

CHAPTER 6

Newly Emerging Industrial Development Nodes in Myanmar: Ports, Roads, Industrial Zones along Economic Corridors

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NEWLY EMERGING INDUSTRIAL DEVELOPMENT NODES IN MYANMAR: PORTS, ROADS, INDUSTRIAL ZONES ALONG ECONOMIC CORRIDORS

Aung Min and Toshihiro Kudo

INTRODUCTION

Considering the cross-border transport infrastructure in East Asia, the location of Myanmar is crucial in connecting China, India and ASEAN countries. As a matter of fact, neighbouring countries have started infrastructure investment in Myanmar. Thailand is enthusiastic in developing deep sea ports and industrial complexes at Dawei, which will create a new alternative international trade route other than the present maritime route through the Malacca Strait. China has undertaken the deep sea port at Kyauk Phyu and the pipeline to Yunnan Province in order to build a logistic route to supply energy such as petroleum from Middle East and natural gas from the Shwe Gas Project near Kyauk Phyu. And China is also interested in investing in the port and industrial complex at Thilawa, a city located about 30 km from Yangon, and now it will appear as a special economic zone (SEZ). India has started to develop the port of Sittway in order to open a gateway from the northeastern part of India and link to a sea line through the Kaladan River and Sittway Port. The development of these port areas increases the connectivity among Thailand, India, China and Myanmar. In addition, the cities on the opposite shore of the Ayeyawady River, such as Monywa and Pakokku, have obtained a better possibility of being industrialized by constructing new bridges. On the other hand, the government of Myanmar has issued the Special Economic Zone Law and the Dawei Special Economic Zone Law. Similar laws for Thilawa and Kyauk Phyu would be enacted.

The purpose of this study is to make clear the government plan for regional

development in Myanmar, and examine the connectivity between the designated regions and metropolises such as Yangon and Mandalay and the potential for industrial development on the routes to metropolises.

In order to realize further industrialization and smooth logistics in the metropolitan area, it is necessary to point out the locations of industrial estates, ports and harbors, and airports. At the same time, the supply and demand of the infrastructure should be important. On the other hand, the development of roads and city planning has to accompany the growth of the region.

In order to identify these challenges, a field survey was conducted in some local cities and ports of Yangon in August 2011, collecting various data on industrial estates, ports and harbors, airports, roads, railways and other development projects.¹ This chapter describes the situation of 4 local cities in Myanmar; Dawei, Kyauk Phyu, Monywa and Pakokku; and identifies their potential as emerging development nodes of new economic corridors in Myanmar as well as in the Greater Mekong Subregion (GMS).

1. DAWEI

1.1. Dawei Development Project

Myanmar needs deep sea ports for the promotion of regional and international trade. The Myanmar Port Authority (MPA) under the Ministry of Transport in providing port services conducted a preliminary study and selected sites for deep sea ports by taking into consideration the natural and technical conditions. The appropriate sites are earmarked for construction of deep sea ports along the coastline of Myanmar, including the Kyauk Phyu area in Rakhine State, Kalegawk in Mon State, Dawei and Bokpyin in the Taninthayi Region. In July 1996, a Memorandum of Understanding (MOU) was signed between the MPA and Italian-Thai Development Public Co. Ltd. (ITD) to

¹ Dr. Masami Ishida from the Bangkok Research Center and the leader of this research project, Mr. Ikumo Isono, a research fellow at ERIA, Jakarta, Mr. Phyo Kyaw Thu, a research fellow at MMRD, Yangon, and the authors of this chapter joined this field survey. We would like to express our sincere thanks for the Myanmar Industrial Association (MIA) of the Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) and Moe Kyaw, Managing Director, MMRD, Yangon, for their cooperation with our field survey.

Figure 1: Dawei Development Plan Layout



Source: ITD documents.

execute a feasibility study for the Dawei deep sea port and integrated development. The scope of the project included construction of a highway road and development of the deep sea port to accommodate 50,000 DWT and 300,000 DWT general/ container vessels and break bulk vessels, respectively (Figure 1). According to the feasibility study, ITD selected three favorable locations for deep sea ports. The MOU on the Dawei deep-water sea port and industrial zone project between the MPA and ITD was signed on December 6, 2008, and an agreement was made on October 2, 2010. The Dawei deep sea port project, developed by ITD, was approved and signed on a 60-year build, operate and transfer (BOT) agreement with the government, with total project costs expected to reach US\$ 58 billion.

1.2. Industrial Estates and SEZs Plan

The Dawei deep sea port and industrial estate is expected to cover an area of 250 km² or 61,775 acres.² The project will demand sufficient land area to prevent industrial congestion, environmental problems and future expansion. The industrial estate has 5

² One acre is equal to 43,560 m² or 0.40468564224 ha, roughly is equivalent to 0.4 ha (0.004 km²).

zoning plans as follows:

- (1) Zone A - Heavy industry zone (38.3 km²) includes a coal-fired power plant, steel mill, fertilizer, ship building and cargo yards, and a deep sea port
- (2) Zone B - Heavy industry zone for oil and gas storage, an oil refinery, a gas separation plant and a compound circled power plant
- (3) Zone C - Medium and heavy industry zone (44.7 km²) for upstream and downstream petroleum industry
- (4) Zone D - Medium industry zone (58.6 km²)
- (5) Zone E - Light industry zone (43 km²)
- (6) Public area (13.5 km²) for a commercial complex, authority centre and township and district offices

The industrial estate will need at least 300,000 m³ of raw water per day. A reservoir will be built to provide 100 million m³ to the industrial estate during the 4-month dry season.

1.3. Deep Sea Port Project

According to the port plan, vessels can approach through the navigation channel and fairway to port areas. The port development project has two port areas as follows:

- (1) Deep sea port (North) - Port area is 2.7 km², and a 1.5 km² cargo yard and a 1.4 km² ship building yard are included.
- (2) Deep sea port (South) - Port area is 3 km² and a 1.5 km² ship agriculture yard is included.

The port facilities and industries are well linked and ITD estimates that the steel industry will be supported by bulk port, requiring throughput of iron ore, coal and other materials, and will export its own finished products totalling 40 million tons a year. The port will handle 5 million tons of agricultural products, such as rice, sugar, corn, tapioca and other grains, a year. The import of coal will be 25 million tons a year. The port will handle 3.2 million TEUs a year, which is equivalent to 45 million ton a year. In addition

50 million tons of general cargo, 35 million tons of chemicals and petrochemicals and 36 million tons of crude oil will be handled. Total handling capacity of the port will be 200 million tons a year.

1.4. Dawei Special Economic Zone Law

In order to enhance the Dawei Development Project, the previous military government enacted the Dawei Special Economic Zone Law as Law No. (17/2011) on January 27, 2011. The objectives of this law are as follows:

- (a) to implement the Dawei Special Economic Zone by the supervision of the Central Body in accordance with the objectives contained in section 3 of the Myanmar Special Economic Zone;
- (b) to emerge as the pivotal place for the trade and transportation of the Southeast Asian region;
- (c) to develop the businesses of the Dawei Special Economic Zone;
- (d) to create more employment opportunities for the public within the Dawei Special Economic Zone;
- (e) to develop the infrastructures within the Dawei Special Economic Zone.

The Dawei Special Economic Zone Law has the following topics:

- (1) Formation of the Management Committee of the Dawei Special Economic Zone and Functions and Duties
- (2) Special Privileges of Investor
- (3) Special Duties of Developer and investor
- (4) Land Use
- (5) Bank and Finance Management and Insurance Business
- (6) Management and Inspection of Commodities and Customs Department
- (7) Quarantine Inspection and Confinement so as not to Spread Contagious Disease
- (8) Matters Relating to Labour

1.5. Current Development Situation of Dawei Deep Sea Port and SEZs Project

Although it is still in the early stages of development, the planned deep sea port and SEZ at Dawei, Thanintharyi Region, is providing clues as to its industrial and energy impact. ITD has already named some of the companies that will invest in the project, including Myanmar's Asia World Company, while the Thai energy company, PTT Exploration and Production (PTTEP), will reportedly be responsible for producing 6,000 MW of electricity transmitted to Thailand. PTTEP are said to be involved in establishing a coal-fired power plant, a steel mill and a fertilizer factory in the SEZ's heavy industry zone A, while heavy industry zone B will contain oil and gas storage facilities, an oil refinery, a gas separation plant, and a combined cycle power plant.

The first phase of the development project includes construction of an 8-lane freeway between Dawei and Kanchanaburi of Thailand. It is estimated that the cost of building the infrastructure in phase 1 would reach US\$ 8 billion. The scope of preparation work to be implemented in 2010 included a small port, soil boring at the deep sea port basin, accommodation and a site office, a trans-border rail link and a Nabule-Baan Phu Nam Ron road. However, the Nabule-Yebyu road construction project and land acquisition and relocation of 7 villages in the Nabule area got underway in October 2011. The deep sea port project will require over 50,000 acres of land.

7 villages, Nyaungbinseik Village of Launglon, and Hteingyi, Pradat, Leishaung, Mayingyi, Mudu and Kaloutha villages of Yebyu Township, are in the Dawei Special Economic Zone and they will be displaced. Hteingyi, Pradat, Leishaung, Mayingyi and Mudu villages will be relocated to Bawa Village, with Nyaungbinseik Village to Pantinn Village and Kaloutha to a nearby area. The regional government, Dawei Special Economic Zone Supportive Group (temporary) and ITD are coordinating to reimburse villagers for the loss of annual and perennial crops plantation at current prices. ITD have been directed to give back to the villages enough lands for accommodation and agriculture in the new settlement, to reclaim lands for farming and growing perennial crops, to provide them with monthly cash assistance for families in the interval while they are not making a profit from farming, to relocate and allow them to continue farming in the old place while starting crops plantation in the new settlement,



Road construction from the Nabule area to the Myanmar-Thailand border through Yebyu.
Source: Taken by the author on July 20, 2010.

to help the families start farming if they live on earnings from farming and the crop is in season, to provide monthly cash assistance before the start of the next season if the crop is out of season so as to avoid suffering from lack of income, to allow families who earn a living from perennial crops to grow the same crop in new plantation and then displace there when they are able to make profits from the plantation, and to provide guaranteed monthly and annual cash assistance if they are so displaced earlier. Coordination has also been made to complete school, hospital, clinic, bazaar and religious edifices construction in the new settlement at the time of displacement. Two-storey RC buildings with GI-sheet roofs will be built for displaced families, and plans for convenience of socio-economic status of displaced villagers are included. In order to secure environmental and social issues, Chulalongkorn University and Tesco Co., Ltd will conduct the environmental impact assessment and TEAM Consulting Engineering and Management Co., Ltd of Thailand will conduct the social impact assessment.

2. KYAUK PHYU

2.1. City Profile

2.1.1. Location, area and landscape

Kyauk Phyu is located in the north of Rambree Island, Kyauk Phyu District, in Rakhine

State. It is divided in two, the shore and the archipelago. It is situated at 6 feet³ above sea level. This archipelago consists of 71 islands. The landscape is not a flat plain. The area of the township is 678.37 square miles⁴ or 434,144 acres, which ranges 54 miles from the east to the west and 90 miles from the north to the south. Kyauk Phyu Township is organized with 10 wards including 54 village tracts and 262 small villages. The whole population is 192,383, with 24,773 in the urban area and 167,610 in the rural area. Thus, 283.59 people are living in 1 square mile. Ann Township is located in the east of Kyauk Phyu, the Bay of Bengal is in the west, Rambree is in the south and Myebon Township is in the north. The inhabitants of the township are Rakhine, Chin, Kaman, Maramagi and Bengali.

Being formed by a group of islands, Kyauk Phyu, the smallest town, has many creeks and rivulets. All rivers and creeks are salinated and the tide occurs the whole year round. Thus, water transportation is the single means of access to most villages in the township. On the main island of Rambree, where Kyauk Phyu is located, Rambree town and other villages of the township can be accessed by road.

2.1.2. Agriculture

In Kyauk Phyu Township, there are 56,672 acres of agricultural land and 54,200 acres of cultivated land. The remaining areas are 2,473 acres of agricultural land, 5,349 acres of virgin land, 204,313 acres of forest land, 20,480 acres of forest reserved and non-reserved land and 99,324 acres of other types. The major seasonal crops are paddy and peanut. However, a few tobacco plants are also grown. The long-term sustainable crops are cashew plant, Dani palm, coconut palm, rubber plant, mango tree and betel vine. There are many mangroves. In the hilly regions, low-quality timber such as TaungThaYet, KaNyin, ThinGaNet and bamboo and cane are grown.

2.1.3. Livestock & Breeding

Some villages in the township run the cattle breeding business and cows are sold out to other places. Poultry breeding is done by individuals. However, the prawn and soft crab breeding business is carried out on a commercial scale. The crab breeding business is

³ One foot is equal to 30.48 cm.

⁴ One mile is equivalent to 1.6 km, and is equal to 1.609344 km, more precisely.

done around Chi Island. On Chi Island, the Gold Soft Crab Co. Ltd. is doing business in 40,000 acres. The products are exported to overseas markets via Yangon. The township also has fish breeding ponds. In 2010-2011, due to the economic recession because of exchange rate decline, most fishery businesses could not proceed.

Fishery

Fish breeding and fisheries are done in Kyauk Phyu Township. The onshore and offshore fisheries are also done. For the fishery businesses, ice blocks are supplied by two ice factories in Sittway. There are also about 100 fishermen and 10 storehouses of marine equipment. In Kyauk Phyu, there are 4 small-scale cold storages and fishes are sent to the Yangon market.

2.1.4. Minerals

In Kyauk Phyu Township, there are limestone mountains. In Yenantaung Village, there is a thin layer of crude oil, so oil is taken out by individuals from hand-scooped oil wells. They locally refine diesel, petroleum, and oil dredge or residue for domestic use. Refining crude oil has been done since 1970. The crude oil is heated and the leftover oil is used for small diesel engines. In 1979, the Myanmar Oil Corporation launched a test-well in the Layhtaung area. A small oil refinery was run by the gas produced from the test-well. In 2000, the Yam Mar Wady Company had successfully refined the crude oil in Kyauk Pyauk Village in Kyauk Phyu Township. The refinery could produce good-quality petroleum, kerosene, diesel, wax, and oil dredge or sludge. On Rambree Island, oil drilling with modern machines has been done once the colonial period, and also by the Myanmar Oil Corporation during 1979 and 1980 and by CNOOC of China in 2005. At present, oil drilling is being done manually as well as by the rotary table system. As Kyauk Phyu Township is adjacent to the sea, salt production is also carried out.

2.1.5. Other Business

As people in Kyauk Phyu are doing fishery businesses, the making of dried fish, dried prawn, prawn powder and fish crispy are carried out. Moreover, the local products are exported to Bangladesh by border trade.

2.2. Kyauk Phyu Development Plan and Shwe Gas Project

Started in 2000, the Shwe project is led by a consortium of companies carrying out natural gas operations in the Shwe, Shwe Phyu and Mya gas fields situated in blocks A-1 and A-3 off the coast of Rakhine State.

With 51% ownership of the shares for both blocks, Daewoo International Corporation of Korea is the operator of the project. ONGC Videsh Limited and Gail Limited from India hold 17% and 8.5% of the shares, respectively, and Korea Gas Corporation has another 8.5%. Myanma Oil and Gas Enterprise (MOGE), as the national partner in the Shwe consortium, holds a 15% share.

The natural gas produced under the Shwe project will be sold to the affiliate of China National Petroleum Corporation and sent to China via a pipeline that will run across Myanmar territory, as agreed in 2008. The project was started in 2009. The Onshore Gas Terminal (OGT) is being constructed near Kyauk Phyu. Construction of the OGT was started in 2009 and will be completed in 2013.

2.3. Kyauk Phyu Deep Sea Port

The Kyauk Phyu Deep Sea Port plan is being implemented in Maday Island, which is located in the east of Kyauk Phyu city. In the project, a deep sea port with 91 berths will be built to cover 11 containers, 19 cargo vessels, 39 petrol chemical carriers, 8 repairing ships, two cruise liners and 12 service ships. The current situation of Kyauk Phyu is that the whole township is mainly carrying out the economic investment services depending on the projects of the deep sea port, Shwe offshore gas, railroad, airfield and various quays. Then, necessary machinery, equipment and supplies including gas pipes for the projects are being transported and piled. Thus, for the deep sea port of Kyauk Phyu, construction of the port is being done at Maday Island which is situated in the east of the city, and the construction of the OGT of the Shwe Gas Project site is also underway for the gas pipeline. Preparation work for construction of a bridge between the Kyauk Phyu site and Maday Island for the gas pipeline project has already begun.

Kyauk Phyu's deep sea port is under construction near the town at the Than Zit River on Maday Island (Figure 2). Situated 8 miles away in the southeast of Kyauk



Onshore Gas Terminal being constructed near Kyauk Phyu.

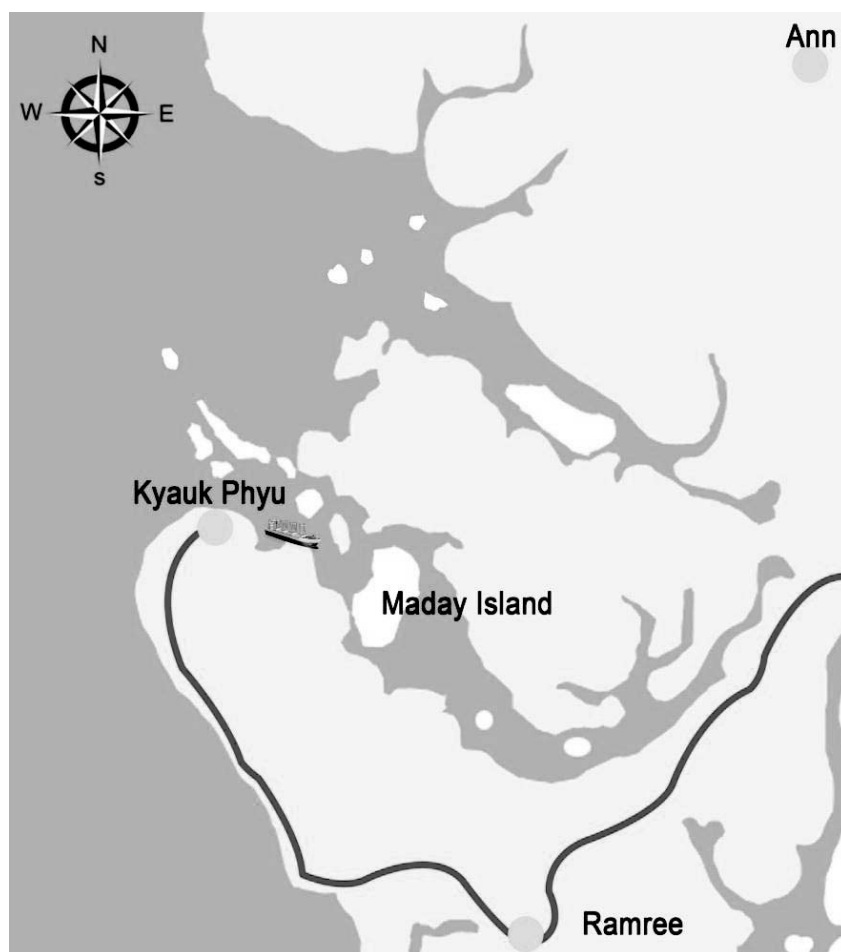
Source: Taken by the author on August 11, 2011.

Phyu, Maday Island is 3.5 miles long and 2.5 miles wide. According to the records of 1975, it is found that foreign vessels can sail and anchor safely in the sea around Kyauk Phyu and Maday Island. It is known that the MPA has surveyed the depth of the sea to range from 105 feet to 158 feet within 35 miles of the waterway. The water area of Maday Island has 4,000 square feet so there is sufficient space for anchored ships. Since 1995, the authorized persons as well as domestic and foreign experts have done many surveys. So the location was selected as the best place for the deep sea port because it is complete with the essential requirements for a deep sea port, as well as safety measures which could protect from heavy storms and waves.

The total length of the waterfront on the port area on Maday Island is 2,350 meters and the total backup area covers 4,390 acres. Least available depth (LOA) is 30 meters, and 800 meters at the southern part of the island will be allocated for the Oil and Gas Terminal and 1,550 meters at northern part of the island is allocated for the Commercial Deep Sea Port.

Thus, in 2009 the project of deep sea port construction was carried out. It has also been found that the projects of the Kyauk Phyu-Kunming Oil Pipeline, the Natural Gas Pipeline and the China-Myanmar Corridor are under arrangement to be carried out

Figure 2: Map of Rambree Island and Maday Island



Source: Google Map.

simultaneously with the deep sea port project. On October 31, 2009, the opening ceremony was held for the beginning of the project of the Myanmar-China Crude Oil Pipeline and the Work Boat Wharf. The MOU signing ceremony for the China-Myanmar Corridor Project was held on May 18, 2010. The corridor would connect with Muse (opposite to Ruili, the Chinese border town) and Kyauk Phyu. Kyauk Phyu's deep sea port could be berthed by 300,000-ton oil tankers. The project includes a 480-meter-long quay, a 150-meter-long jetty to allow 5,000-ton vessels to berth, a 29.7 km-long waterway, a 600,000 m³ water storage tank and machine facilities as well as constructing buildings.

The construction of the retaining banks at the port site on Maday Island has been



Kyauk Phyu Deep Sea Port Construction site on Maday Island.

Source: MMRD Field Survey.

done. It comes to be known that the waterway is being cleared up for the purposes of incoming and outgoing ships. It is also known that while the deep sea port project is underway, the floor of the Than Zit River is being dredged by machines to enable oil tankers to access the Indian Ocean. The waterway is essential for the deep sea port. It is known that for the convenience of incoming and outgoing of over 300,000-ton vessels, the shoal and the river bed are being dredged. The task of clearing the waterway is being carried out day and night by dredging ships of Dharty Co. Ltd. Within the area of the Than Zit River, the local people are doing fishing. The early warning has been made by the concerned departments to all fishermen to mark the visible signs in daytime as well as light signals in night time for safety.

2.4. Industrial Estate Plan

Though the project plan is for the industrial estate to be constructed together with Kyauk Phyu's deep sea port, the local people do not know yet where the estate would be constructed. It has not started as of the date of writing this chapter. The people of other regions are interested in the Kyauk Phyu industrial estate project, so they are preparing to invest in it if the industrial estate emerges.

3. SITTWAY

3.1. City Profile

3.1.1. Location, Area and Landscape

Sittway is the capital of Rakhine State. It is situated at the west side on the mouth of Kaladan River. The area of the city is 89.42 square miles or 57,228 acres. It includes 32 wards, 30 village tracts and 89 small villages. The population is 269,138. The urban population is 153,341 and the rural population is 115,797. Thus, 3,000 people are living in one square mile. Pauk Taw Township and the Kaladan River are situated in the east of Sittway. The Bay of Bengal is in the south. The Bay of Bengal and Ya The Taung Township are in the west. The Kywi Tae River and Ponna Kyun Township are in the north. The city is generally situated at 15 feet above sea level. The city area is like an island with a flat plain and plenty of rivers, creeks and ponds around it.

3.1.2. Agriculture

Sittway Township has 21,617 acres of agricultural lands, 20,269 acres of paddy lands and 33,395 acres of waste and fallow lands. Paddy is mostly grown and other crops such as mustard, cow pea, green pea and chilli are also grown. Coconut palms are grown as long-term plants. An acre of paddy yields 70 baskets. Three baskets of paddy seeds are used for the seed-spreading method and two baskets are used for the nursery method. In some areas, summer paddy is grown as a test run. The annual consumption of rice per head is 12 to 15 baskets.

3.1.3. Fishery

Within the township, besides the sea water prawn farming, mud crabs, freshwater prawn, and all sorts of freshwater fishes are caught from rivers and creeks. So, there are wholesalers of fishes and prawns, and then other marine products, cold storages and ice mills. The principal marine products are fishes, prawns and dried fish. When exporting marine products, the products are directly exported to Bangladesh because it gives more money. Thus, there are 10 marine products marketing firms.

3.1.4. Commerce, Trade and Others

Being a township that is close to the seashore, the fishery business is also done other than paddy cultivation. In the rural area of Sittway, villagers weave Rakhine longyis and blankets as a home business. The city is also a border trading station. Therefore, there are banks such as the Myanmar Economic Bank, Livestock and Fishery Development Bank, Innwa Bank, Yoma Bank and Kambawza Bank for financial services.

Sittway is a centre of marketing and trading for various commodities which come from other parts of Rakhine State. The commodities are exported by waterway via the Shwe Min Gan jetty of Sittway to Bangladesh. The exported items are prawn, turmeric, ginger and rice. As the Bangladesh market offers a higher price, prawn and other marine products are directly exported to it.

3.1.5. Transportation

Road transportation is accessed by car from Sittway to other townships in Rakhine State such as Ponnagyun, Kyauk Taw, Myauk Oo, Minpya, Ann, Maei, Yanme, Kyauk Phyu, Taunggyut, Thantwe, Kyeinnali and Gwa. The motor road heads to Rakhine and east of the Yoma range. Trishaw, bicycle and motorcycle taxis are available at Sittway as city transport. One can travel from Sittway to Yangon in two routes. One route is from Sittway to Taung Gup-Pyay (Nawaday Bridge route), at a distance of 599 miles through Sittway-Kyauktaw, Taung Gup, Pyay, Yangon. Another route is from Sittway-Kyauktaw, Ann, Padan, Magway, Pyay, Yangon, by crossing the Ayeyawady Bridge (Magway) and it is 634 miles long. Tar road is accessible to travel year round. The trip will cost 18,500 kyats for Sittway-Yangon and 15,200 kyats for Yangon-Sittway. Very few passengers use the land route, the road transportation being mostly for cargo transport because that is faster than the coastal way, and it charges kyats 300-400/viss (US\$ 230-300/ton).

3.2. Ports and Harbors

The MPA has built three jetties in Sittway; the Min Gan jetty, Phaung Taw Gyi jetty and No. 2 Boatseik jetty, for loading and unloading passengers and commodities. The Min Gan jetty is also a border trading site to which fishing boats, cargo boats and coastal boats usually berth for exporting commodities to Bangladesh. The coastal ships usually berth at the Phaung Taw Oo jetty. The No. 2 Boatseik jetty, which is in the Set Yoe Kya

creek, is berthed by inland water transport ships. The Min Gan jetty is 240 feet long and 2,000-ton ships can berth to it. The water depth at the jetty is 12 feet and the jetty can stand 444 lbs⁵ of weight per square feet and 10 tons of a loaded truck. The Phaung Taw Gyi jetty is 240 feet long. It can be berthed by a 400-ton ship and the water depth is 15 feet. The jetty can stand 600 lbs of weight per square feet and 50 tons of a loaded truck.

All townships such as Bu Thee Taung, Ya Thay Taung, Pauk Taw, Min Bya and Mye Bon can be reached by waterway from Sittway. The ships of inland water transport are based in Sittway and run to other townships. In return, the other townships also can make a tour to Sittway by boat.

3.3. The Project of Sittway Port (Kaladan River Waterway Project)

India is facing difficulty to access its northeastern part, Mizoram State and Manipur State. The waterway from Calcutta of West Bengal to Aizawl of Mizoram is 1,967 km long. If India opens the trade route in Sittway, it will save 673 km (418 miles). India plans to construct a road from the Myanmar-India border to Paletwa for 248 km and a water route from Paletwa to Sittway will be 157 km (Figure 3). For the project of the Kaladan's waterway, an MOU has been signed between India and Myanmar since 2008. Construction of Sittway's harbor was started by ESSAR Project (India) Ltd. in September 2010. The project period is three years. The project of the Kaladan River's waterway, which might be a new trade route between Chin State and Rakhine State of Myanmar and Mizoram State of India, would be opened in 2013 (Table 1). It is known that land-locked Indian commodities would pass through Chin State via the Kaladan River to Sittway Port. Then, those commodities would be exported to other Southeast Asian nations. Construction of Sittway Port and the Kaladan waterway will cost US\$ 68 million and road construction to border will be US\$ 50 million.

In relation to the river project, 29 warehouses would be built near the port of Sittway. The complex would include 8 warehouses which cost 100 million kyats each. Those warehouses would be completed within the period of the port construction. The

⁵ One lb is equal to 0.453592 kg.

Table 1: Time Schedule for Port & Inland Water Transport (IWT) Component of the Project

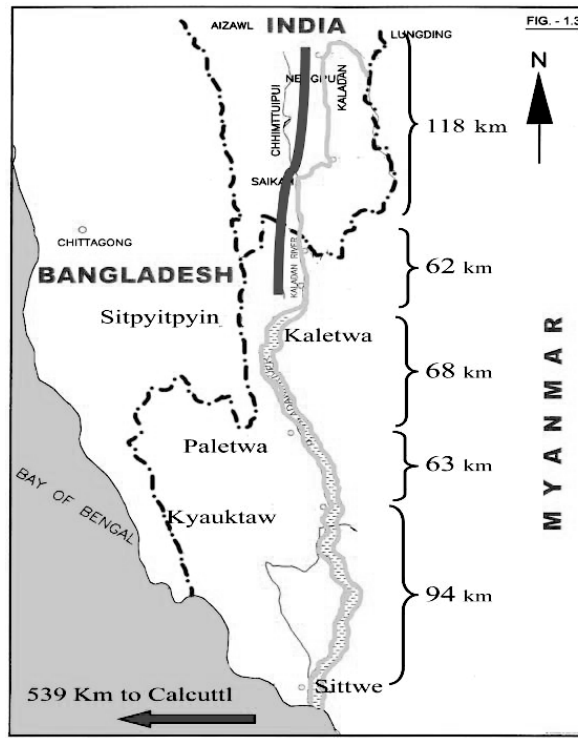
Sr.	Activity	1 st Year (2011)	2 nd Year	3 rd Year
1	a) Mobilization of cutter suction dredger and its ancillary crafts, pipeline to Sittway b) Establishing project offices and logistics arrangements for implementation of works	■	■	
2	Capital dredging harbor channel at Sittway by CSD for reclamation & development of channel of specified dimensions b) Construction of rubble mounted dyke at Sittway for protection of reclaimed area	■	■	
3	River dredging (soft/coarse/pebbles/boulders)			■
4	Construction of port & IWT terminals at Sittway		■	■
5	Construction of IWT terminals at Paletwa			■
6	Procurement and installation of aids to navigation			■
7	Dredging of offshore channel, harbor channel & turning at Sittway a) Mobilization of TSHD and ancillary crafts at Sittway b) Dredging at Sittway			■
8	Procurement of IWT vessels		■	■

Major Quantities		
No	Description	Quantity
1	Construction of dyke at Sittway	
2	Reclamation at Sittway	
3	Dredging	
4	Construction of port for receiving ships up to 20,000 DWT and ancillary facilities	1Nos
5	Construction of IWT terminals	2Nos
6	Supply of 300T capacity self-propelled barges	6 Nos

Source: ESSAR Project (India) Ltd.

project of the Kaladan River's waterway is an interesting project to businessmen so the big domestic traders could have a chance to do business with international traders and then Rakhine State would have opportunities to export fish products to international markets. Right now, ESSAR Project (India) Ltd. is piling project materials and doing construction for Sittway's quay. The project was started with 150 workers from the environs of Sittway and 50 Indian workers.

Figure 3: Kaladan River Project Connecting Mizoram State of India to Sittway Port



Source: Myanmar Port Authority.

3.4. Myanmar-Bangladesh Highway

The Sittway area will be on the transportation route of the Myanmar-Bangladesh Highway. The Myanmar-Bangladesh Highway starts from Khaungton Village in Bangladesh and passes through Taung Pyo Village of Maung Taw Township in Myanmar via Kyein Chaung, Maung Taw and Bu Thee Taung and then connects with the Sittway-Yangon Road near Kyauk Taw. Via this road, it will connect with the Southeast Asian Highway and the Greater Mekong (GMS) Highway, and finally it will join with the Southeast Asian nations and South Asian nations. This highway includes the following routes.

- (1) Taung Pyo - Kyein Chaung Road: It is an earth road and the distance between Taung Pyo and Kyein Chaung is 20 miles and 5 furlongs.
- (2) Kyein Chaung - Maung Taw Road: This road is 24 miles long and a rough gravel road which is utilized in all seasons.
- (3) Maung Taw - Bu Thee Taung Road: This road is 16 miles long and a tarred road

which can be utilized in all seasons. It was an old railroad. It was built by breaking through May Yu Mountain. There are two tunnels, one 685 feet long and the other 98 feet long, to pass through the mountain.

(4) Bu Thee Taung - Kyauk Taw Road: The road is 56 miles and 6 furlongs long.

4. THILAWA

4.1. Profile of Thilawa

In order to cope with the growth of seaborne traffic resulting from the market-oriented economic reformation and liberalization program of the country, port development has been carried out by inviting local and foreign investment at Yangon and the Thilawa Port area. Maritime transportation serves more than 85% of the country's exports and imports. Yangon Port, the premier port and a gateway for the export and import of the state, plays a vital role as the main sector for the economic development of the state. All vessels calling to Yangon Port and Thilawa Port have generally been sailing on flood tides and crossing to both the inner bar and outer bar at near high tide to assure sufficient water depths.

In view of the natural conditions and meanderings of the Yangon River, Yangon Port is accessible to vessels of 167-meter LOA, 9-meter draft and 15,000 DWT, and Thilawa Port is accessible to vessels of 200-meter LOA, 9-meter draft and 20,000 DWT. To cope with the growth of seaborne cargo traffic and to lessen the logistics cost in maritime trade by providing accessibility for bigger vessels to the ports, the MPA is taking initiatives to improve the Yangon River access channel, while development of Thilawa Port is a key solution.

To comply with the Thilawa Port plan, the Department of Human Settlement and Housing Development (DHSHD) under the Ministry of Construction tried to establish the Thilawa Industrial Zone in Yangon's Thanlyin Township in the early 1990s. The Thilawa area was planned to be implemented as the first full foreign investment SEZ in Myanmar. Designed by Chinese experts, it covers an area of 12.8 km² (3,200 acres). However, the plan was postponed up to 2010. According to the SEZ law, Thilawa has potential for an SEZ as Chinese and Korean companies start investing.

4.2. MITT and MIPL

Myanmar International Terminals Thilawa (MITT) is a subsidiary of Hutchison Port Holding (HPH) which developed the facilities and managed to world standards the port management system. It is a privately owned port with full foreign investment. The original proposal of C&P (Pte) Ltd for establishment of the port was approved by the Myanmar Investment Commission (MIC) under a BOT system for a period of 25 years. The contract was signed by MPA and C&P (Pte) Ltd. With the permission of MIC, C&P (Pte) Ltd handed over the project to Hutchison Port Holding Ltd, (HK), the world's leading port investor, developer and operator. HPH manages 206 berths in 49 ports in 25 countries throughout Asia, the Middle East, Africa, Europe and the Americas. MITT's experienced management team has the support of HPH's extensive track record in container terminal management. The staffs also receive intensive training to allow them to competently manage all types of container operations, and to meet customer needs.

MITT provides service with berthing capacity for 5 ocean-going container vessels at the same time during the shortest approach time. There are two cranes for container handling. Two new 41-ton cranes were substituted in the place of cranes destroyed by Cyclone Nargis in 2008. Customs facilities are also installed, including a customs X-ray inspection machine and a 60-ton weight bridge, and berth operation, ship operation and railway operation are well facilitated. The essential facts and facilities of MITT are listed in Table 2.

Myanmar Integrated Port Ltd (MIPL) is next to MITT and was built on land plot No. 4 in the Thilawa Port Estate. MIPL is modern and has dedicated facilities designed to handle bulk liquid and general cargo. It was established through two investment permissions granted originally by the MIC with a BOT system for a period of 25 years to Myanmar Integrated Port Services Private Limited (MIPS) for construction of a port and its supportive activities and by Asia Pacific Edible Oil Limited (APEO) for construction of oil storage tanks and edible oil production activities. Importing palm oil was commenced on March 25, 1998, but this business has ceased due to policy changes. MIPL is handling only general cargo loading and unloading.

The MIPL wharf is 200 meters long, its apron width is 17 meters and permissible

Table 2: Facts and Facilities of MITT

Facilities	Unit	Total
Amount of initial investment	US\$ million	101.284
Terms of BOT	Year	25
Total Area	Hectare	75
Container berths	No.	5
Total berth length	Meters	1,000
Depth alongside	Meters	10
Container loading yard	TEU	25,000
Container empty yard	TEU	2,500
Reefer plug	Point	108
Types of cargo handling	Container and general cargo	
Container handling capacity/year	TEU	118,000
Container quay cranes	Unit	2
Rubber tyred gantry (RTG) cranes	Unit	3
Front loaders	Unit	3
Forklifts	Unit	7
Tractors	Unit	15
Trailors	Unit	24
Warehouse	sq m	20,000
Management and workforce	Persons	200

Source: MITT.

draft at the jetty alongside is 10 meters. It allows vessels up to 20,000 metric tons to be berthed conveniently. Among the total working area of 150,000 m² (38 acres), 110,000 m² are meant for wharf operation.

- 1) 5 units of grab with 25 tons lifting capacity each
- 2) 10 sets of auto sewing machines
- 3) 9 sets of manual sewing machines

MIPL can also provide facilities for liquid bulk cargo, mostly edible palm oil, as follows:

- 4) 6 units of tanks (oil storage capacity 6,000 tons)
- 5) Oil steel pipes connected to storage tanks onshore
- 6) Size of factory is with 5,200 m² basement

Table 3: Ship Called and Cargo Loading at MITT and MIPL

Year	MITT		MIPL	
	Ships called at	Total cargo ton handling	Ships called at	Total cargo tons Handling
2003-04	115	1,661,396	31	207,400
2004-05	119	1,738,050	27	235,535
2005-06	113	1,718,504	25	198,663
2006-07	127	1,952,195	29	273,740
2007-08	163	2,033,895	29	121,565
2008-09	172	1,623,093	32	149,876
2009-10	214	1,810,324	43	289,780

Source: Myanmar Port Authority.

- 7) Drum production capacity is 1,500 drums per day
- 8) Drum filling ability from storage tank is 1,000 drums per day

Table 3 shows the number of ships called and the weight of cargo loading at MITT and MIPL.

4.3. Comparison with Other Ports of Yangon

As shown in Table 4, of the total containers throughout to Yangon ports, 40% was transported through Asia World Port Terminals (AWPT) in every year except some years of 2005-06 and 2006-07. AWPT took a share of over half of the total container

Table 4: Capacities of Container Handling in Yangon Ports from 2003 to 2010

Year	MPA		MITT		AWPT		MIP		Total	
	TEUs	%	TEUs	%	TEUs	%	TEUs	%	TEUs	%
2003-04	47,864	27.6	31,418	18.1	74,147	42.8	19,895	11.5	173,324	100
2004-05	39,451	25.4	35,011	22.5	68,410	44.0	12,712	8.2	155,584	100
2005-06	54,351	31.6	35,767	20.8	63,284	36.8	18,506	10.8	171,905	100
2006-07	54,801	22.8	47,509	24.1	77,187	39.1	17,782	9.0	197,279	100
2007-08	73,933	32.6	42,744	18.9	100,270	44.3	9,556	4.2	226,503	100
2008-09	59,408	22.5	27,614	14.2	136,412	51.7	30,572	11.6	264,006	100
2009-10	70,707	23.3	23,297	7.7	182,453	60.1	26,953	8.9	303,410	100

Source: Myanmar Port Authority.

throughout. In 2009-10, it gained a 60% market share of containers in and out of the foreign trade.

2009-10. Total containers throughout of MITT increased prominently from 2003-04 until 2006-07. In 2008-09, its performance of container handling decreased compared to previous years. MIP is in third place for market share of container handling.

4.4. Thilawa Industrial Zone

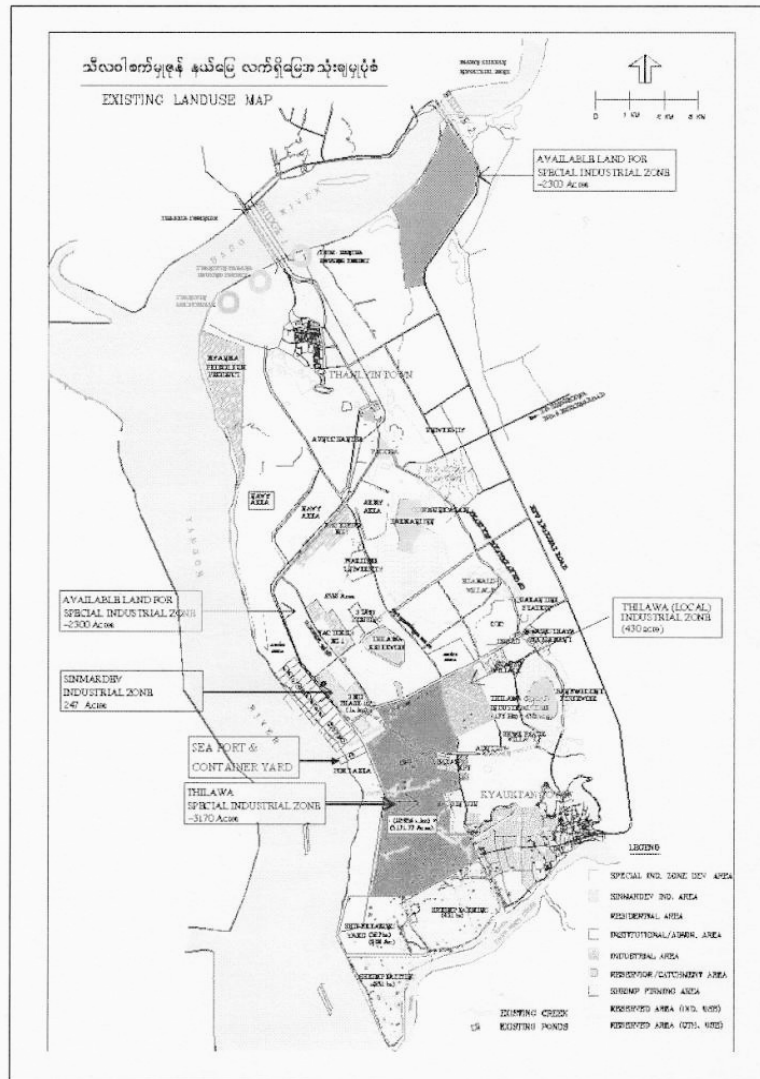
The Thilawa Industrial Zone was developed by the DHSHD in Thanlyin Township of Yangon Southern District in 2001. Total area is 125 acres, and 69 plots have been designated and sold out to Myanmar citizens since September 2001. It is situated at the east bank of the Yangon River and 20 km from downtown Yangon city (Figure 4). The Thilawa Industrial Zone has been planned to be established as an SEZ but the plan was delayed till January 2011 when the Special Economic Zone Law was enacted. As it is a good location only 4 hours from the mouth of the Yangon River and 45 minutes from downtown Yangon city, foreign investors and developers are keeping their eyes on the area to establish various SEZs in different ways. Singapore, China, Malaysia and Japan investors have tried to sign MOUs with DHSHD.

The present infrastructure is occupied by MITT and MIPL, and new berths with palm oil storage tanks are under construction. Under a 37 berths plan, Berth Numbers 1 to 4 are already occupied by MIPL and Nos. 5-9 are for MITT, and the remaining berths include 5 jetties for palm oil imports.

In the SEZ plan, SEZs and industrial zones will be as follows:

- 1) Special Industrial Zone (for FDI) - 2,300 acres
- 2) Local Industrial Zone - 430 acres
- 3) Singapore Myanmar Development (SINMARDEV) Industrial Zone - 247 acres
- 4) Sea ports and container yard
- 5) Thilawa Special Industrial Zone - 3,170 acres

Figure 4: Existing Land Use Map of Thilawa SEZ



Source: Department of Human Settlement and Housing Development.

5. MONYWA

5.1. City Profile

Monywa is the capital of the Sagaing Region and situated in the northeast of Myanmar. Shwebo District is in the north, Sagaing is in the east, Pakokku District is in the south, and Kalay and Gantgaw districts are in the west of Monywa District. Monywa is organized with 8 townships at a population of 1.6 million. The urban population is 347,542 and the rural population is 1,265,282. In Monywa Township alone, there are 392,703 inhabitants. Among them, 250,852 people are living in 18 wards and 141,851



Monywa Jetty and Chindwin River.

Source: The author's photo on August 7, 2011.

people are in rural areas.

5.2. Ports and Airports

Being situated on the Chindwin River, passengers and cargo are transported by waterway to Homalin, Khamti and Kalaywa via the port of Monywa. There are 4 ships owned by Inland Water Transport and 6 more privately owned ships running from Monywa Port to the northern part of the Sagaing Region. It takes 6 days from Monywa to Homalin, 7 days to Khamti and two days to Kalaywa. It has three jetties for speedboats. With a speedboat, it takes two days from Monywa to Homalin and one day to Kalaywa which is close to Kalaymyo.

Since 2004, Myanmar Airways has been flying to Monywa and in 2010 Asia Wings also started flying there, but with just two flights a week. The flight route is Yangon-Mandalay-Homalin Monywa-Homalin-Mandalay. The airfield is modern and can be landed at by the Fokker-100. The measurements of the new airfield are 8,500 feet by 100 feet. The airfare from Monywa to Homalin is kyats 7,000/- (US\$ 46) charged by Myanmar Airways and kyats 80,000/- (US\$ 100) by Asia Wings.



Monywa Airport

Source: The author's photo on August 7, 2011.

5.3. Trade Route

Monywa is situated on the North-West Trading Route and the Asian Highway. It is also on the Transit Trade Route because domestic products of Monywa to Tamu on the India-Myanmar border as well as the Chinese commodities from Muse to Tamu are sent to concerned destinations via Monywa. Traders of Tamu generally purchase commodities in the Monywa market and they also directly order from traders in Muse. Thus, Chinese products such as slippers, blankets, electrical appliances, snacks, assorted juices and foodstuffs are found in the market of Monywa. However, a very small amount of commodities of Tamu are sent to Muse. On the Transit Trade Route of Muse to Mandalay-Monywa-Tamu, there are a variety of directions from Monywa to Tamu.

5.3.1. Monywa to Yargyi Road

The road is 115 miles long from Monywa to Yargyi and Kalaywa by passing over the Chindwin River from the new bridge. Then, the distance between Kalaywa and Tamu is 96 miles. So, the total distance is 211 miles. In the open season, it takes only one day from Monywa to Tamu via the Yargyi Road. The Yargyi Road passes through the deep forest and mountainous area.

5.3.2. Monywa to Gantgaw Road

In the rainy season, the Yargyi Road cannot be used so the route of Monywa-Yinmabin-Gantgaw-Kale is utilized. This route from Monywa to Kalaywa is 281 miles long so it takes two days.

5.3.3. Monywa-Kalaymyo-Reed Road

The Reed Border Trade Post is situated at the Myanmar-India border of Tidim Township of Chin State. The Reed Border Trade Post can be reached from Monywa via Kalaymyo. The distance between Kalaymyo and the Reed Trade Center is 90 miles and it is a rough highland road. So, it takes two days from Monywa to Reed. Thus, 90% of Myanmar-India border trade goes through Tamu but only 10% of goods passes through the Reed post (Figure 5).

The road project of Sagaing-Monywa-Shwebo is carried out by Shwetaung Co. Ltd. When transporting commodities between Monywa and Tamu, waterways are utilized by 70% but roadways by just 30%. This is because the cost of waterways is very cheap. If commodities are transported by waterway, it costs kyats 20/- per viss (US\$ 15/ton) from Monywa to Kalaywa, kyats 50/- per viss (US\$ 100/ton) from Kalaywa to Tamu so the total cost is just kyats .70/- per viss (US\$ 115/ton). If the commodities are transported by the Monywa-Yagyi Road, it costs kyats .110/- per viss (US\$ 84/ton) and K.150/- (US\$ 115/ton) by the Gantgaw Road. Thus, the transportation charge between Kalay and Reed is kyats .80/- to kyats .100/- per viss (US\$ 80/ton).

It is found that there are many good prospects in the North-West Trading Route (Monywa to Tamu). Though the domestic products like Monywa blankets are affected by some Chinese and Indian commodities, the benefits of trade development have been gained. Then, the North-East Trading Route situated on the Asian Highway can assist to widely expand the transit trade between China-India and Thailand-India.

5.3.4. Monywa to Mandalay to Muse Road

Mandalay is 86 miles from Monywa and 280 miles from Mandalay to Muse. The total distance is 366 miles.

Figure 5: Monywa - Tamu Route



Source: The authors.

5.3.5. Large Bridges Crossing over the Chindwin River

Previously, it was difficult to access by road to the western areas of the Sagaing Region and Chin State, as well as to Pakokku District. Now Pakokku, which is 72 miles from Monywa, can be easily reached by road via the Sinbyushin Bridge over the Chindwin River. The large bridge was constructed in 1994 and its length is 4,957 feet. In addition, another over 4,000-foot-long bridge crossing the Chindwin River was constructed in 2007 at 9 miles west from Monywa. You can reach the Pathein-Monywa Road via this bridge, and then via the Yargyi Road Kalaymyo and Tamu can be reached easily.

5.4. Industrial Outlook

5.4.1. Agriculture and Livestock

The type of soil in the Monywa area is not good enough for paddy cultivation. So, the



Sinbyushin Bridge crossing Chindwin River
Source: MMRD Field Survey.

area has become the market place of trading local products. However, the region grows a small variety of assorted pulses, some crops and betel leaf, and there is a certain extent of cow, pig and chicken breeding. Most livestock breeding, especially with cows, is found in the Monywa Industrial Zone, where over 5,000 cows are bred and produce cow milk as raw material for dairy products such as condensed milk from factories in the zone.

5.4.2. Business Firms

The major business firms are wholesale warehouses and trading as well as gold and metal mining. The principal products are assorted beans, cotton, Virginia tobacco, and bean vermicelli. Those products are sent to the Yangon and Mandalay markets. Brokers usually sell sale-or-return goods by taking commissions.

5.4.3. Border Trade with India

Fish paste, dried fish and palm oil which come from Yangon and Lower Myanmar are sent to the market of Monywa. The commodities of Yangon do not go beyond the

market of Monywa, because commodities from Yangon are not accepted in the market of Tamu, a border town with India. But commodities of Tamu are sent to Mandalay, Yangon, Meikhtilar, Nay Pyi Taw and Myawaddy on the Thai border via Monywa. Therefore, all sorts of Chinese and Indian commodities are found in the Monywa market. The market has a variety of commodities at reasonable prices. The commodities carried from Tamu to Monywa include male and female clothes, bed sheets, rugs, traditional medicines, fertilizers and forest products. In general, clothes are for the market of Monywa, traditional medicines are for Mandalay and forest products are for China. A piece of Indian batik costs around kyats.2,000/- and a gold-coloured batik costs kyats.6,500/- to 12,000/-. A bed sheet costs kyats.9,000/- and a rug costs kyats.14,000/-. Cosmetics, toothpaste, joss sticks, steel household wares, and assorted foodstuffs and biscuits are also found in the market. The Indian commodities are of fair quality and price. The Tamu border trade route on the Myanmar-India border is accessible. However, due to restrictions pertaining to the Myanmar-India Border Trade Agreement, most items other than agreed items are being smuggled into Myanmar.

5.4.4. Development Project

As Monywa becomes more populated and active with business, the Monywa Hill Modern Housing Complex Project is underway. It is known that a hotel zone is going to be constructed near the airfield as there are only two standard hotels and 10 guesthouses in Monywa.

6. PAKOKKU

6.1. City Profile

Pakokku is the largest city among the cities of the west bank of the Ayeyawady River and it is situated in Pakokku District, Magway Region. Monywa District is in the north of Pakokku, Gantgaw District in the west and Myingyan District in the east of the Ayeyawady River. The whole population of Pakokku District is 1,008,348, and over 80,000 people are living in 15 wards of Pakokku city while over 350,000 people are living in 55 village tracts of the township.

In the Pakokku area, various kinds of beans and oil crops are cultivated, especially sesame. Ninety-day sesame is usually grown in September and harvested in January. Sixty-day sesame is grown in June and harvested at the end of July. The sesame market is in Shwebo and Mandalay and sesame oil, which is preferable in Upper Myanmar, is distributed to Pakokku, Magway and Aungmye. As the city is situated on the Ayeyawady River, Chin State and the southern part of the Sagaing Region usually depend on the market of Pakokku.

6.2. Pakokku Commodity Exchange Center

The Pakokku Brokers Association was formed in Pakokku in 1939 and is now 72 years old. In the era of socialism, the association vanished. The Pakokku Traders and Brokers Association was re-established on March 2, 1989, and it has become the Pakokku Chamber of Commerce with 7 business branches.

It is also known as the Pakokku Commodity Exchange Center. The Executive Committee is organized with 19 members from over 400 members. The majority of the members of the chamber are members of the firms of toddy sugar, beans and maize, who are more than 200.

The second most membership consists of dealers of oil products. The Pakokku Commodity Exchange Centre is usually active in the morning till noon. The commodities are sold out by the tender system. The sample goods are presented with the price and the announcement is made by loud speaker for all members to know the displayed products and prices. The common marketing commodities are sesame, chick peas, cow peas, green peas, lablab beans, red mung beans, green peas, B2 peas, wheat flour and maize. In the market of Pakokku, assorted peas from Pale, Sarlingyi and Yinmabin in the Sagaing Region are sold. Commodities are transported by motor boats or ships to the Yangon market via the Pakokku market. The main reasons for bringing commodities to the Pakokku market are the good treatment to the producers and merchants, the cheap cost of transportation and the offering of better prices than at the Monywa Commodity Exchange Centre.

6.3. The Largest Rice Market of Upper Myanmar

Pakokku is the biggest rice market in Upper Myanmar due to the rice requirement of the

region itself and being a door to Chin State which also needs rice. Of the incoming rice to Pakokku, 70% is from the Ayeyawady Region (Myaungmya, Hinthada and Myanaung) and 30% is from Shwebo and Ye-U of the Sagaing Region. Some 20% of rice coming into the market of Pakokku is consumed by Pakokku itself, and the remaining 80% is sent to other township markets. Most buyers are from Myaing, Yezagyo, Pauk and Kalaymyo. In the Pakokku market, consumption is 15% for top class, 50% for middle class and 35% for lower class rice. There are about 5 large rice wholesalers and 10 small rice wholesalers. A large rice wholesaler sells 500 to 1,500 bags per day, so it can sell 180,000 to 200,000 bags (9,000-10,000 tons) a year. Due to the smooth transportation and the booming market, the rice price becomes very high. Thus, the rice market in Pakokku has increased to double that of the Mandalay market.

6.4. Industrial Estates and SEZs

The Pakokku Industrial Zone was founded in 1998 on 378 acres of land on Pakokku-Yezagyo Road. Some 898 land plots (each 10,000 square feet) were identified for sale. In 1999, 378 plots were occupied. Up to 2002, 540 factories and other firms were established in the zone. Years later due to a lack of electrical power supply, some factories moved back into the city area. Currently, there are only 282 factories. Among those, there remain 173 lathe and iron casting mills, 47 peanut and sesame grinding mills, 26 oil mills, 10 wood-based industries, 6 foodstuff factories, 5 vehicle factories, and two motorcycle factories which are Yoma Razar and Chindwin Naga. These factories generally import machinery and parts from China and assemble in the industrial zone. Motorcycle factories are situated in Pakokku Industrial Zone because motorcycle production is permitted only in the areas of Yenanchaung, east of the Ayeyawady River, and Pakokku, to the west. Though the cost of land plots and the labour charge is cheap to a certain extent, the major problem is the lack of electricity supply. It is known that in the mid-2011, the electricity is regularly available. When the growth of locally produced motorcycles becomes dull in the Pakokku market, those cycles are sent to other markets. Yoma Razar cycles are sent to Nay Pyi Taw and Bago while Chindwin Naga's products are sent to Monywa.

The development of the industrial zone has been slowing down and it is providing fewer job opportunities. The vehicle factories produce small parts, frames and bushes.

However, the car workshop business gains a certain good income. The Chindwin Naga Motorcycle Factory was started in 2006 and before then, the business ran under the name Zaw Light Truck. The factory produces Zaw-Kenbo motorcycles by taking the design of the Chinese-made Kenbo. Most machinery parts are imported from China and other parts such as bolts, nuts and ingots are purchased from the Sinte factory under the Ministry of Industry No. 2. In 2008 and 2009, the motorcycle factory could produce 5,000 units but in 2010, it could produce only 3,000 units.

Yoma Razar Motorcycle Factory was founded in 2005 and started operating in 2006. It is one business branch of SPA Co. Ltd. The factory produces two types of motorcycles: Yoma Dream 110 and 125. Machinery parts for the motorcycles are imported from Luoyan Co., Dayan city in China. Though it planned to import 36% from China and to use 64% from local factories, the factory actually utilizes very few local parts. The factory can produce a maximum of 25,000 units per year but in 2010 it produced only 8,000 units. Formerly, the company tried to establish in Pyay, 160 miles away from Yangon, where the location is favorable to penetrate the Ayeyawady and Magway regions and Rakhine State. However, as instructions of the Myanmar Industrial Development Committee allowed the company to build the factory only in Pakokku, the



Motorcycle factory in the Pakokku Industrial Zone.

Source: The author's photo on August 9, 2011.

present factory was founded in the Pakokku Industrial Zone. When selecting the factory site, the company had a lack of opportunity to choose but the site was selected by the department concerned.

There is a training school, namely the Indo-Myanmar Industrial Training School, situated 6 miles from Pakokku, which was built by the assistance of the Indian government. In the training school, Indian instructors teach 9 mechanical subjects. The training period is two years. There are 216 trainees and each subject class has 24 students.

6.5. Transportation

In Pakokku, there is a harbor owned by IWT, a government enterprise. The port is usually berthed by passenger and cargo ships which are running along the Ayeyawady River. By waterway, it takes about 15 days from the Ayeyawady Region to Pakokku. The transportation charge is kyats.1,300/- per rice bag from Myaunmya to Pakokku. It costs kyats .2,000/- per rice bag if it is carried by road.

Pakokku can be reached from Monywa by road. Chin State and the Sagain Region also can be reached from Pakokku. One route is Pakokku-Pauk-Kyauktu-Matupi and another route is Pakokku-Myaing-Gantgaw. The transportation charge is kyats.500/- per rice bag from Pakokku to Pauk just for 47 miles,kyats.200/- to Myaing for 27 miles, kyats.1,500/- to Matupi and then kyats.1,700/- to Kalay. At present, the Ayeyawady Bridge (Pakokku) is under construction starting from Letpanchepaw at the east bank of the river to Pakokku.

6.5.1. Ayeyawady Bridge (Pakokku)

Myanmar sees a project for construction of a road in border areas in Paletwa and the Kaladan River as a renovation project, in addition to the Asian highway to link Myanmar with Thailand, Laos, China, India and Bangladesh, the BIMSTEC Highway, the eastern, western, southern and northern highways in the Mekong Region, and the highways to be constructed jointly by India, Myanmar and Thailand and by India and Myanmar.

As part of the highway project to be implemented jointly by India, Myanmar and

Thailand, Public Works under the Ministry of Construction has constructed the Ayeyawady Bridge (Pakokku) over the Ayeyawady River to link Letpanchepaw in Bagan and Pakokku in order to have easy access to Kalewa and Tamu through Myawady, Ottwin, Pyawbwe, Kyaukpadaung, Letpanchepaw and Pakokku.

Ground consecration ceremonies were held simultaneously on the Letpanchepaw side, Yayle Island and the Pakokku side on December 14, 2009. The following day, ceremonies to drive stakes and bored piles were held. On construction of 4 more bridges spanning the Ayeyawady River, the project has come into force. The main bridge with approaching sections is approximately 21,000 feet long, far longer than the Thanlwin Bridge at Mawlamyine (Table 5). The bridge was completed on 14 December 2011 and officially opened on 31 December 2011.

The bridge is a rail cum road facility on the Pakokku-Myitchaint-Letpanchepaw-Thithtaut-Nyaung U railroad section, which will be linked with the

Table 5: Facts of Ayeyawady Bridge Project

1	Main Bridge	11,431 feet (3,484 meters)	(2.1622 miles)
2	Type		
	(a) Foundation & Lower Structure	Broad Crest	
	(b) Upper Structure	Steel Girder	
3	Formation		
	Main Bridge (1) Nyaung U side	8,183 feet	(2,494 meters)
	100 meters	2 spans	
	120 meters	19 spans	
	Main Bridge (2) on Bawlonkhon Island	1,004 feet	(306 meters)
	100 meters	3 spans	
	Main Bridge (3) on Pakokku Side	2,244 feet	(684 meters)
	100 meters	2 spans	
	120 meters	4 spans	
4	Road/Railroad and Walkway		
	(a) Motorway	28 feet wide	(8.50 meters)
	(b) Railroad	14 feet	(4.30 meters)
	(c) Walkway (3'3" wide each)	6'6"	(2 meters)
5	Clearance Area (Width)	262 feet	(80 meters)
6	Clearance Area (Height)	52 feet	(16 meters)

Source: Ministry of Construction documents.



Ayeyawady Bridge (Pakokku) crossing the Ayeyawady River.

Source: The author's photo on August 10, 2011.

Magway-Taungdwingyi railroad section in the eastern part of Ayeyawady and to the Kyangin-Pakokku railroad section on the west bank of the river.

It will be on the highway to be constructed by India, Myanmar and Thailand. The bridge will make Pakokku accessible to Bhamo in Kachin State, Kengtung in Shan State, Myeik in Taninthayi Division, Kyauktaw-Sittway Region in Rakhine State, Kalay, Moreh and Kyalkhaung. The Ayeyawady River is a gift of nature to Myanmar but also a natural barrier separating areas in the east and west of the nation. It is noteworthy that the Ayeyawady Bridge (Pakokku) is a grand bridge on the Thailand-Myanmar-India ASEAN BIMSTEC Road.

7. CHALLENGES OF CONNECTIVITY

Despite many improvements and development programmes being observed, there are still many challenges in connectivity, especially in multimodal transport. The paper will assess those challenges in two parts as the lower part and the upper part of Myanmar.

7.1. Dawei, Kyauk Phyu and Sittway

Though there are various development plans in Dawei, Kyauk Phyu and Sittway, the

areas are not well-connected with Yangon and Mandalay, showing some bad and fair sections. Road and rail transport between Dawei and Mawlamyaine city is not yet developed and a security problem still exists between the section of Ye and Dawei at nighttime. The road situation is also bad in this section, though the road section between Yangon and Mawlamyaine is good. It takes 8 hours for cargo trucks to drive between Yangon and Mawlamyaine, a distance of 197 miles. It will take at least 20 hours for the section of Dawei and Mawlamyaine, that being 187 miles. As there is only one up train and down train with three or 4 couches between Dawei and Mawlamyaine, rail transport is still limited. The limited air flights between Yangon and Dawei are a problem for air passengers and coastal transport for Yangon and Dawei is only twice a month.

Road transport between Yangon and the Kyauk Phyu part of about 500 miles takes 20-24 hours for buses and two or three days for cargo trucks. Roads are still bad between Pyay and Kyauk Phyu. Cargo carried by coastal ships takes three days for this trip. The road between Sittway and the Ann section has obstacles from landslides in the rainy season. It will take three days for Sittway and Yangon at 634 miles and Mandalay of about 600 miles. Air transport for the Yangon-Kyauk Phyu trip and the Yangon-Sittway trip cannot fulfill the demand of air passengers. Thus, trade between Stittwe-Yangon/Mandalay and Kyauk Phyu-Yangon/Mandalay has many limitations in connectivity. This needs to be improved in compliance with development of border trade among Myanmar-Bangladesh and Myanmar-India.

7.2. Monywa and Pakokku

In the upper part of Myanmar, both Monywa and Pakokku are well-connected with Yangon and the Mandalay market. Though Monywa is farther away than Pakokku to connect to Yangon, road transport is better and faster at present as the Ayeyawady River seems to be an obstacle and cargo trucks/buses would need Z-craft to cross the river. The road from Pakokku to Yangon or Mandalay will be well-connected when the over 2-mile-long Ayeyawady Brige (Pakokku), the longest bridge in Myanmar, has been completed by mid-2012. Border trade between Tamu and Moreh of the Myanmar-India border is improving but routes from Monywa to Tamu at the India border have to be improved as it takes two days for a trip of about 300 miles.

7.3. Regional Development Projects in Myanmar

Development works in Myanmar are implemented by various organizations. City development in metropolitan areas (Yangon, Mandalay and Nay Pyi Taw) is under supervision of three city development committees. The development activities for the remaining townships, districts, states and regions are the responsibility of the Ministry of Border Affairs under the new administration in 2011 which oversees not only regional development done by the Department of Development Affairs but also border area development done by the Department of Border Affairs.

Under the military government named the State Peace and Development Council (SPDC), the Special Projects Implementing Committee was formed with various ministries to carry out the large-scale projects. The head of state/chairman of SPDC chaired and supervised the committee. The coordination meetings were held twice a year to review the progress of the projects and approve new projects.

The newly elected government which assumed state power in April 2011 also carries out the tasks of the committee, which is now chaired by the president. The committee plans to complete the construction of motor roads, bridges, railways, airports and hydropower projects that were not completed in the time of the military government. The first coordination meeting (1/2011) of the Special Projects Implementation Committee under the new administration was held on April 22, 2011. Some projects for development of the nation such as dams, river water pumping, hydropower plants, strategic railway networks and strategic road networks need a large amount of investment and a long time. They are to be included in the list of special projects and implemented under the supervision of the Union Government.

According to the meeting of the Special Projects Implementation Committee, the Ministry of Construction has planned to implement 19 more projects for construction of new roads and bridges. The Ministry of Communications, Posts and Telegraphs is implementing two major projects. These aim to increase telephone density across the nation. A plan is underway to extend 30 million GSM mobile phone lines within 5 years from 2011 to 2015. On completion of the 5-year project, Myanmar will have 50.6% telephone density. A state-owned satellite will be launched for uplifting the capacity of the communication and information sector and for acquiring aerospace technology.

The Ministry of Industry-2 plans to implement a project to manufacture 1,000 sets of automobile moulds and dies, jigs and fixtures per year in order to produce spare parts locally for vehicles. Projects for manufacturing 10,000 sets of various types of axles and spare parts for light trucks, medium trucks, heavy trucks, super trucks and commercial vehicles are being arranged for implementation in the Ywatha area of Myingyan Township. Moreover, a plan is underway to open the Industrial Training Center with the assistance of India for fulfilling the requirement of industries and for turning out the skilled workers. At present, 4 technical training centres have been opened in Hsinde, Mandalay, Thagara and Pakokku that turn out about 750 skilled workers yearly.

In the energy sector, MOGE under the Ministry of Energy has joined hands with North Petro-Chem Corporation Ltd of the People's Republic of China for exploration and production of oil and natural gas in inland block F (Nghlaingtwin area), with SNOG Pte Ltd and UPR Pte Ltd of Singapore for exploration and production of shale in the Mepalay area of Kayin State, and with Korea Myanmar Development Co. Ltd and Brilliant Oil Corporation Pte Ltd of the Republic of Korea for exploration and production of oil and natural gas at block A-5 and block A-7 at offshore Rakhine State and block M-15 and block M-16 at the offshore Taninthayi Region. Furthermore, a plan will be implemented for renovation of the petrochemical plant in Thanbayagan.

Up to March 2011, Myanmar has 3,285.9 MW installed, with the capacity to generate 18,765 million KW hours yearly. A total of 32 power plants under control of the Ministry of Electric Power No. 1 are generating 3,285.9 MW. Moreover, a total of 67 ongoing projects , 14 projects to be implemented by the Ministry of Electric Power No. 1, 9 by private companies and 44 through foreign investments, will generate 45,378.5 MW in the future.

CONCLUSION

Myanmar is moving forward to some extent in terms of infrastructure, which has obviously advanced in the past decade. Large bridges, roads, railroads, expansion of airports, dams, and hydropower and telecommunication infrastructure make the country built up for future development, and the country is trying to forge regional

transportation, trade and industrial linkages. There is large-scale investment for projects in the oil and gas, energy and mining sectors around the country, amounting to US\$ 40 billion at the end of 2011. Among those investments, hydropower projects constitute US\$ 14.5 billion (40%), the oil and gas sector US\$ 13.2 billion (38%) and the mining sector US\$ 2.4 billion (7%). Investment in the transportation sector is small with only US\$ 313 million.

Neighboring countries are investing and seeking to expand trade and logistic routes via Myanmar for the projects named in Sittway, Kyauk Phyu, Thilawa and Dawei, of which three areas will become SEZs with Sittway the exception. The Dawei Special Economic Zone will create opportunities to market regional products such as rubber, oil palm and marine products of the Taninthayi Region. As trans-border roads and rail links will be established from the Dawei SEZ to Thailand, regional produce will be exported and foreign goods will be imported through the border, helping border trade develop. In parallel with the emergence of the SEZ, motor roads and railroads linking with other regions inside Myanmar will be upgraded, contributing to better road transportation of the region. Plenty of the job opportunities from the production and services of the zone will be opened up not only to local people but also to people from other regions. The capacity of skilled citizen workers, technicians and staff will be improved. The Kyauk Phyu and Sittway projects are in the interests of China and India but Myanmar can enjoy benefits and infrastructure development from these projects.

The Thilawa SEZ and Thilawa deep sea port will be constructed for large vessels with over 100,000 tons to be moored. The Thilawa Industrial Zone in Kyauk Tan Township will attract Myanmar investors and foreign investors from Japan, Korea, China, Singapore, Thailand, Malaysia and other countries. Applications will be accepted from local and foreign investors wishing to invest in the Thilawa SEZ project in accordance with the prescribed rules and regulations.

Regarding the Myanmar-India side, Myanmar and India signed various agreements during the Myanmar president's visit to India, on lines of credit amounting to nearly US\$ 300 million for the development of railways, transport, power transmission lines, oil refinery, and an OFC link, among others. Myanmar and India will carry on the implementation of the Kaladan Multi-modal Transit Transport Project, especially the port development and inland waterways. It was decided that the road component of the

project would be started first, with a study on the commercial usages of the Kaladan project and the necessary agreements to operationalize the route finalized. It was also decided to open an additional land customs station/border trade point on the India-Myanmar border to allow for the smooth flow of goods generated by the Kaladan project.

Both sides reiterated their commitment for an early implementation of the Reed-Tiddim Road Development Project with grant assistance from India. Reviewing the progress in establishing tri-lateral connectivity from Moreh in India to Mae Sot in Thailand via Myanmar, it was noted that substantial progress had been achieved in preparation of a DPR for roads and causeways in Myanmar.

Myanmar welcomed the interest of Indian companies to invest in Myanmar and the two sides agreed to promote trade, investment and economic cooperation in a sustainable manner. With a view to promoting border trade, the two sides agreed that meetings between Indian and Myanmar customs, immigration, border chambers of commerce, officials of bank branches at the border, border trade officials (Tamu and Reed-OSS Team), and government officials would take place at Tamu-Moreh and Reed-Zowkhathar regularly. The business representatives of the Manipur/Sagaing Region and of Mizoram/Chin State will also participate in these meetings. Both sides agreed to examine the feasibility of establishing railway links and ferry and bus services between the two countries. In this context, both sides agreed to examine commencement of ferry services on the Calcutta-Yangon and Chennai- Yangon routes.

The relationship between Myanmar and India is excellent and India seems enthusiastic to enter the Myanmar market from the west while China is penetrating the market from the north. The relationship between Myanmar and Thailand is better than before and joint programs for mutual benefit have been initiated. Myanmar has signed regional agreements and commitments in trade, services and connectivity which will be materialized in 2015 and beyond. Thus, Myanmar has to prepare for implementing a regional agenda and a logistic and infrastructure development program. Myanmar hosted the GMS Summit and Business Forum in December 2011. Myanmar will be connected in the regional network in terms of transportation and logistics. In order to pace the development with momentum, the new government is committed to launching political and economic reform measures. In conclusion, it is clear that the country is

moving forward in a new direction, though there are a lot of things to do. Facilitation of cross-border trade and regional development will be on the agenda of the country's development.

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