell their products before they go bad. Rice, the most widely produced crop in Southeast Asia, is particularly vulnerable to postharvest loss. In some countries such as Thailand, the agriculture sector is able to acquire machinery to harvest rice more quickly. Paradoxically, farmers often do not end up reaping large benefits from this. Because of a lack of storage facilities, a large portion of harvest goes to waste or is sold at lower prices.

Thailand has farm-to-table quality management systems in place, including Good Agricultural Practices (GAP), which has helped decrease postharvest loss in warehousing and distribution. A number of institutions, including the Ministry of Agriculture's Division of Plant Pathology and Microbiology and the Thailand Institute of Scientific and Technological Research, perform research on postharvest loss. In fact, Thailand is a leader in postharvest research for the region, having developed a comprehensive program in postharvest manpower development, specifically for research. Using a loan from the Asian Development Bank, the program aims to train 150 postdoctoral researchers on postharvest crop handling over the next few years.

In Malaysia, recent upgrades of methods and mechanisms for postharvest handling are credited with improving exports. For example, in 2011, total exports of Malaysia's horticulture crops (fresh fruits, vegetables, and ornamentals) were valued at US\$418.6 million (RM 1.3 billion)—a 69.8 percent increase over the 2006 exports of US\$246.6 million (RM 764.5 million). The Malaysian Agricultural Research and Development Institute (MARDI) examines scientific aspects of Malaysia's rice supply, including research on seed, productivity, and postharvest loss. Through technology transfer MARDI supports the government objectives of strengthening the availability, accessibility, and affordability of food.

Some stakeholders interviewed during the RATE assessment in Malaysia indicated, however, that investment in agricultural infrastructure has actually declined in recent years. Government infrastructure investment is targeted to industrial crops, while other crops are neglected. Some areas of the country are

**View from Vietnam:
Seeking enterprise-based solutions
for postharvest loss**

At nearly 14 percent, the postharvest loss of rice in the Mekong Delta is high, and other crops suffer from similar rates of loss. The Institute of Agriculture Engineering and Postharvest Technology has endeavored to address this problem, particularly through storage and processing infrastructure, as well as through the development of cash crops. The government has provided incentives for private investment in postharvest loss technology.

In July 2012, the State Bank of Vietnam announced a revamped subsidy policy to reduce farmers' losses after agricultural and aquatic harvesting. Subsidies are offered to institutions, households, and individuals who borrow money to purchase machines and equipment aimed at reducing their losses after harvest. Similarly, entities that invest in rice and maize storage, storage for aquatic products (including cold storage in fishing vessels), vegetables, fruit, and coffee are eligible for government support. Also eligible are private enterprises that manufacture agricultural machinery and equipment to reduce losses following their harvest. Five banks have committed to providing loans with subsidized and investment development interest rates.

not easily accessible for transporting products to market, which leads to slow transport and continued problems with postharvest loss.

Cold chains: Continued disruption caused by lack of facilities, standards, and compliance

The opportunity to make use of cold chains immediately opens markets for agricultural producers, increasing incomes while decreasing postharvest loss and spoilage after processing. This option is not available to most ASEAN producers, however, especially across long distances and for those operating at a smaller scale. The private sector complains vehemently about the lack of cold chain facilities throughout the region. For many traders, cold chain facilities are nonexistent, and logistics management is deficient. Operators and users of cold chain networks lack attention to regulations or incentives to meet their regulatory or contractual obligations. Poor storage facilities also impact the health of livestock. According to an international consortium of swine producers, for example, storing vaccines in Vietnam is difficult because power for refrigeration is not consistently available.

Of course, cold storage requires reliable, affordable electricity. Although conditions have improved dramatically in the past generation, some ASEAN Member States continue to struggle with this fundamental issue. For example, Cambodia does not yet have a reliable “grid,” and, as of 2012, only about 25 percent of the population had access to electricity, which is generated by fewer than 25 small, isolated power plants. Electricity prices in Cambodia are the highest in the region and probably among the highest in the world.¹⁶



Cargo moves efficiently by boat through the Mekong Delta in Vietnam.

Indonesia is reorienting its energy production away from exports to serve its growing domestic consumption.¹⁷ Aging infrastructure and oil fields suggest the country will struggle to meet production targets in the short term, according to the U.S. Energy Information Administration.¹⁸ As of 2013, electricity resources for cold storage of such products as dairy, meat, fish, fruits, and vegetables are inadequate at all junctures along the supply chain, including ports and other transport hubs.

Even where electricity is accessible and trade in food products is robust, most ASEAN countries have not established national standards for cold chain management. Singapore was the first ASEAN country to develop cold chain standards in 2007. In Thailand and the Philippines, the standards for cold chains seem to be incorporated in food safety standards, but they are not widely understood by smaller and mid-sized enterprises. In Vietnam, the European Chamber of Commerce has challenged the government to establish standards and enforce monitoring of temperature-controlled transportation for both truck loads and containers.¹⁹ Other representatives of the private sector have similarly pressed the government to establish policies and practices that guard against breaks in cold chains.

In Malaysia and Vietnam, the national governments have committed to supporting the work of agricultural research and development institutions in reducing postharvest loss, including through improved plant varieties and farming techniques. These institutions work directly with farmers and have been effective in fixing problems and increasing production. Their experiences, and similar ones in other Member States, can be transferred across the region.

As the Philippines becomes increasingly engaged in food processing—the industry accounts for 40 percent of total manufacturing output, contributes 20 percent of GDP per annum, and is growing at 8–10 percent per annum²⁰—the country operates many different warehouse regimes that serve different types of traders, including by offering cold storage facilities. For example, common bonded warehouses store imported goods, including meats, fish, dairy, fruit, and cereals, that are transferred to processors in special economic zones who use the materials to produce a product for export. Goods placed in these facilities are exempt from payment of duty and taxes. Three nonreimbursable customs officers, each with a specific type and function, are assigned to common bonded warehouses to monitor activity. In addition to serving as raw material for exports, most imported food moves into the food-processing sector before making its way into the various domestic food retail and service outlets.²¹

Other warehouse facilities in the Philippines serve both large enterprises and SMEs that cannot afford to manufacture in special economic zones. Domestic distribution of food products often entails excessive spoilage, particularly for interisland distribution.²²

Over the past generation, Malaysia has created a network of resources for commodity storage, mostly supplied by the private sector. With respect to cold storage, Malaysia has managed to thrive where its neighbors have struggled; the private sector provides the transport and storage facilities that Malaysian companies need to both export and import goods requiring cold storage. Reliable, cost-effective cold storage systems have facilitated Malaysia's growing reputation throughout the world as a source of halal-certified products. At the beginning of value chains, most farms have access at least to small-scale freezers and refrigerators, to an extent greater than in most farming communities in Cambodia, Laos, and Vietnam.

PPPs: Evolving, but more understanding and confidence needed

Increasingly in the last decade, ASEAN Member States have engaged in PPP-type transactions. Some countries, such as the Philippines, Malaysia, and Thailand, report favorable experiences with PPPs. As a result, a body of knowledge and experience has developed in the region, which is important for ASEAN and foreign enterprises to undertake PPP arrangements. As summarized by the World Bank:

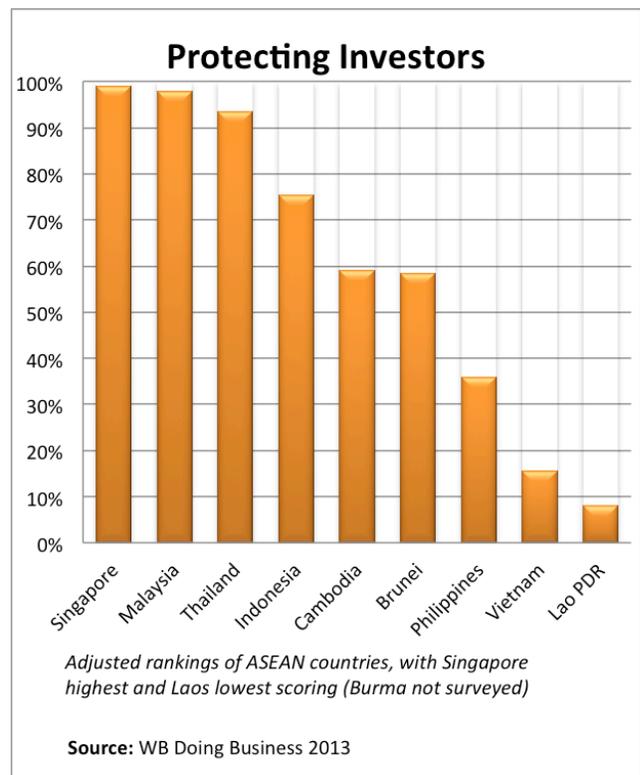
PPPs combine the skills and resources of both the public and private sectors in new ways through sharing of risks and responsibilities. This enables governments to benefit from the expertise of the private sector, and allows them to focus instead on policy, planning and regulation by delegating the day-to-day operations.²³

In examining infrastructure, trade facilitation, and access to finance, the RATE assessment did not look precisely at financing opportunities for large-scale infrastructure projects, but nonetheless encountered considerable enthusiasm for the potential of PPPs generally as a means of supporting agricultural trade. To date, relatively little substantive information about this mechanism has been compiled, although the Asian Development Bank has launched a platform for regional understanding, beginning with a PPP Handbook (2008) designed for its own staff.²⁴ Financiers, academics, government officials, and traders want to learn from the experience of others about the prospects for use in the future. A common definition or framework for PPPs in the region does not yet appear to have been developed; indeed, the concept of PPPs is perceived differently across countries.

The strongest reputation for PPPs is found in the Philippines, and representatives from other countries express eagerness to know more. The Philippine Development Plan 2011–2016, asserts the country’s aim to engage the private sector in financing construction, operation, maintenance, and rehabilitation of major infrastructure in high-priority areas such as transportation, power, and water. To that end, the government is revisiting its enabling legislation pertaining to joint venture agreements between government and private entities and RA 9184 (the General Procurement Reform Act).

For Thailand, foreign donor funds are an important source of financing for infrastructure projects but are not sufficient to meet the country’s needs. Private sources—financial institutions that are complex enough to support these deals—are available. Consequently, the Thai government has encouraged the private sector to participate in infrastructure investment through PPPs. In February 2012, SEC Thailand introduced an infrastructure fund to raise private funds and ease the financing burden on the government. The Ministry of Finance issues bonds regularly to mobilize funds from investors and the general public for infrastructure financing.

In anticipating the demand for more knowledge about PPPs and for greater use of PPPs, ASEAN



Member States may consider taking steps to improve their reputations for protecting investors. As detailed by the World Bank's Doing Business index,²⁵ investors seek opportunities where they can succeed, and to determine those opportunities, they must be able to weigh risks and predict their chances for success. The Asian Development Bank says,

A successful PPP is designed with careful attention to the context or the enabling environment within which the partnership will be implemented. Where the operating environment can be reformed to be more conducive to the goals of PPP, this should be accomplished. Where elements of the operating context cannot be changed, the PPP design must be tailored to accommodate existing conditions.²⁶

Perceptions of “grand corruption” taint infrastructure projects across the region

Public confidence in the transparency of infrastructure projects is low across ASEAN countries, particularly in terms of procurement, finance, staffing, and safety. In nearly all Member States visited by RATE (all but Singapore, Brunei, and Burma), there is suspicion that infrastructure concession awards and management are regularly compromised. It is a common perception that contract awards often go to parties favored by ruling parties and that concessions are granted without open tenders or competitive bidding. Indeed, even the most transparently executed projects can hardly escape from entrenched public skepticism about the extent to which public officials use their positions to facilitate private gain.

In Cambodia, nontransparent land concessions that benefit a small group of empowered people are common and have resulted in significant economic displacement and disruption to rural communities. Under Cambodia's 2001 Land Law, the government is allowed to make use of all “private state land” and to lease up to about 25,000 acres to a company for as long as 99 years. This allowance has led the government to engage in a series of highly controversial, nontransparent land deals that ultimately undermine its commitment to food security. As a prominent example, in 2007, the Cambodian government leased the 133-hectare Boeng Kak Lake to local developer Shukaku Inc., in a US\$79 million, 99-year deal. The deal was opaque and involved the eviction of many people from the land, including those holding titles. As a result, at the end of 2010 the World Bank halted funding for proposed projects valued at approximately US\$128 million.²⁷

According to a 2010 news report, “Cambodia is halfway through a road-building spree with 10 projects totaling 1,173 kilometers, or 730 miles, of pavement still under way,” and 11 additional roads under negotiation. Sources of finance for these roads vary, with donors such as the Asian Development Bank employing more rigorous—but substantially slower—procurement procedures than Chinese investors, who have financed many new roads all over Cambodia. In fact, some donors refuse as a matter of policy to become involved in Cambodia's infrastructure projects, due to the government's resistance to engaging in consistent public bidding processes. Another common concern is that, in exchange for allowing Chinese investors to build Cambodian roads, the Chinese are extracting resources under terms that are not widely understood by the public.²⁸ As summarized in 2012 by the European Union, “Major road building programmes are stimulating economic development but have been criticized for the inadequacy of their social and environmental safeguards.”²⁹

In Malaysia, notwithstanding the country's great economic advances in recent years, deep, publicly expressed suspicion over the implementation of major infrastructure projects remains. In December 2011,

when Malaysia's score and ranking on Transparency International's Corruption Perceptions Index fell for the third year in a row, the local office of the NGO said,

Elements of state capture which facilitate "grand corruption" are still prevalent. These include the continuing and snowballing practice of awarding mega projects and contracts without open tenders or competitive bidding, limited access to information which contributes to a culture of secrecy and lack of transparency, allegations of inflated pricing in military purchases and the continued close nexus between business and politics in Malaysia.³⁰

In reviewing the process for awarding infrastructure contracts in Malaysia, the Japanese Bank for International Cooperation has said, "More transparency in the tender process is required in order to boost investor confidence to increase their participation in these Government-Linked infrastructure projects. This uncertainty or level of imperfect information can pose challenges in raising finance. Thus, credible concessionaires would be a good signal to the market of the viability of the project."³¹



Warehouses are critical for efficient passage along agricultural value chains.

investigation found a US\$7.6 million shortfall in funds spent to support a water management project, implemented by a state-owned enterprise, in the Mekong Delta.

The key distinction between petty and grand corruption is that the former usually reflects specific weaknesses within systems, while grand corruption can involve "the distortion and manipulation of entire systems to serve private interests."³² To the extent that grand corruption in infrastructure projects persists, agricultural production, processing, and agricultural trade in several of ASEAN Member States' economies will remain far below potential.

In 2010, to address perceptions of corruption in infrastructure projects, Malaysia's government launched a new tender portal, MyProcurement, to provide procurement-related information, including an hourly update on tender advertisements and the names of successful bidders. The new portal aims to reduce corrupt practices, enhance transparency, and increase confidence in the procurement process.

Concerns abound in other countries, as well. In Thailand, the perception is common that the government allocates higher budgets for infrastructure projects than their actual costs require. The difference is reportedly collected by government officials who are one way or another "favored." In Vietnam, public confidence in the transparency of major infrastructure projects is similarly low. There is reportedly considerable corruption in the procurement of infrastructure projects, which are often sourced to people with personal connections to ruling party members. Corruption is considered especially pervasive at the local level. Although they are required to declare their assets, local officials have been implicated in bribe-taking schemes pertaining to land administration and management as well as public procurement. In early 2012, for example, a Party

OPPORTUNITIES FOR ACTION

Within ASEAN and its Member States, there are many pathways to change. Important reforms can be moved forward by a single, visionary champion or a by groundswell of stakeholders. Some reforms may take a number of years to take root, while others are a matter of empowered actors acting quickly and decisively in a way that reflects both public demand and international best practice. In most cases, a “big idea”—including the type that is often promoted by international organizations such as the World Bank—can be broken down into many smaller tasks, which, again, can be seized by a variety of public and private actors. Accordingly, the opportunities for action set forth below are intended to be multifaceted. They may be a foundation for regional or domestic policy development, a resource for private-sector initiatives, a benchmark for tracking change, a reference for academic instruction, and most immediately, as a jumping-off point for stakeholder discussion and consensus building.

Opportunities for ASEAN and Regional Entities

With the ASEAN Infrastructure Fund, as well as other funding sources, explore opportunities for funding infrastructure activities that connect agricultural products to markets, and Member States with one another

As ASEAN and the ADB continue to develop the Infrastructure Fund, there is an abundance of opportunity, for this institution and others, to invest in infrastructure projects that will benefit agricultural trade and may even result in a higher rate of intraregional trade of agricultural products over the long term. Investments can focus on the following areas, which have been identified as bottlenecks in ASEAN Member States, the removal of which could decrease costs for lower ends of the value chains significantly and open the possibility for farmers to be integrated into modern supply chains:

- ***Feeder roads linking farms to markets.*** There is demand for rural pathways, gravel roads (“the first mile”) and similar passages to be upgraded to paved roads, or at least improved, in order to be connected to feeder roads. The quality of feeder roads connecting to main roads can similarly be improved to decrease high trucking tariffs and commodity load losses. Roads should be constructed with the idea of eventually linking to the ASEAN Highway Network.
- ***Irrigation.*** The RATE assessment in Cambodia found that small-scale, community-managed irrigation projects offer benefits that can be equal to or better than those arising from large-scale, top-down projects, in the perception of users. Small-scale water systems contribute to agricultural production in many locations across ASEAN, but their number remains small because of financial constraints. Existing projects have been financed largely through donor funding, but also through government and private-sector funding.
- ***Inland waterway infrastructure (river transport/ports).*** In the ASEAN region, especially in Vietnam, Laos, and Burma, river transport is underutilized. If developed, it could offer important alternatives to road transport for agricultural commodities. Credit from ASEAN Infrastructure Fund or other sources could make private sector investment in inland waterway infrastructure appealing.
- ***Power.*** Electricity for cold storage at the farm level and after processing and before domestic or foreign trade is important for agriculture. It is also important for storing essential vaccinations for animal husbandry. Large scale power projects such as dams and nationwide power grids may not reach remote areas; rural markets would benefit from small-scale electricity and power projects, such as village

hydro, pico-hydro, and solar PV panels to fill in the gaps created when large projects fall short. These projects are particularly well suited for PPPs.

The arm of the ASEAN Infrastructure Fund focusing on rural projects would benefit from a mechanism for including farmer and other stakeholder perspectives at the lender's due diligence stage, feeding into the design of the project, as well as over the course of implementation. In addition, fund representatives should review regularly whether projects are executed as planned. Education and training on the ADB's strong anticorruption policies and other mechanisms of ensuring integrity should be woven into project development and roll-out.

Encourage greater study and understanding of the links between infrastructure and postharvest loss

The ASEAN region would benefit from greater sharing of learning on infrastructure and postharvest loss, drawing on the resources of the many research institutes and university faculties across ASEAN that study postharvest loss. In addition to greater research and data collection, a clearinghouse is needed for information about findings, resources, and strategies pertaining to infrastructure and postharvest loss in the region. An easily accessible, dynamic clearinghouse, institute or similar facility could greatly inform regional postharvest loss policies. It could perform targeted research to improve understanding of certain problems, conduct pilot projects that test remedies, and transfer best practices across ASEAN. The establishment of such a clearinghouse could be facilitated by partnering with an international organization, such as UNIDO, that has already worked extensively on postharvest loss in ASEAN and has a history of conducting studies and workshops in the region.

Formulate a regional transport policy, incorporating the establishment of transnational corridors passing through locations that are centers of agricultural and industrial production

The Greater Mekong Cross-Border Transport Agreement is an important step toward regional transport coordination at the subregional level. Regional infrastructure experts should be invited to contribute to a discussion of the development of transnational corridors, ultimately for implementation at the ASEAN level. Pursuant to international best practice, proposed corridors should aim to increase trade flows and attract investment to their surrounding areas. Ultimately, a regional transport policy would need to be coupled with gradually reduced regulatory, legal, and institutional barriers between nations, as the Blueprint for the ASEAN Economic Community anticipates. As a means of increasing trade, corridors generally are intended to integrate shared quality standards. The ASEAN Strategic Transport Plan 2011–2015 is an important step toward such an approach to regional integration.

Encourage regional initiatives to strengthen cold storage opportunities

Traders across ASEAN know that cold chains are as strong as their weakest link. Unlike other possible supply chain disruptions, an interruption in a cold chain cannot be compensated for by paying higher costs. When a cold chain is disrupted, the cold goods are lost for good, even if the cold chain was impeccable up to the point of disruption. Various institutions within ASEAN, within the private sector, and among universities and think tanks can contribute to an effort to harmonize cold chain standards and procedures across the region, opening up new possibilities for agricultural traders.

Establish a shared definition of PPPs in the region along with a network for sharing standards and guidelines for protecting investors' rights

Any number of regional institutions—universities, policy institutes, a business association, or even ASEAN itself—can contribute to better understanding of PPPs. This might begin with the building of a regional consensus on a definition of PPPs, including of PPP types and subcategories. A network for shared information and statistics about protection of investors, one that is easily accessible to outsiders looking to learn more about their opportunities, could also support use of PPPs as an infrastructure financing mechanism.

Opportunities for Member States

Create infrastructure accountability websites to track public expenditure on physical infrastructure projects

The status of the development, award, and implementation of public infrastructure projects should be publicly available on websites and other information platforms (such as cell phones). After being established at the country level, the information platforms should be carried to the ASEAN level to increase visibility and discourage corrupt acts. Such websites have been a great success in many countries, such as Kenya, where information on the allocation of funds to infrastructure projects are publicly available and citizens flag incidents of corruption when funded projects either do not exist or are not receiving their allocated share of budget.

Incentivize infrastructure development for agricultural trade

Member State governments can incentivize infrastructure development through the following approaches:

- Remove taxes and duties for facilitating rural infrastructure development projects in areas where markets do not create the necessary resources, such as for storage facilities, small-scale irrigation projects, and upgrading remote linkage roads to farms
- Clarify and articulate the process for obtaining funding from the ASEAN Infrastructure Fund to stakeholders in both the public and private sectors
- Partner with international expert organizations to implement pilot projects on infrastructure, obtaining essential advisory services for facilitating concessions to increase private sector participation, as well as developing supply chains.
 - Create a domestic network for shared information and statistics about protection of private investors, one that is easily accessible to outsiders looking to learn more about their opportunities.

¹ “A ‘global value-chain’ refers to the process of production, exchange, and consumption of a given product or service within or beyond national borders. In contrast to a supply chain, the concept finds its focus in ‘value,’ or more appropriately, ‘value-added.’ Adding value at each step of the production chain remains a defining feature, critical for efficient governance.” Dennis McNamara, Georgetown University, APEC Study Centers Consortium 2011 conference, Directions for Sustainable Development: Public-Private Partnerships for Infrastructure Investment (September 22–23, 2011).

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- ⁶ World Bank, PPP in Infrastructure Resource Center, <http://ppp.worldbank.org/public-private-partnership>.
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- ¹² “... I have always found that plans are useless but planning is indispensable.” Dwight D. Eisenhower (1962).
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- ¹⁴ World Bank portal for Trade Development in Indonesia (2012).
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