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■ Objectives

○ To prepare for the base of sustainable ocean cooperation between Korea and Myanmar

○ To build policy network up, developing viable private and/or public ocean-based business

○ To establish an ocean alliance in the Asia-Pacific region, increasing the exchange of experts and collaborative research projects in ocean fields

■ Program of Event

Ⅰ. The Opening Event

: including MOU Ceremony between KMI and MMU

○ Date: November 7, 2012, 10:30~12:00

○ Place: Park Royal Hotel, Yangon

○ Host: Korea Maritime Institute (KMI), Myanmar Maritime University (MMU)

○ Participating Organization

- Korea: KMI, Korea Embassy in Myanmar, KOICA, Korea Marine Business Association (KMBA), related Korean companies.
- Myanmar: MMU, MOT, Governmental Organization and companies

Ⅱ. Korea-Myanmar Ocean Forum

○ Date: November 7, 2012, 13:30~17:30

○ Place: Park Royal Hotel, Yangon

○ Host: Korea Maritime Institute (KMI), Myanmar Maritime University (MMU)

○ Participants: Experts from Korea and Myanmar(public/private sectors)

III. Program

Time		Program
Part I: Opening Event		
10:00~10:30	30min	Registration
10:30~10:35	5min	Introduction of participants
10:35~11:05	30min	**Opening Speech**: *Hak-So Kim* (President, KMI)
		Welcome Speech: *Charlie Than* (Rector, MMU)
		Congratulatory Remarks: *U Nyan Tun Oo* (Regional Minister, Union of Myanmar)
		Congratulatory Remarks: *Haeyong Kim* (Ambassador, Korean Embassy in Myanmar)
11:05~11:15	10min	**The MOU Ceremony between KMI and MMU**
11:15~11:20	5min	Exchange of Gift and Group Photo
11:20~12:00	40min	**Keynote speech**: Future and cooperative projects of Korea-Myanmar for the Myanmar economic development Speaker: *Maung Maung Oo* (Director General, Dept. of Marine Administration, Ministry of Transport, Myanmar)
11:20~13:30	90min	Luncheon

Part II: Korea-Myanmar Ocean Forum		
□ Session 1: Presentation		
13:30~13:50	20min	**Special topic:** 1. Foreign investment development plan and policies in Myanmar - *Kyaw Zaw Maung* (Director, Ministry of National Planning and Economic Development, Myanmar) 2. Practical application of a jacket type breakwater with water chambers to the fishing port - *Takayuki Nakamura* (Professor, Ehime University, Japan)
13:50~14:20	15min 15min	**1st topic: Korea-Myanmar cooperation in fishery and aquaculture** - Korea: Cooperation in Aquaculture between Korea-Myanmar, *Duk-Hyun Yoon* (CEO, Aqua-Int. Ltd.) - Myanmar: A Paradigm Shift for Sustainable Fishery Resources Management, *Swe Thwin* (Prof., MMU)
14:20~14:35	15min	Coffee break
14:35~15:05	15min 15min	**2nd topic: Korea-Myanmar cooperation in maritime, ports, and logistics** - Korea: Cooperation Way for Korea-Myanmar in Logistics, *Ken S.-W. Lee* (Director, International Logistics Research Department, KMI) - Myanmar: Establishing of dry port in Myanmar and Korea's Cooperation, *Myo Nyein Aye* (Assistant General Manager, Myanmar Port Authority, MOT)
15:05~15:35	15min 15min	**3rd topic: Korea-Myanmar cooperation in marine industries** - Korea: Cooperation between Korea & Myanmar in Marine Industries, *Yohan An* (Senior Researcher, KMI) - Myanmar: Facts on offshore oil and gas exploration in Myanmar, *Htay Aung* (Administrative Officer, Director General Office, Dept. of Marine Administration, MOT)
15:35~15:50	15min	Coffee Break

□ **Session 2: General discussion**		
15:50~17:30	100min	**Policy proposal for feasible plans of cooperative business** Chair: *Jaewan Lee* (President, KMBA) Discussants - **Korea**: *Sungchan Cho* (CEO), *Bay Moon* (Managing Director, KOREA P&I), *Mansik Shin* (Director, KOICA), *Hoon Kang* (Senior Reporter, Chosun Ilbo), *Myungsang Jung* (Director General, KMI) - **Myanmar**: *Htay Aung* (Rector, Mawlamyine University), *Ohn* (Chairman, FREDA), *Soe Win* (Managing Director, Win Ye Kyaw Services Co. Ltd.), *Tin Ohnmar Tun* (Local P&I Correspondent, Yangon), *Aung Htoo* (Deputy General Manger, Myanmar Five Star Line)

* Public language is English, but in general discussion, translation into Korean or Myanmar Language will be served.

Keynote speech

CURRICULUM VITAE

NAME	-	MAUNG MAUNG OO
DATE OF BIRTH	-	4th JULY 1958
EDUCATION	-	BACHELOR OF SCIENCE
PRESENT POSITION	-	DIRECTOR GENERAL ,
		DEPARTMENT OF MARINE ADMINISTRATION
JOB EXPERIENCE	-	1976 - 1980 DEFENCE SERVICES ACADEMY
	-	1980 -2005 MYANMAR NAVY
	-	2005-2012 DEPARTMENT OF MARINE ADMINISTRATION
MARITAL STATUS	-	MARRIED TO DAW MAW MAW HTWE WITH ONE DAUGHTER
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Future and cooperative projects of Korea-Myanmar for the Myanmar economic development

Maung Maung Oo[1]

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ABSTRACT

With the new government system and strong determination, Myanmar is struggling hard to wake up from its weak economy. Since it is a transition period, there are many issues to be handled which will support the sustained economic development. It needs helps and cooperation in many sectors from experienced personnel, organization and countries.

KEYWORD

Cooperation, economic development

1 INTRODUCTION

Myanmar with a rich endowment of natural assets, abundant land, water, and energy resources; a youthful, low-cost labor force and a strategic location in Asia is providing a strong foundation for growth. With the country's rich agricultural resources and favorable climate, the agricultural sector provides enormous potential for growth and poverty reduction. Possessing a coastline of about 2,800 kilometers, which provides access to sea routes and deep-sea ports, it has the potential to serve as a land bridge between Southeast and South Asia, as well as between Southeast Asia and China. Therefore Myanmar has a great opportunity to gain access to regional and global markets, technology, and finance and management expertise. Government of Myanmar and its lawmakers are trying to promote foreign direct investment which plays major roles for the development of the country.

The sectors which draw the major interests of foreign investments are transportation, telecommunication, energy, agriculture and human resource development, tourism, environment, trade facilitation and investment.

2 ENERGY SECTOR

Myanmar is one of the five major energy exporters in the region, particularly of natural gas. With four major rivers, Ayeyarwaddy, Chindwin, Thanlwin and Sittaung, it also has the great potential of hydropower. Myanmar has identified 92 large hydropower potential projects with a total installed capacity of 46,101 MW. A gas reserve of 11.8 trillion cubic feet in total is proven.

Although it possesses huge energy resources, Myanmar's energy consumption per capita is one of the lowest in Southeast Asia. Even in the situation of low energy demand, Myanmar has been suffering severe electricity shortage which suffocates the industrial development.

Expecting the rapid growth in industrialization as well as the living standard of the ordinary peoples, energy demand will also be increased dramatically.

The main issues and constraints facing the energy sector include-

(i) persistent power supply shortages in Yangon which is economic heart;

(ii) high technical and nontechnical losses because of poor maintenance of power transmission and distribution systems,

and gas pipeline networks;

(iii) the lack of technicians;

(iv) the lack of a planning function

(v) the government-controlled pricing policy;

(vi) the need to consolidate the responsibilities of eight ministries within the energy sector, with a limited overall planning mandate of MOE.

3 AGRICULTURAL AND NATIONAL RESOURCES

Myanmar was one of the world biggest rice exporter before 1960s. It is one of the largest countries in Southeast Asia in terms of land area and population. Myanmar is endowed with substantial arable land, dense forest reserves and considerable freshwater and marine resources. Wide-ranging climatic conditions make it possible to grow tropical and moderate temperate crops.

Like in most monsoon countries, the agriculture and natural resource sector in Myanmar faces the risk of floods and cyclones during the monsoon season and drought during the dry season. Urban and industrial development competes for land resources in the densely populated delta region, where the most productive lands and watershed areas. The sector also faces the loss of value-added from uncontrolled and unregulated direct foreign investments. Inadequate access to irrigation, limited electrification, poor flood control, drainage, and salinity control structures, lack of market information and unattractive producer prices also triggered the lack of motivation to the farmers.

But with the worldwide climate changes, food production is decreased also in other countries. With proper management and foreign investments Myamar's agricultural sectors is one of the promising business to support the economic development.

4 HUMAN RESOURCES DEVELOPMENT

Recently the Government of Myanmar has recognized that the human resources development is essential for sustained economic growth and poverty reduction and made efforts to reform the education sector.

Despite of many technical, vocational training schools, colleges and universities established countrywide, they have insufficient financial supports, poor facilities and learning resources, poor supports for research, weak information and quality control systems.

Recently, the government has expressed its intention to promote the cooperation with the foreign universities. That would be bold step in education sectors paving the foreign universities to cooperate with Myanmar universities in various fields.

5HEALTH

Government of Myanmar has set the goals and targets to improve the national health care systematically. It includes improving maternal health, combating HIV/AIDS, malaria, and other transmitted diseases, promoting the hospitals and local health centers. Currently public hospitals in Myanmar are in needs of facilities, medicines and financial supports. For the grass-root level, the reliable and effective health care system is difficult to reach because of the high costs of medical care in private hospitals and limited capacities of public hospitals. There is also needs to establish a health insurance system nationwide to help the ordinary citizen.

6 TRANSPORT SECTOR

Land, water and air transport sectors in Myanmar are facing great challenges to meet the demanding development plan.

Not only the infrastructure but also the planning and management bodies need to be conformed to the growing sector of trade locally and internationally including border trade. To compete with the neighboring countries when the Asean Free Trade becomes affected, transportation system of Myanmar needs to meet the international standard (at least Asean levels).
Myanmar has already practiced the partial privatization in the sector of land transport by allowing the private companies to participate in construction, operation and maintenance mostly with contract system.
Meanwhile, Myanmar has initiated to start the deep sea port projects which would be a center of trade in the region if it is successful because of the strategic location. Along with the deep sea port projects, there will be special economic zones attracting the foreign investments.
Air transport system has started to privatize the construction of new airports, upgrading the existing ones, maintenance and service and operations. According to the data, Mingalardon airport which is the biggest and main airport located in Yangon has limited area to accept the growing visitors near future. The airport expansions and construction of new larger airports to support the economic development in line is inevitable.

7 TELECOMMUNICATION

Telecommunication sector of Myanmar is also struggling to answer the growing demands of public at least to be par with the neighboring countries since only about 7% of the population is able to possess the telephone. The internet system which is vital for trade, banking system and information is even worse with its very poor connection and services and high costs.
Myanmarteleport has announced to reform itself as a private organization and also to allow other private companies to participate in telecommunication sector to fufill its commitment to promote the country's telecommunication sector.

8 TOURISM AND ENVIRONMENT

Myanmar has good reputation for its rich in culture, natural resources, biodiversity and beautiful and interesting places. Recently travel agencies around the world started to mention Myanmar as one of the worth to visit countries in their ranking systems. Tourism is well known as smokeless industries which greatly supports the economic development of country.
But to meet the rapidly growing demand of tourism industry, Myanmar needs to promote its infrastructure including hotels, transportation system, tour guides, clean restaurant, etc.

9 CONCLUSION

As a rapidly changing country with political and economic reforms, Myanmar gains the good impressions on the stage of world. Many countries and organizations are forecasting Myanmar as one of the economic powers near future. But there are many challenges and opportunities to overcome and grip including transparency, prudential planning and management and cooperation with international organizations.

10 REFERENCES Interim Country Partnership Strategy: Myanmar, 2012-2014

Session 1

Presentation

Special Topic

CURRICULUM VITAE

Name	Kyaw Zaw Maung (Mr)
Age (Date of Birth)	57 years (27-10-1955)
Gender	Male
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Nationality	MYANMAR
Religion	Buddhist
Qualification	BSc. (Zoology)
Designation	Director Directorate of Investment and Company Registration (DICA) Ministry of National Planning and Economic Development
Work Experience in Government	As a Deputy General Manager since 30 years ago in Ministry of Commerce, a township manager, district manager, state manager in the States and Regions of Myanmar. At that time, I have been worked responsible duties step by step in rice and paddy management field. At there, I have welly through the six kinds of management: man, money, material, machine, market and method. Now, I am working as Director in Directorate of Investment and Company Administration, facing many challenges in investment field which sector is the most popular not only in Myanmar but also worldwide.
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FOREIGN DIRECT INVESTMENT POLICY AND INVESTMENT ENVIRONMENT

Kyaw Zaw Maung, (Mr.)

Abstract

With her forests, river systems, mountain ranges, minerals, gems, cultivable acreage, a long coastline and literate population, the Republic of the Union of Myanmar (hereinafter refers to as Myanmar) could be classified as a country rich in natural and human resources. What she needs to reap the benefits of such an endowment are capital and technology for sustainable development. Therefore, Myanmar is inviting foreign investment from all over the world. Necessary steps have been taken to create an investment-friendly climate for foreign investors such as revising Foreign Investment Law and Special Economic Zone Law. Viewing the greater importance of the role of connectivity, government is making all-out effort to establish three Special Economic Zones in Myanmar. After implementing the said zones, Myanmar will become a bridge between ASEAN and the world's most populated countries China, India and Asia.

I. Myanmar In Brief

Myanmar, with a total land area of 677,000 sq.km (261,228 sq. miles), is the largest country on the mailand of South-East Asia. The country stretches for 582 miles (936 kilometers) from east to west and 1,275 miles (2,051 kilometers) from north to south. It shares a total of 5,858 km (3,640 miles) of international borders with Bangladesh and India on the north-west, China on the north-east, Laos on the east and Thailand on the south-east. It has a total length of 2,832 km (1,760 miles) of coastlines. The length of coastline from the mouth of the Naaf Riverto Kawthaung in Tanintharyi Region is 1,385 miles (2,229 kilometers).

Myanmar is endowed with natural resources and a forest-clad mountainous country. Three parallel chains of mountain ranges run from north to south. They begin from the eastern extremity of the Himalaya mountain range. The peak of the Hkakabo-Razi at 5881 m is the highest in South-East Asia.

As it is mainly in the Tropical Region, Myanmar has a tropical monsoon climate with three seasons: the hot season from mid-February to mid-May, the rain season from Mid-May to mid-October and the cool season from mid-October to mid-February.

The population of Myanmar, spread over seven States and seven Divisions was estimated at 59.8 million in 2010/2011 of which 37.35 million or 62.5 percent contributes to the working age. Myanmar is inhabited by many ethnic nationalities. There are as many as 135 national groups with the Bamars, comprising about 70 percent of the population, forming the largest group.

II. Economic Policy of Myanmar

Since the assumption of the responsibilities, the new government launched a series of economic reform measures. In this connection, the government laid down the economic policies as follows:

(a) Sustainable development of agriculture towards industrialization and all round development;

(b) Equitable and proportionate development among Regions and States;

(c) Inclusive development of entire people;

(d) Quality of statistics and statistical system;

III. Foreign Investment Environment in Myanmar

- **Myanmar's Investment Laws**

In view of the prevailing stage of economic development in 1980s, it became quite clear that basic changes were imperative in the management of the economy to stimulate capital formation and technological transfer that would lead to a major economic advancement and a higher standard of living for the people. Keeping that in view the Government of Myanmar, Myanmar adopted the market oriented economic system in the year 1988 after practicing the centralized planning economic system for a couple of decades. Substantial stabilization and reform measures had been undertaken to be in line with the new economic system. The initial step taken towards a more liberalized economy is to allow foreign direct investment and to encourage the private sector development.

In the area of legal framework, one of the first laws on investment promulgated is the Myanmar Foreign Investment Law (FIL), promulgated on 30 November 1988 to induce foreign investment and to boost investment particularly in the private sector. There are three laws enacted after the adoption of market-oriented system in 1988. They are:

(a) Foreign Investment Law of the Republic of the Union of Myanmar (1988)

(b) Myanmar Citizens Investment Law (1994)

(c) Special Economic Zone Law of the Republic of the Union of Myanmar (2011)

(d) Dawei Special Economic Law (2011)

The Basic Principles of Foreign Investment are as follows:-

(a) promotion and expansion of exports;

(b) exploration of natural resources which require heavy investment;

(c) acquisition of high technology;

(d) supporting and assisting production and services involving large capital;

(e) creation of new employment;

(f) development of works that would save energy consumption; and

(g) regional development.

Myanmar has invited foreign direct investment avoiding factors that harm national interests, dignity and sovereignty of the country and environment as Myanmar's Investment Policy.

- **Forms of Investment**

According to the Myanmar's Foreign Investment Law, foreign investment in Myanmar can take one of the following three forms:

(a) Partnerships, Limited Companies, or wholly foreign-owned subsidiaries. A Partnership Firm or a Limited Company incorporated outside Myanmar can conduct business as a foreign branch by bringing in the total capital required by such a branch. (100 % Foreign-owned)

(b) Joint Ventures, either as Partnerships or Limited Companies with any Myanmar Partner, individual, firm, cooperative, or State-owned enterprise of Myanmar. In all joint ventures, the minimum share of the foreign party is 35 percent of the total equity)

- **Minimum Capital Requirement**

To be eligible under the Foreign Investment Law of Myabmar, a provision on Minimum amount of foreign capital requirement is indicated. For a manufacturing company, an investment amount of US$ 500,000 (USDollar five hundred thousand only) and for a service company, US$ 300,000 (USD three hundred thousand only).

- **Exemptions and Reliefs**

According to the new FIL, an investor shall enjoy the following exemptions or relief from taxes. The following are the highlights of the privileges-

- Exemption from corporate income tax for 3 consecutive years beginning with the year in which the operation commences and a further tax exemption or relief for an appropriate period in case if it is considered beneficial for the country;
- exemption or relief from income tax on profit which is reinvested within one year;
- relief from income-tax up to 50 percent on the profit from exports;
- right to pay income tax on behalf of the foreign employees and to deduct the same from the assessable income of the enterprise;

- **Guarantee**

Enterprises operating under the Foreign Investment Law shall have the State guarantee against nationalization and expropriation.

- **Right to Transfer Foreign Currency**

An investor who has brought in foreign capital can transfer the following:-

- foreign currency
- net profit after deducting all taxes and provisions
- foreign currency permitted for withdrawal by the MIC which may include the value of assets on the winding up of business.

i. A foreign employee can transfer his salary and lawful income after deducting taxes and other living expenses incurred domestically.

ii. With the aim of facilitating investment procedures and getting better opportunities in doing business, Government issues the Notification for Foreign Currencies Transfer under the Foreign Investment Law of Myanmar (Notification No. 40/2011) prior to the enactment of the new Foreign Investment Law, investors are allowed to open Foreign Currency Accounts at any bank either government bank or private bank within Myanmar which has right to operate in foreign currencies.

- **Land Lease**

Foreign organizations and persons are not allowed to own land in Myanmar. However, Land may be acquired from Government owned lands, Governmental Department, Organization owned lands and Citizen owned private lands for the period of up to 30 years initially and extended two consecutive terms of 15 years depend on investment amount and type of business activity. (Total 60 Years)

The Government issues the notifications related to Land use in September 2011 (Notification No. 39/2011) prior to the enactment of the new Foreign Investment Law. An investor can lease the following lands with prior approval of the Union Government:

- government-owned lands;
- land owned by the government department, organization;
- private lands owned by citizen.

- **Procedures relating to the Foreign Investment Law of Myanmar**

A foreign investor who intends to invest in Myanmar is required to apply MIC Permit (Myanmar Investment Commission) if he wishes to be considered for incentives and exemptions under the Foreign Investment Law. A potential foreign investor, or promoter, must submit the investment proposal to the MIC in a prescribed form and submit to the Directorate of Investment and Company Administration.

Structure of MIC

According to the Notification No (82/2011),in order to monitor the provisions of the existing Investment Laws ,the government of the Republic of the Union of Myanmar reorganized the MIC. In recently reorganized MIC, the members are not only from the government but also from the private sector and experts.

- **The Myanmar Special Economic Zone Law**

Myanmar Special Economic Zone Law was enacted in January, 2011 with the following objectives.

a. To base on the framework of the maintenance, protection and safeguarding the sovereignty of the State in allowing to operate foreign investment businesses;
b. To develop the momentum of the economy of the State by establishing and operating the Special Economic Zones;
c. To develop the industry and high technologies in the State;
d. To improve the goods processing, trading and service business;
e. To enable the citizens to train, learn and transfer the high technologies;

Likewise Myanmar Investment Law, Myanmar Special Economic Zone Law grants special privileges to foreign investors. The following are the highlights of incentives offered by Myanmar SEZ Law:

- Income tax exemption on the proceeds of overseas sale for the first five years from the day of commencement of the production or services;
- 50 % relief on the income tax rate stipulated under existing Law for the second five years on the overseas sale proceeds; etc

With the aim to create investor-friendly climate, Special Economic Zone Law is being revised. Myanmar is rich in natural resources and it has the strength of strategic location. Therefore, Myanmar has huge investment opportunities to attract foreign countries. Myanmar has become a bridge between ASEAN and the world's most populated countries China and India. Steps are taken to establish the Special Economic Zones in Myanmar. For the time being, Dawei SEZ project is being implemented. The government is making and Thilawa SEZ and Kyauk Phyu SEZ will be developed.

IV. Reform Measures in investment sector

Government launched series of reform measures to induce investment from every corner of the world. To create an Investor Friendly Environment, the procedures and notifications have been streamlined and simplified for removing bottleneck such as reducing the supporting documents in formality, enhancing coordination with investment related ministries. For clear information and transparency purpose to the Myanmar Citizens and foreigners who inquire about the investment information in Myanmar, Coordination Team comprising senior officials from Myanmar Investment Commission, Ministry of Finance and Revenue, Ministry of Commerce, Ministry of Industry and Ministry of Construction.One Stop Service was introduce since 18th May 2011 to facilitate the company registration so as company incorporation certificate can be issued within one day if the required documents are completed.

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FOREIGN DIRECT INVESTMENT POLICY AND INVESTMENT ENVIRONMENT

Presented by

Ministry of National Planning and Economic Development (MNPED) of Myanmar

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1) Myanmar in brief
2) National Economic Policy and Basic Principle of Foreign Investment Investment laws of Myanmar
3) Foreign Investment law
4) Foreign Investment Situation in Myanmar
5) Formation of MIC
6) SEZ Law
7) Reform Measures in Investment Sector

PROFILE OF MYANMAR

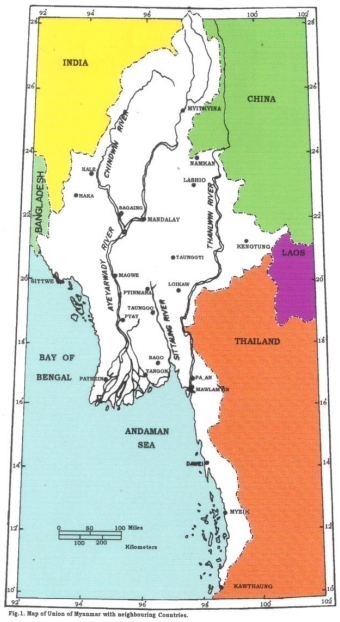


Fig. 1. Map of Union of Myanmar with neighbouring Countries.

The Land: The largest country in mainland South East Asia

Capital : Nay Pyi Taw
(14 Regions and States)

Total land area : 676,577 sq km

Total Coastline: 2832 Km

Climate: summer, rainy and cold season

Border countries: Bangladesh 193 km, China 2, 185 km, India 1,463 km, Laos 235 km, Thailand 1,800 km
(40% of World Population)

Population : 60 million

Working Age : 37.35 million (62.25%)

PROPORTION OF WORKFORCE IN MYANMAR

Age Group	Male (%)	Female (%)	Total (%)	Percentage
15-19	2.9	2.79	5.7	9.5
20-24	2.77	2.69	5.46	9.1
25-29	2.57	2.54	5.12	8.5
30-34	2.34	2.38	4.73	7.8
35-39	2.1	2.18	4.29	7.2
40-44	1.84	1.96	3.8	6.3
45-49	1.58	1.71	3.3	5.5
50-54	1.31	1.44	2.75	4.6
55-59	1.06	1.19	2.26	3.8
Total	18.47	18.88	37.35	62.25

4

Source: Department of Labor

NATIONAL ECONOMIC POLICY OF MYANMAR

- Sustainable development of agriculture towards industrialization and all round development;
- Equitable and proportionate development among Regions and States;
- Inclusive development of entire people;
- Quality of statistics and statistical system;

BASIC PRINCIPLES OF FOREIGN INVESTMENT

According to the Foreign Direct Investment Law 1988, basic princiles of Foreign Investment are:-

- Promotion and expansion of export;
- Acquisiton of high technology;
- Supporting and assisting production and services involving large capital;
- Opening up of more employment opportunities;
- Regional development

POLICY OF MYANMAR INVESTMENT COMMITTEE

- Not to Harm
- National Integrity
- National interest
- Sovereignity
- Environment

CRITERIONS OF INVESTMENT

- To develop of Economy through promotion of Investment
- To flow more capitals, to acquire more technical know-how, to create more employment opportunites
- To integrate ASEAN Economic Community
- To increase more foeign investmemt and citizens investment flow in line with economic system
- To protect environment

CRITERIONS OF INVESTMENT

- Protection To Investors,
- Social Impact Protection,
- Transparency And Accountability In Financial Matters,
- Corporate Social Responsibility (CSR)

Investment Laws of Myanmar

Nov 1988	• The Union of Myanmar Foreign Investment Law
Jan 2011	• The Myanmar Special Economic Zone Law
Jan 2011	• The Dawei Special Economic Zone Law

10

FOREIGN INVESTMENT LAW

Form of organization

- 100 % foreign-owned
- Joint Venture

  (Any Myanmar Partner or An Individual or A Private Company or A Cooperative Society or State Owned Enterprise)

FOREIGN INVESTMENT LAW (CONT;)

Minimum Foreign Capital

- **Manufacturing - US$ 500,000**
- **Services - US$ 300,000**

- **Both Kind → in**
  → in Cash

FOREIGN INVESTMENT LAW (CONT;)

Tax Incentives

- 3 years tax holiday
- Further tax exempt ion/ relief for an appropriate period in case if it is considered beneficial for the State
- Exemption or relief from customs duty or other internal taxes or both on importation of machinery & equipments during construct ion period.
- Importation of raw materials for production for the first 3 years.

FOREIGN INVESTMENT LAW (CONT;)

- The Commission may also grant ; -
  - exemption or relief from income tax on profit which is reinvested within one year.
  - Relief from income tax up to 50 percent on the profit from exports.
  - Right to pay income tax on behalf of the foreign employees and to deduct the same from the assessable income of the enterprise.
  - Right to pay income tax of the foreign employees at the rate applicable to the citizens of Myanmar.
  - Right to deduct the research and development expenditure.
  - Right to accelerate depreciation
  - Right to carry forward and set off losses up to 3 consecutive years, from the year the loss is sustained.
  - *exemption or relief from custom duty or other internal taxes or both on machineries, equipments , etc if the investment amount is increased and the original investment business is expanded during the permitted period.*
  - *exemption or relief from commercial tax on the goods produced for export.*

Right to transfer foreign currency

The investor has the right to transfer the following currencies abroad through the bank which has the right to carry out foreign banking in the relevant foreign currency at the stipulated exchange rate :

(a) foreign currency entitled to by the person who has brought in foreign capital;

(b) foreign currency permitted for withdrawal by the Commission to the person who has brought in foreign capital;

(c) net profit after deducting all taxes and relevant funds from the annual profits received by the person who has brought in foreign capital;

(d) legitimate balance after causing payment taxes due and after deducting living expenses for himself and his family in the manner prescribed, out of the salary and lawful income obtained by the foreign service personnel by performing service in the State;

Land Use

- Investors are allowed to lease the land either from the government or from the private
  - for 30 years as initial
  - to be extended 2 times, each time allow 15 years

GUARANTEE

- Enterprises operating under the Foreign Investment Law shall have the State guarantees
  - against nationalization
  - to transfer the entitled Foreign Capital to investor on the expiry of the term of the contract
  - against termination of investment during the permitted term

FOREIGN INVESTMENT OF EXISTING ENTERPRISES AS OF (30/9/2012) (BY SECTOR)

(US$ IN MILLION)

Sr. No.	Particulars	Existing Enterprises		
		No.	Approved Amount	%
1	Oil and Gas	62	13474.728	43.37
2	Power	4	13037.498	41.96
3	Mining	8	2289.162	7.37
4	Hotel and Tourism	30	814.475	2.62
5	Manufacturing	94	633.447	2.04
6	Real Estate	7	275.000	0.89
7	Industrial Estate	2	179.113	0.58
8	Agriculture	6	154.070	0.50
9	Transport & Communication	7	137.676	0.44
10	Livestock & Fisheries	7	64.946	0.21
11	Other Services	5	8.067	0.03
	Total	232	31068.182	100.00

Source: DICA

FOREIGN INVESTMENT OF EXISTING ENTERPRISES AS OF (30/9/2012) (BY COUNTRY)

(US$ IN MILLION)

Sr. No.	Particulars	Existing Enterprises		
		No.	Approved Amount	%
1	China	14	14064.303	45.28
2	Hong Kong	23	6278.436	20.21
3	Republic of Korea	45	2893.656	9.31
4	Thailand	25	2460.333	7.92
5	U.K *	22	2246.973	7.23
6	Singapore	41	1516.033	4.88
7	France	1	499.926	1.61
8	Malaysia	16	433.616	1.40
9	India	7	269.000	0.87
10	Japan	14	114.247	0.37
11	Russia Federation	2	94.000	0.30
12	Panama	2	55.101	0.18
13	Viet Nam	4	49.796	0.16
14	Mauritius	2	30.575	0.10
15	Indonesia	3	22.200	0.07
16	Republic of Liberia**	2	14.600	0.05
17	Philippine	1	6.667	0.02
18	Australia	1	5.819	0.02
19	The Netherlands	2	4.335	0.01
20	Germany	1	2.500	0.01
21	Canada	2	1.310	0.00
22	Austria	1	1.000	0.00
	Total	232	31068.182	100.00

Formation of Myanmar Investment Commission

- According to the Notification No(70/2012) dated on 23rd September 2012,in order to monitor the provisions of the existing Investment Laws ,the government of the Republic of the Union of Myanmar reorganizes the Myanmar Investment Commission as follows:

H.E U Soe Thane Union Minister for President Office (3)	Chairman
H.E U Aung Min Union Minister for President Office (4)	Member
H.E U Hla Htun Union Minister for President Office (6)	Member
Dr Htun Shin Union Attorney General Union Attorney General's Office	Member
Dr. Aung Htun Thet Economist	Member
U Nyunt Tin Ambassador (Retired)	Member

Source: DICA

Formation of Myanmar Investment Commission (Cont.)

U Win Khaing Chairman of the Myanmar Engineering Association	Member
Daw Mya Thuza Advisor	Member
Daw Khine Khine Nwe Entrepreneur	Member
H. E U Tin Naing Thein Union Minsiter for the President Office (5)	Secretary
H. E Thura U Thaung Lwin Deputy Minister for Rail Transportation	Joint Secretary

21

Source: DICA

RESPONSIBILITIES RELATED TO INVESTMENT OF DICA

As Secretariat Office of the MIC

- Scrutinizing the Investment Proposals
- Assisting To Solve The Difficulties On Investment Issues
- Provide information to Investors and coordinate with the relevant Ministries

Business Administration and Registration

- Business Registration
- Business Administration

SPECIAL ECONOMIC ZONE (SEZ) OBJECTIVES

- To base on the framework of the maintenance, protection and safeguarding the sovereignty of the State in allowing to operate foreign investment businesses;
- To develop the momentum of the economy of the State by establishing and operating the Special Economic Zones;
- To develop the industry and high technologies in the State;
- To improve the goods processing, trading and service business;
- To enable the citizens to train, learn and transfer the high technologies;
- To create more employment opportunities for the citizens;
- To develop the infrastructures of the State.

- **Production based businesses**
  - goods processing business
  - hi-tech production business
  - industries
  - agriculture
  - livestock breeding and fishery
  - mineral produce business
  - forestry produce business;

❑ Services business

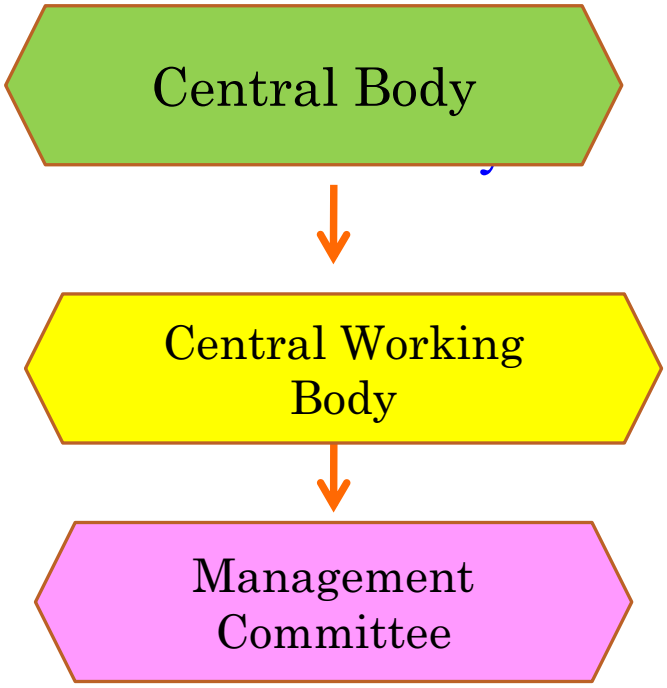
- trading
- logistics and transportation
- storage
- hotel and tourism
- education and health
- residential quarters
- infrastructure supply and support centers
- green areas which conserves and protects the natural environment
- recreation and resort centers

❑ Infrastructure construction businesses

- road
- bridge
- airport
- port
- electricity
- communication and water supply
- environment conservation and protection
- wastes control

❑ Other businesses

- determined by the Central Body, with the approval of the Government.



INCENTIVES FOR INVESTOR UNDER THE SEZ LAW

- Tax holiday - 5 years
- Second 5 years - 50% relief on income tax – overseas sale products
- Third 5 years - 50% relief on income tax – reinvestment obtained from export sale
- More applicable

Incentives for Investor under the SEZ Law (Cont.)

Exemption from customs duty

- Imported raw material
- Machineries
- Equipment

} Export Processing Zone

- Machineries
- Vehicles

} 5 years

- 50% exemption for the next 5 consecutive years

EMPLOYMENT OF EXPATRIATES

- Allows investors to employ expatriate technicians, expert, staff & skill labour as follows as follows : -

(a) First 2 years 75%

(b) Second 2 years 50%

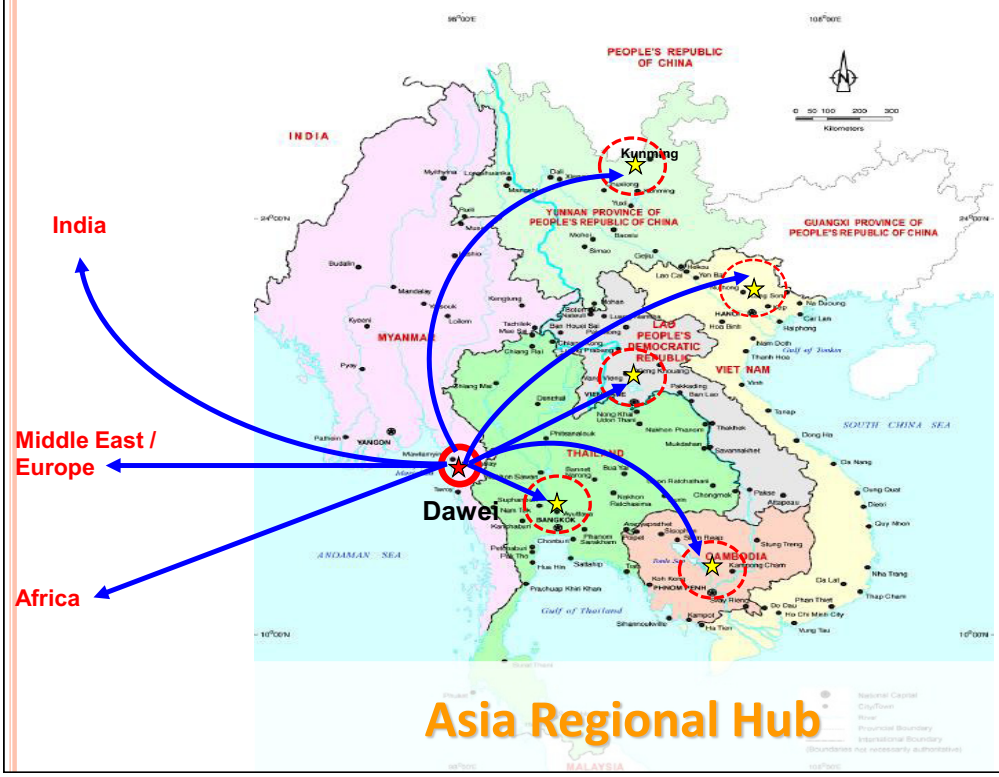
(c) Third 2 years 25%

- Limitation of time can be increased for appropriate period for knowledge based activities.

Special Economic Zones in Myanmar

- ❑ **Dawei Special Economic Zone** - being developed
- ❑ **Thilawa Special Economic Zone** - in the process
- ❑ **Kyaukphyu Special Economic Zone** - to be developed

Dawei SEZ Project Location



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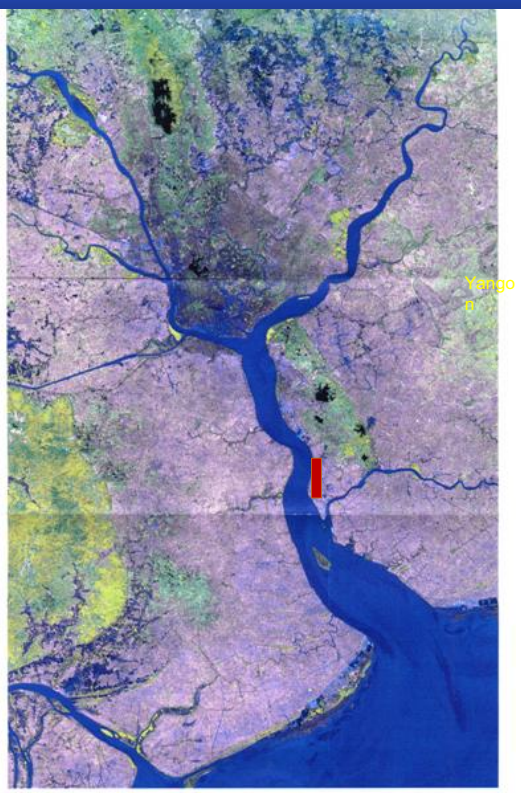
Thilawa SEZ Project Location



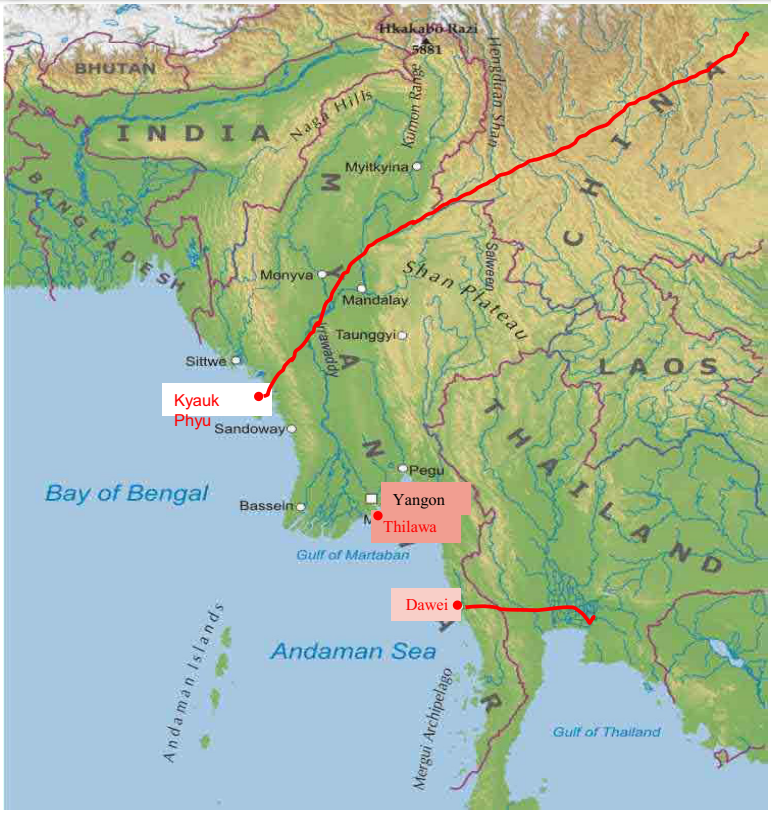
Yangon down town to Thilawa = 18 Km

33

MYANMAR INTERNATIONAL THILAWA TERMINAL

MYANMAR INTERNATIONAL THILAWA TERMINAL

Special Economic Zones in Myanmar



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Bilateral Investment Promotion & Protection Agreements

Concluded	Under negotiation
Philippines	Russia
Vietnam	Bangladesh
Lao PDR	Mongolia
China	Japan
India	Korea
Thailand	Iran
Kuwait	

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FIRST REFORM

- Reviewing of FIL is the first step for change in investment climate and new FIL will come out very soon for shaping up promotion and facilitation of investment.

Revising of Foreign Investment Law

- In order to be adaptable to the advancing era and develop the whole economic infrastructure, FIL is being revised .

Existing Law	Revised Law (Draft)
No specific definition on investment	Specific definition on investment
No specific definition on grant of land lease or grant of land use	Specific definition on grant of land lease or grantee of land use
Not mentioned on restricted activities	Mentioned on restricted activities
Export Promotion	Export promotion and import substitution
No description on rights and obligation of investor	Description on rights & obligation of investor
3 years tax holidays	5 years tax holidays
No description on land use	Description on land use
No description on administrative penalty	Description on administrative penalty
No description on dispute settlement	Description on dispute settlement

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SECOND REFORM

- To create an Investor Friendly Environment, the procedures and notifications have been streamlined and simplified for removing bottleneck. It is notified that the next step of investment climate is to be issued notification no. 39/2011 relating to the right to use land According to notification no. 39/2011, investors can lease the land not only from the State but also from private.

THIRD REFORM

- In the past, all of you known that there were two exchange rates which we called market rate and official rate.
- The differences between these two rates were about 200 times. As a result, those kinds of dual exchange rates were affected on some businesses and investments.
- Therefore, the government issued the notification no. 40/2011 relating to the foreign currencies. As a result, investments can be made at prevailing market exchange rate.

FOURTH REFORM

Since FIL enacted, 1988, Myanmar Investment Commission was organized with only government sectors. However, the Myanmar Investment Commission which is chaired by Minister for President Office (3) and is consisting of 11 members who are not only from Government Sector but also from private sector, academic field and researcher field has been recognized. That is the evidence for encouragement of participation of private sector in Investment Authority. This is the fourth step of reforms.

STREAMLINING PROCEDURE IN DICA

- **Reduce supporting documents in formality**
- **Enhance coordination with investment related ministries**
- **Provide technical suggestion to investors**
- **Promote public relations**
- **Investors can get investment permit within two weeks if documents are completed.**

SIMPLIFYING FORMALITY

- One Stop Service in company registration has been provided since 18th May 2011 and the process of company registration is finished within one day if the documents are completed.

SETTING UP OF COORDINATION TEAM

- For clear information and transparency purpose to the Myanmar Citizens and foreigners who inquire about the investment information in Myanmar, Coordination Team has been formed since July 2011.

- It comprise senior officials from Myanmar Investment Commission, Ministry of Finance and Revenue, Ministry of Commerce and Ministry of Construction.

- Its Meeting is held on every Friday for answering the queries of investors, scrutinizing the investment proposals and assisting to solve the difficulties on investment issues, etc.

Bilateral Investment Promotion & Protection Agreements

Concluded BITs	BITs Under negotiation
Philippines	Russia
Vietnam	Bangladesh
Lao PDR	Mongolia
China	Japan
India	Korea
Thailand	Iran
Kuwait	

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THANK YOU

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Professor

Professional Summary

Dr. and Prof.,
Graduate School of Science and Engineering, Engineering for Production and Environment
Ehime University

Career

1976/04-1978/03 Ehime university (Research Assistant)

1978/04-1982/03 Ehime University (Assistant Professor)

1983/04-2005/03 Ehime University (Associate Professor)

2005/04-2012/09 Graduate School of Science and Technology, Ehime university (Associate Professor)

EDUCATION

1971-1973 Completed Master course Civil Engineering, Graduate School, Division of Engineering, Osaka University

1973-1976 Withdrawn after Completion of required course credits Doctor Course Civil Engineering, Graduate School, Division of Engineering, Osaka University

1971 Graduated Faculty of Engineering, Ehime University

PRACTICAL APPLICATION OF A JACKET TYPE BREAKWATER WITH WATER CAHMBERS TO THE FISHING PORT

Takayuki NAKAMURA

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ABSTRACT

In this study, a new jacket-type breakwater was proposed for the economical construction of breakwaters in deep-sea ports. This breakwater consists of water chambers with two inclined walls and a submerged horizontal plate. In order to reinforce the breakwater structure, the inclined support piles ER B (L=150m) were adopted instead of vertical piles. Accordingly, the inclined walls were used as front and rear curtain walls. Piston mode wave resonance can be employed in the water chamber to effectively dissipate incoming waves by the generation of separated flows and the resultant vortex flows around the front curtain wall. The performance of the proposed breakwater was examined from the theoretical and experimental viewpoints. Considering the experimental results, we decided to construct an economical water-chamber-type breakwater on the adopted site.

KEYWORD

Water-chamber-type breakwater; jacket-type; seawater exchange; low wave transmission and reflection

PRACTICAL APPLICATION OF A JACKET TYPE BREAKWATER WITH WATER CAHMBERS TO THE FISHING PORT

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KEYWORD

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1. INTRODUCTION

To secure calmness in the harbor basin at Aou-ura Fishing Port, Nagasaki, Japan, two different types of breakwater as seen in Fig. 1 have been planned and are now under construction. One is a gravity type specified as "JETTY A" in the figure and the other is a pile supported breakwater of jacket type, "OFFSHORE BREAKWATER B". The construction site of the latter breakwater is about 20m in water depth in case of high water level (HWL) and the soil

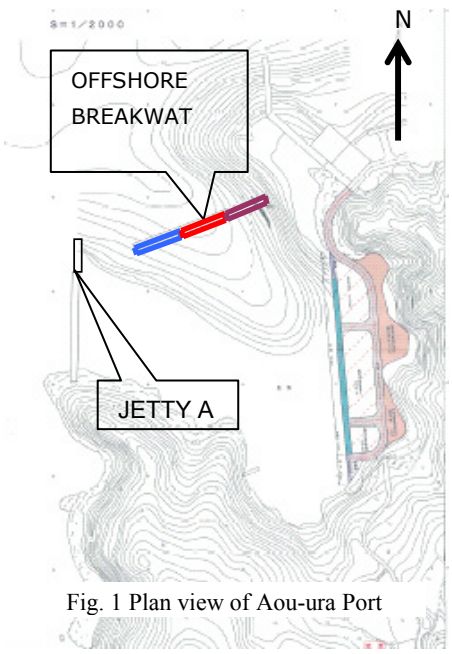


Fig. 1 Plan view of Aou-ura Port

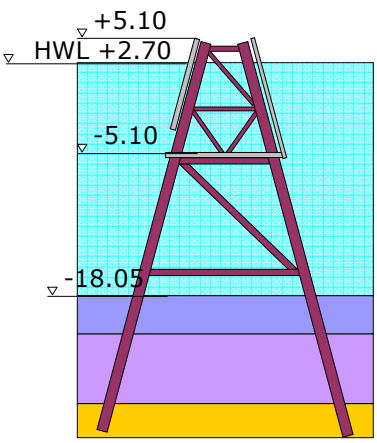


Fig.2 Cross section of the water chamber type breakwater at Aou-ura Fishing Port.

condition of sea floor is comparatively soft. Therefore a pile supported structure was chosen as a suitable breakwater.

In order to add a water-exchange function in the harbor basin to the breakwater function, a water chamber type breakwater as shown in Fig. 2 was adopted after some examinations. In the last several years, we have proposed and examined a new type of pile supported breakwater which has a water chamber near the water surface as seen in Fig. 2. It has become known that the water chamber type breakwater is effective to reduce transmitted waves in addition to reflected waves.

The piston mode wave resonance in the water chamber plays an important role to reduce both reflected and transmitted waves about the breakwater due to generation of large and strong vortices from the lower edge of the front curtain wall. It was also found out that asymmetry of flow separations and resultant vortex formations about a front curtain wall for the two wave phases, say wave crest and trough, causes the mean water mass transport in the offshore direction under the base plate of a water chamber. Hence it has also a water-exchange function.

Table 1 Wave conditions and the required performance

Wave Conditions	Wave Height H1/3(m)	Wave Period T1/3(s)	Reflec. Coeffi. Cr	Trans. Coeffi. Ct	Water Exchange
Extreme Waves	2.4	9.4	<0.3	<0.5	
Crtical Waves for Harbor Access	1.0	5.3	<0.4	<0.1	Required
Nominal Waves	0.55	5.2	<0.4	<0.1	Required

Tidal Level Difference: 2.7m (LWL to HWL)

2. WAVE CONDITIONS AND REQUIRED PERFORMANCE

The wave conditions at the site are tabulated in Table 1. Required performance for each target wave condition is also shown. The cross section of a water chamber type breakwater was determined by referring to the previous study (Nakamura et al, Coastal Structures'2007). According to the previous study, the characteristic length l_a, given by taking a square root of the water chamber area projected by the front curtain wall, is a very important dimension. When the ratio of a wave length L to the characteristic length of the water chamber, L/ l_a, is about ten, the minimum wave reflection from the breakwater as well as the maximum wave energy dissipation can be realized. It has also become known that the amount of water exchange by wave interactions with the breakwater increases significantly from this critical wave condition and for longer waves.

There were some differences between the previous study and this study, typically the configuration of the water chamber. In this study, we have adopted the trapezoidal cross section supported by jacket frames as shown in Figure 2. From the point of reinforcement of the breakwater structure, the inclined support piles should be used instead of vertical piles. In the preliminary study, we have examined the influence of the modification of the water chamber cross section, i.e., the trapezoidal cross section.

3. EXPERIMENT

We have carried out the experiment by using a long wave flume of 30m long, 1.2m high and 1m wide at Ehime University. The model scale is 1/33.3. The Froude low of similarity was assumed. Both the regular and irregular wave conditions corresponding to the site conditions were used. The three different tidal levels corresponding to the HWL, MSL and LWL were realized in the experiment. Measurement items are following; i) reflection and transmission coefficients, Cr and Ct, ii) horizontal velocity distributions under the base plate and the resultant mass transport velocity in the horizontal direction, and iii) wave pressure distributions along the member plates and the resultant wave forces.

4. RESULTS

In Fig.3, typical experimental results on reflection and transmission coefficients are shown, which corresponds to the tidal level of MSL. Numerical computation results based on the damping wave theory by Nakamura et al are also shown. It can be seen that the newly proposed jacket-type breakwater is effective for the target wave conditions specified in Table 1.

It is also seen from Fig.4 that the jacket-type breakwater is highly dissipative. Energy dissipation ratio EL reaches 80 to 90% near the extreme wave condition.

Fig.5 shows the averaged mass transport rate Q per one cycle of wave under the base plate of the breakwater. Dimensionless water mass transport rate Q* normalized by the water mass set in motion during a half wave period, HL/2π, is about 0.1 for the nominal wave condition and increases with wave height, and also wave period.

It has been confirmed that for the other tidal levels, say LWL and HWL, the breakwater in Fig.2 is effective for wave dissipations and water –exchange.

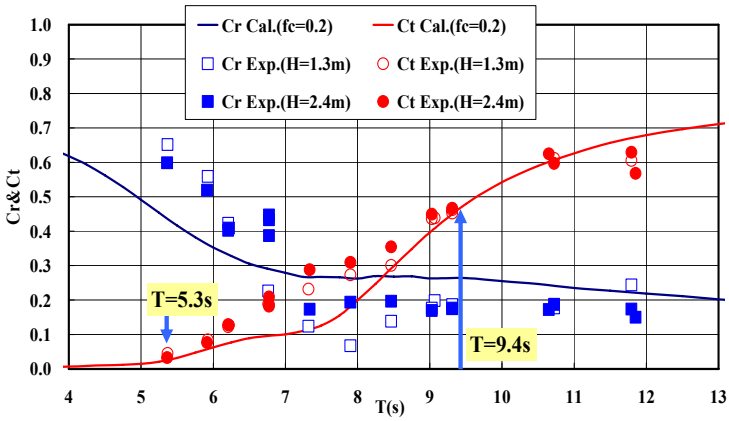


Fig. 3 Reflection and transmission coefficients of a water chamber type breakwater with a trapezoidal cross section (reg.waves, MSL)

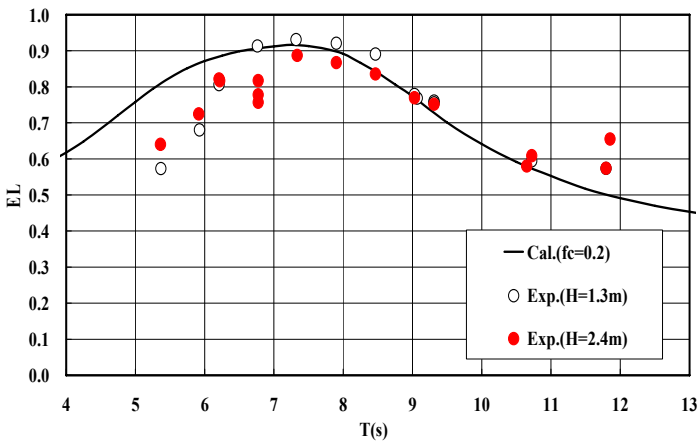


Fig. 4 Energy dissipation ratio of a water chamber type breakwater with a trapezoidal cross section (regular waves, MSL)

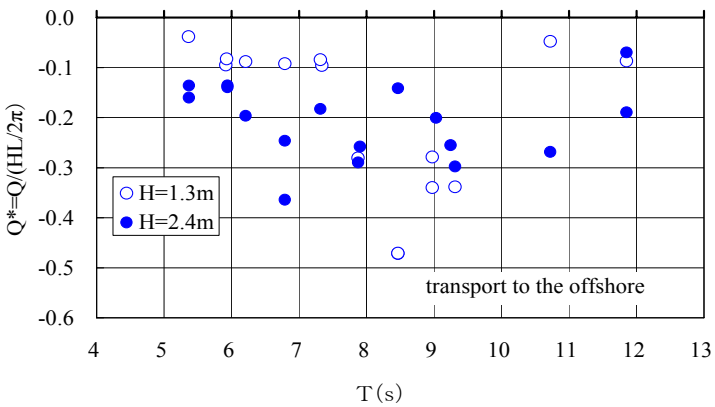


Fig.5 Averaged water transport rate per one cycle Q (reg. waves, MSL)

5. CONCLUSION

It is confirmed that the water-chamber type breakwater supported by jacket frames is very effective for reducing both reflected and transmitted waves in comparatively deep sea, even though the draft depth of the breakwater is shallow as compared to the water depth. It can also be used as a water-exchange device to discharge water mass in the harbor to the offshore by wave actions. The trapezoidal water chamber is as effective as the rectangular one if the cross sectional area of a water chamber is approximately same for the two models.

As the draft depth of the water-chamber type breakwater

supported by jacket frames can be set to be shallow, wave forces on the breakwater become small as compared to the conventional curtain-walled breakwater, typically a half or 1/3. Because of such a low wave loading characteristics, we can construct the breakwater economically even though the water depth is deep and the wave condition is harsh.

Fig. 6 A jacket-type breakwater with water chambers at Aou-ura Fishing Port, Nagasaki, Japan.

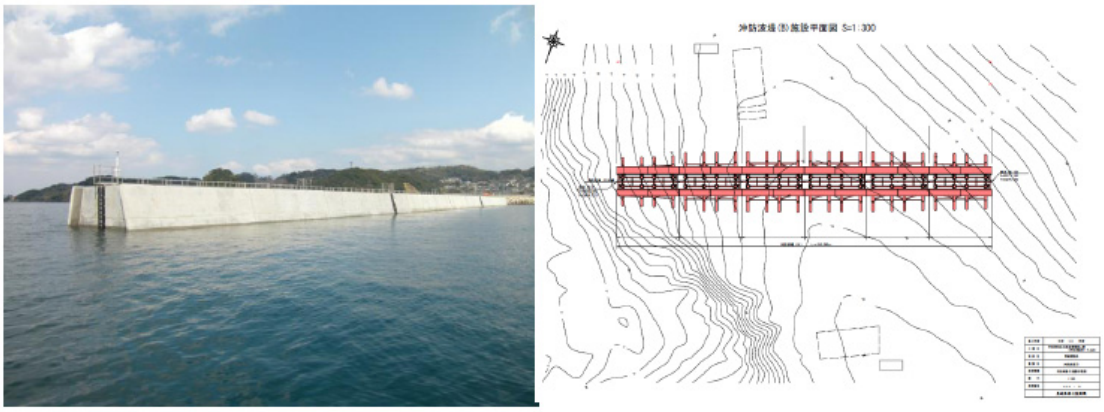


Fig. 7 The completed form of a jacket-type breakwater with water chambers and its plan figure.

6. REFERENCES

Kouno, T. & Nakamura, T. 2009 Jacket-type Breakwaters with Water Chambers in Deep Sea, *2009 Annual ISOPE- vol. 3 pp. 1010-1016.*

Nakamura, T. & Ide, Y. 1997 Analysis on wave transformations and wave force about an angular body considering wave energy dissipations, *Proc. of Civil Eng. in the Ocean, vol. 13, pp. 177-182 (in Japanese).*

Nakamura, T., Yoneshima, M., & Tanaka, K. 2005 Effectiveness of a jacket-type breakwater with water chamber for comparatively long waves in deep sea ports, *Proc. of Coastal Engineering, vol. 52, pp. 671-675 (in Japanese).*

32nd ICCE, Shanghai.

PRACTICAL APPLICATION OF A JACKET TYPE BREAKWATER WITH A WATER CAHMBER TO THE FISHING PORT

Takayuki Nakamura, Dr. of Eng. and Professor,
Ehime University, Japan

■BACK BROUND : Development of a ne breakwater with water chambers

The curtain-walled type breakwater is conventiona for deep water conditions and soft grounds under

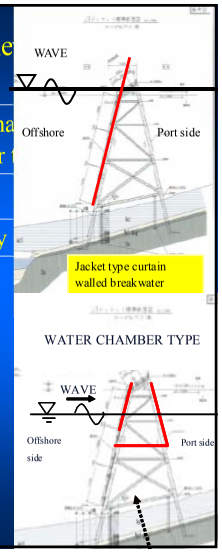
For the region swells acting

The draft depth of the curtain wall becomes very

The horizontal wave force becomes very large

The diameter of support piles becomes large
→ uneconomical designs and constructions

New idea => Water chamber type breakwater



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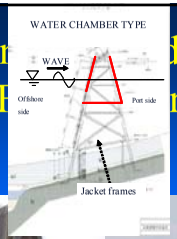


Before set-up to the site

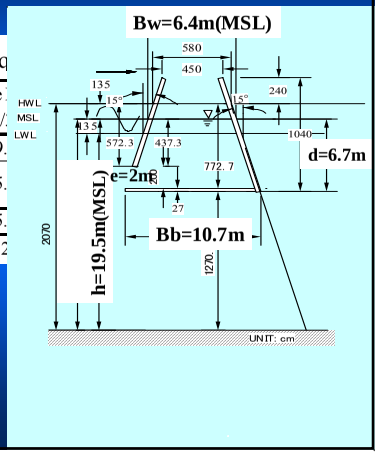
Under construction at the port site

Design wave conditions

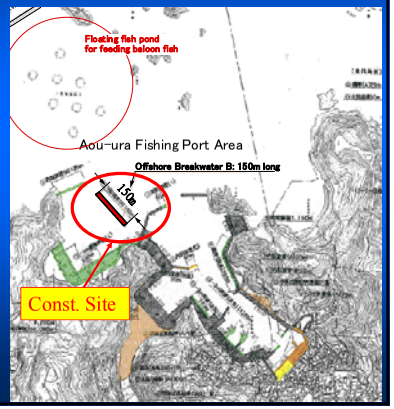
Table 1 Wave conditions and the req

Wave Conditions	Wave Height H1/3(m)	Wave T1/
Extreme Waves	2.4	9.
Crtical Waves for Harbor Access	1.0	5.
Nominal Waves	0.55	5.

Tidal Level Difference: 2



Location of Aou-ura Fishing Port



In the PREVIOUS STUDIES

The water chamber type breakwater has several advantages.

1. Low reflections, 2. Low transmissions, 3. Water exchange functions

Strong vortices are generated.

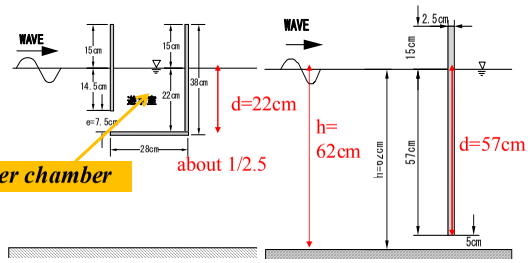
The major driving force is the piston mode wave resonance in the chamber

MEAN CURRENT is induced by jet flows and vortices

BASIC FUNCTIONS OF A WATER CHAMBER TYPE BREAKWATER

In the case of a rectangular water chamber

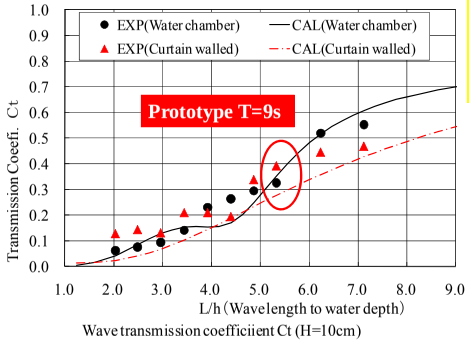
Model breakwaters (model scale S=1/32)



Water chamber type with a rectangular cross section | **Curtain-walled type**

The draft depth of a curtain-walled breakwater was set to have almost the same transmission characteristics as the water chamber type.

COMPARISONS BETWEEN THE WATER CHAMBER TYPE BREAKWATER AND THE CONVETIONAL CURTAIN WALLED BREAKWATER



Cal. Results were obtained by the damping wave model developed by author.

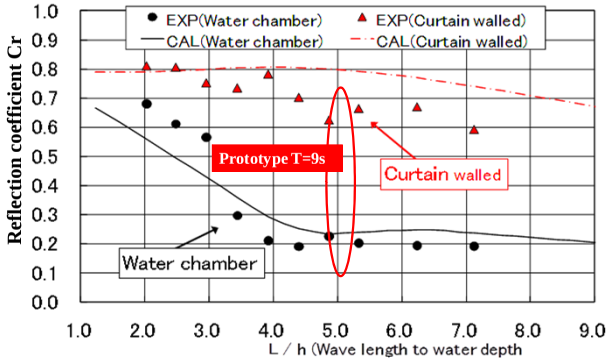
(1)Sheltering effect of transmitted waves

The two different breakwaters have the similar effect.

WAVE HEIGHT H=10cm(3.2m)

(2)Dissipation of reflected waves

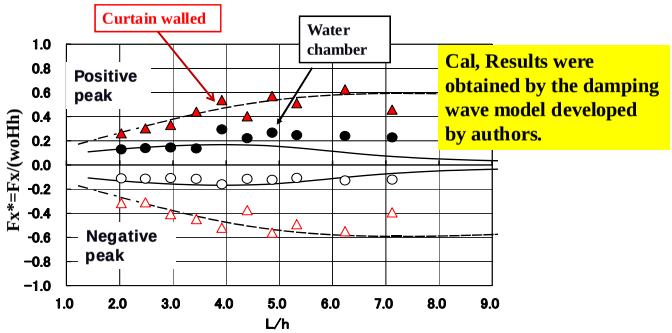
The water chamber type breakwater is much more effective.



WAVE HEIGHT H=10cm(3.2m)

(3) REDUCTION OF WAVE LOADING

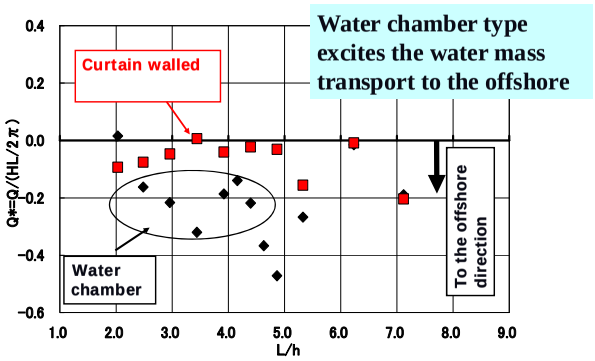
Total horizontal wave forces on the two different breakwaters



The horizontal wave force on the water chamber type breakwater is about one half of that on the curtain walled type.

(4) EFFECTIVE WATER EXCHANGE FUNCTIONS

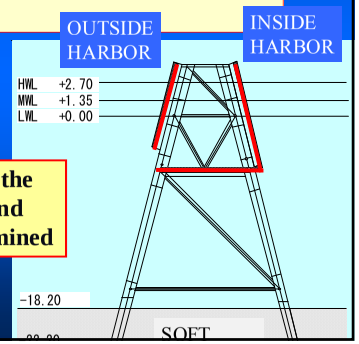
Averaged water mass transport rate per one cycle Q



APPLICATION OF THE WATER CHAMBER TYPE BREAKWATER TO THE REAL SITE

MODIFICATION OF THE CROSS SECTION OF THE WATER CHAMBER IS NECESSARY TO FIT THE SUPPORT STRUCTURES

TYPICALLY FROM RECTANGULAR TO TRAPEZOIDAL SECTIONS.



OBJECTIVES of this study

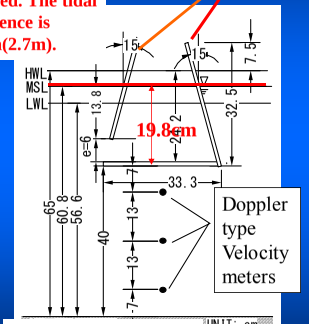
Influence of the modifications on the performance of the breakwater and also the wave forces must be examined

■EXPERIMENTS

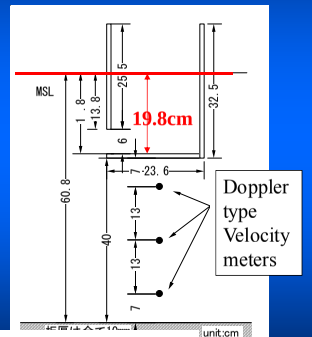
TWO DIFFERENT MODEL BODIES

Three different tidal levels are adopted. The tidal difference is 8.4cm(2.7m).

Inclination angle 15 degrees



(a) Trapezoidal model



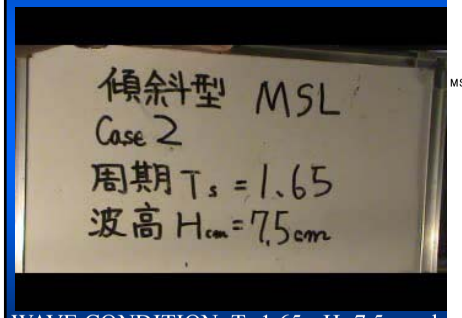
(b) Rectangular model

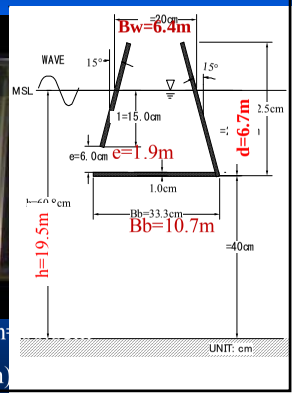
Model scale in this exp. S=1/32

Typical wave motions and vortex flows

In the case of **a trapezoidal water chamber model**

In prototype dimensions, Bb=10.7m, d=6.7m, h=19.5m



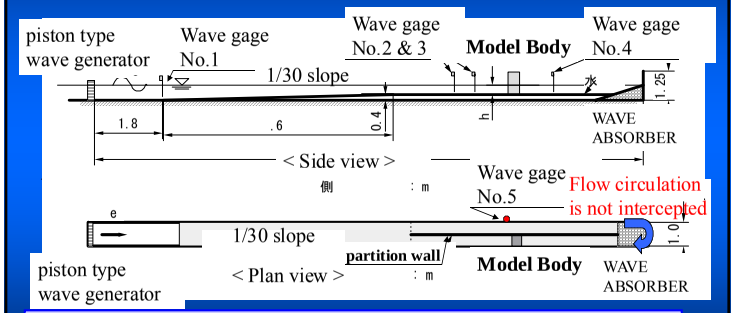


WAVE CONDITION; T=1.65s, H=7.5cm , h=

(PROTOTYPE T=9.4s, H=2.4m, h=19.5m)

WAVE FLUME AND EXP. CONDITIONS

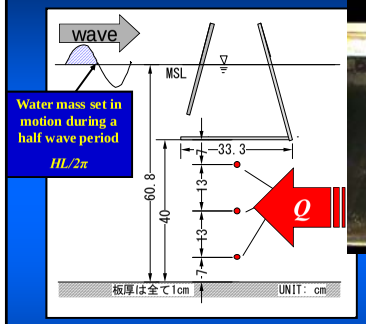
THE WAVE FLUME HAS A LENGTH=30m, BREADTH=1m, HEIGHT=1.25m.



Wave period T=0.95～2.1s **prototype** T=5.4～11.8s

Wave height H=4, 7.5, 13.5cm H=1.3, 2.4, 4.3m

Measurement of water mass transport

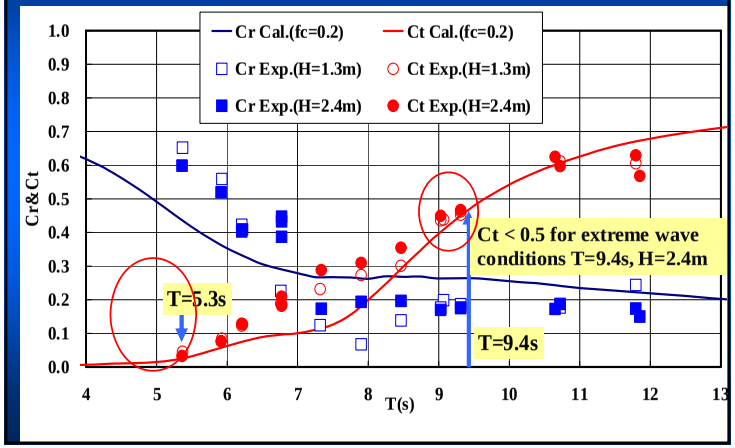


Generation of the mean flow to the offshore direction

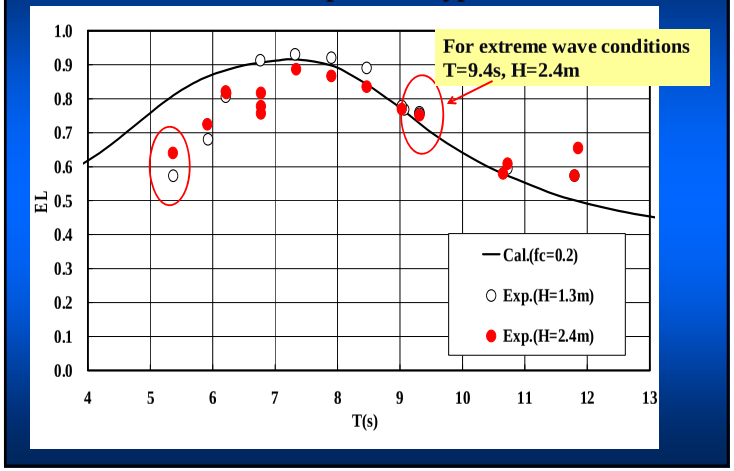
Mass transport amount during one wave cycle

Q=mean flow velocity Uav × discharge length ***l***

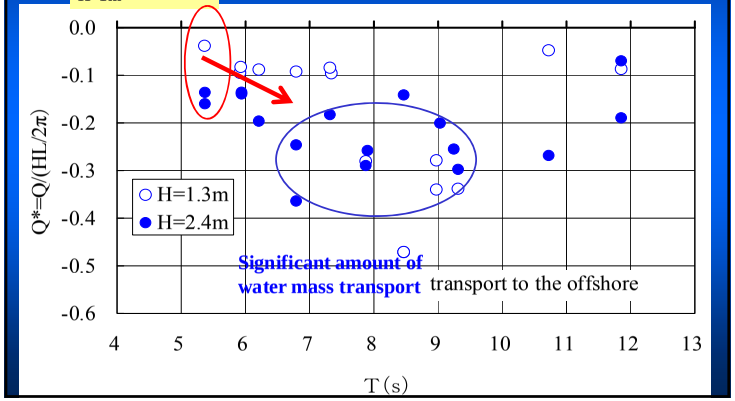
WAVE REFLECTION Cr and TRANSMISSION Ct for the Trapezoidal Type



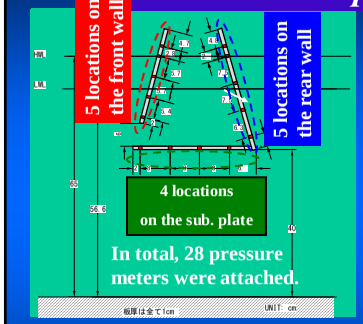
WAVE ENERGY DISSIPATION RATIO EL for the Trapezoidal type



Averaged water mass transport rate per one cycle Q (reg. waves, MSL)



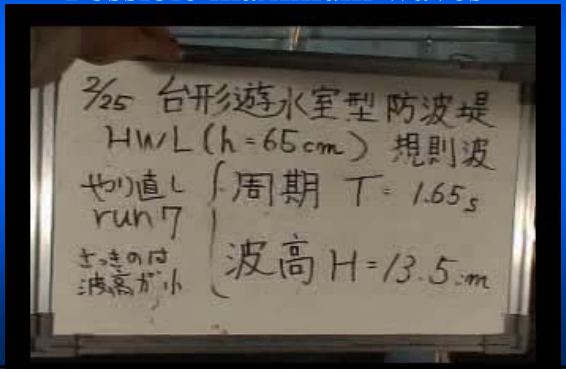
Measurement of wave forces and wave pressures



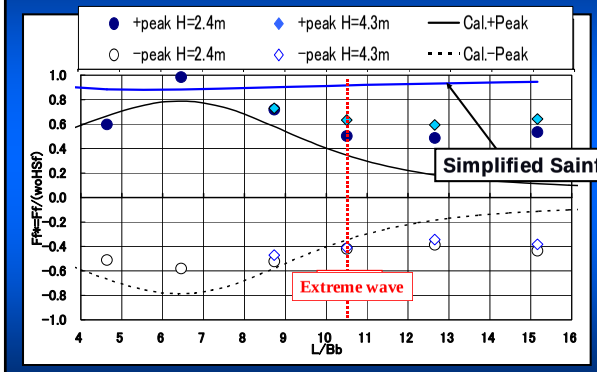
Set-up pressure meters (front view)

Pressure meters are attached to both the front and rear side of the plate to be able to measure the pressure difference on the plate, hence local wave forces.

Experimental View of
wave force measurements/ HWL
T=1.65s(9.3s), H=13.5cm (4.3m)
Possible maximum waves

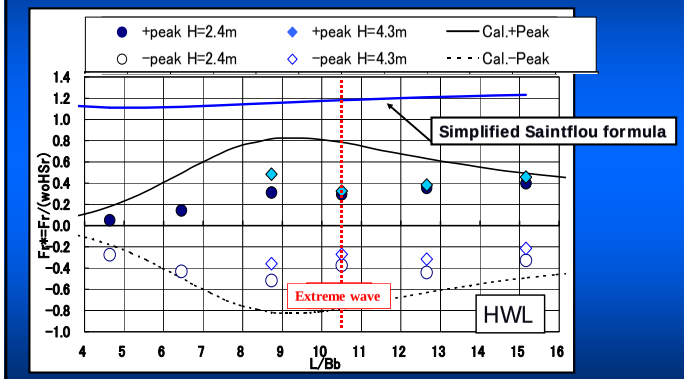


WAVE FORCES ON THE FRONT CURTAIN WALL



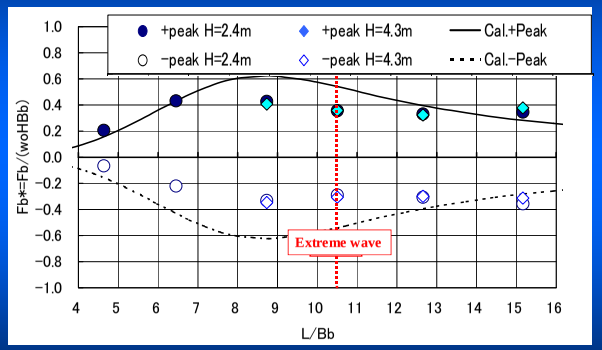
Nondimensional Force Intencity Ff* is less than1.0

WAVE FORCES ON THE REAR CURTAIN WALL



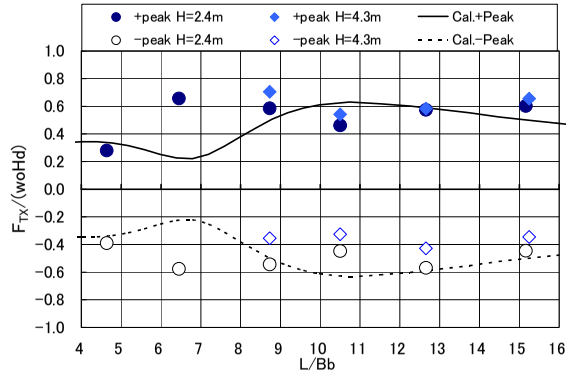
Nondimensional Force Intencity Fr* is less than 0.5

WAVE FORCES ON THE SUBMERGED PLATE (Vertical Forces)



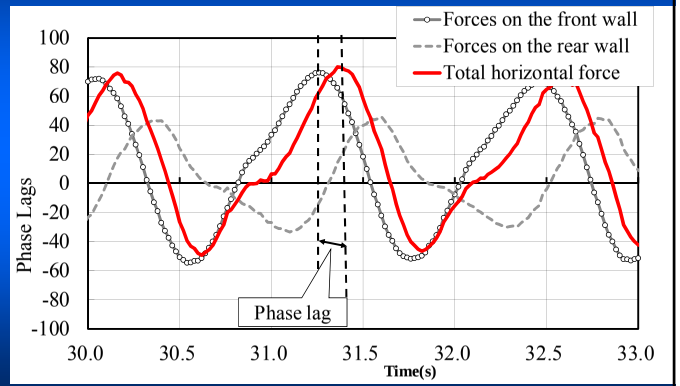
Nondimensional Force Intencity Fb* is less than 0.4

Total horizontal forces on the breakwater F_{TX}

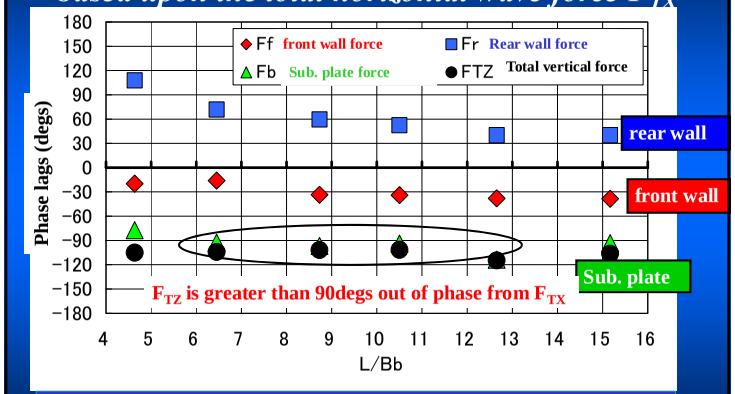


Nondimensional Force Intencity F_{TX}* is less than 0.7

Time variation curves of wave forces and phase lags



Phase differences among local and total wave forces based upon the total horizontal wave force F_{TX}

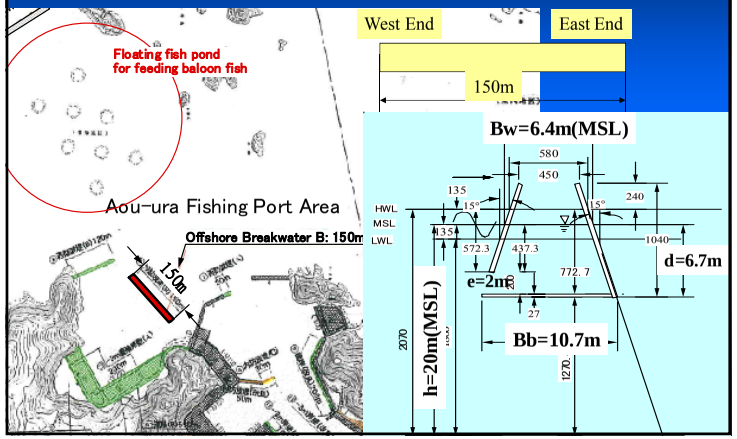


The phase lags among local wave forces become important to obtain the total wave forces.

■CONCLUSIONS

1. **The water chamber type breakwater supported by piles and jacket frames are effective, even if the water chamber cross section is trapezoidal to reinforce the total structure.**
2. **The piston mode wave resonance in the water chamber plays an important role for the breakwater effectiveness.**
3. **Total wave forces on the water chamber type breakwater are comparatively small because of the significant phase lags among local wave forces on member plates.**

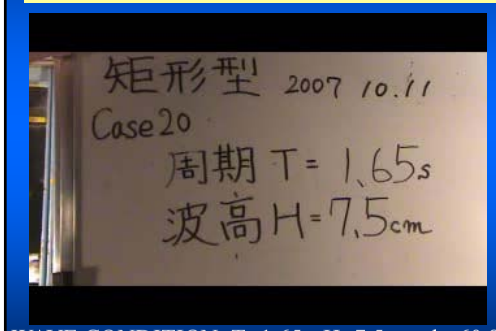
Layout and location of the offshore breakwater of Jacket type with a water chamber

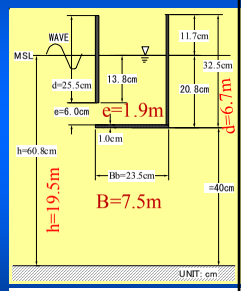


Typical wave motions and vortex flows

In the case of **a rectangular water chamber model**

In prototype dimensions, B=7.5m, d=6.7m, h=19.5m





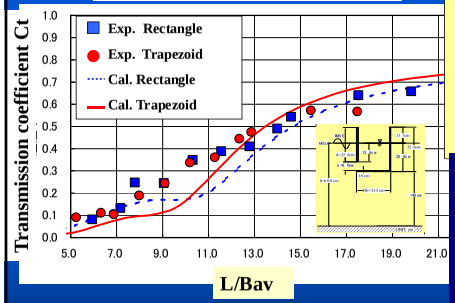
MODEL SCALE; S=1/32

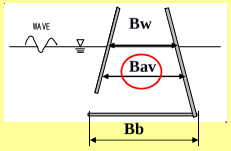
WAVE CONDITION; T=1.65s, H=7.5cm , h=60.8cm

(PROTOTYPE T=9.4s, H=2.4m, h=19.5m)

Correspondences between the two models, trapezoidal and rectangular cross sections

Transmission coefficients Ct





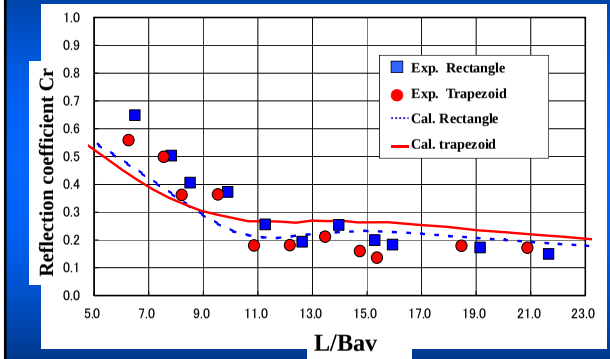
Bav=(Bw+Bb)/2

As a representative length of the trapezoidal water chamber, if we take "Bav", defined by the average breadth of a submerged part of trapezoidal cross section, correspondences between the two models are good.

WAVE HEIGHT H=7.5cm(2.4m),

Tidal level is MSL

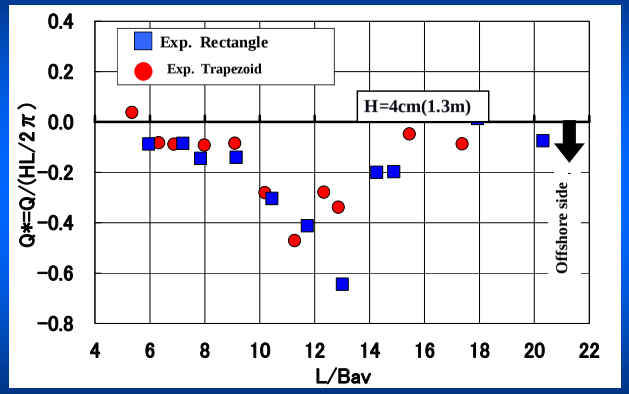
Correspondences between the two models, trapezoidal and rectangular cross sections



WAVE HEIGHT H=7.5cm(2.4m),

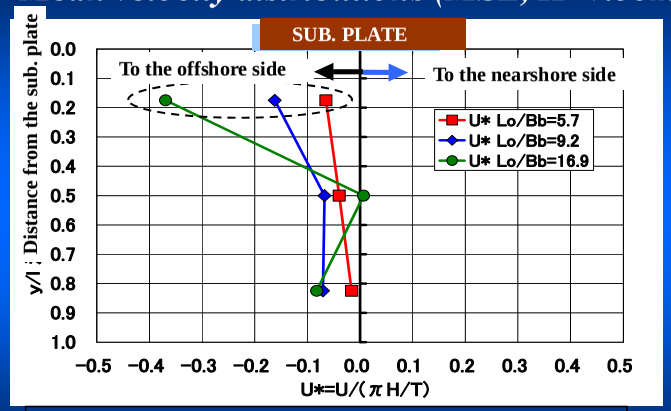
Tidal level is MSL

Water exchange amount of trapezoidal and rectangular cross sections of the breakwater



A dimensionless parameter, L/Bav, is again adequate for expressing the mass transport amount for the two different cross sections of breakwaters.

Mean velocity distributions (MSL, H=7.5cm)



Mean Velocity becomes larger near the sub. plate, and also becomes faster for longer period of waves

TOPIC 1 :

Korea-Myanmar cooperation in fishery and aquaculture

Curricular Vitae

Duk-Hyun YOON

- General Manager of **Aqua-Int. Consulting Ltd**.
- Appointed Consultant for **NFRDI** , KOREA
  (National Fisheries Research and Development Institute)
- Advisory Committee Member for **HRDS**, KOREA
  (**Human Resources Development Service, Ministry of Labor)**

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E-mail ; aquaint11@gmail.com
Home page : www.aqua-int.com

ACADEMIC QUALIFICATION ----------

PhD Research in Aquaculture/Environmental Microbiology 1994 - 1999
Institute of Aquaculture, University of Stirling, Scotland
Impacts of Antibacterial Agents used in Aquaculture on Aquatic Ecosystem
*"***A Marine Microcosm to Investigate the Impact of Oxolinic Acid on the Microbial Community"**

MSc in Marine Environment 1986 - 1988
National Fisheries University of Pusan (NFUP), Korea
Bioaccumulation of heavy metal in the marine bacterial species
"Bacterial characterization of 109Cd resistant Vibrio spp, isolated from chronically contaminated Masan Bay":

BSc in Biology 1977 - 1984
Konkuk University, Seoul, Korea
Bacterial genetics, microbial ecology

EMPLOYMENTS and WORK DESCRIPTIONS ----------

General Manager of **Aqua-Int. Consulting Ltd.** 2003- present
; giving consultancy of aquaculture development
; aquaculture production for highly valued species in oversea, Malaysia
; developing marine biotechnology connected with aquaculture technology
; marketing strategy for seafood produced through aquaculture

Research Scientist in Marine Ranching Research Group 1999-2002
Korea Ocean Research and Development Institute (KORDI)
; environment associated research on marine ranching project,
the feasibility study of oversea aquaculture development project
GIS application on aquaculture management

Consultant for Supreme D. Ltd. London 1995 -1999
; giving constancy for seafood processing, exploring marine resources for Sea Food Processing Company, Supreme D. Ltd., London

UNV/UNDP Marine Biology Specialist , Cyprus 1991- 1993

; improved diet value of phytoplankton and to manage water quality of rearing tank during the early stage of sea bass, Dicentrachus labrax *and sea bream,* Sparus aurata *culture*

Research Scientist in Marine Biotechnology Group 1988 - 1991

Korea Ocean Research and Development Institute (KORDI)

; evaluated fatty acid profiles in live food source, screening bioactive materials from marine organisms and took part in the crab culture project

Research Assistant in Environmental Microbiology 1986 - 1988

National Fisheries University of Pusan (NFUP). Korea

; involved in environmental assessment program of impact of discharge water from Nuclear Power Plant on surrounding ecosystem and isolating the most active bacteria for oil degrading and heavy metal resistance from chronically polluted marine environment.

Assistant Researcher in Epidemiology 1984 - 1986

National Institute of Health (Seoul), Korea

; learnt identification method for Enterobacteriaceae *and basic concepts of Epidemiology*

Laboratory Assistant in Microbial Genetics 1982 - 1984

Dept. Biology, KonKuk University, Korea

; had a good chance to practice basic method of bacteriology as undergraduate student

CONSULTANCY SERVICE AND OUTLINES OF THE PROJECTS ----------

- Policy Development of 'GIS Establishment to manage the Mud Flat Aquaculture" (KMI, 2012)

Application of GIS for aquaculture has been adopted during last decade, and Ministry Of Agriculture, Food and Fisheries would verify the feasibility of GIS tool for better management of mudflat aquaculture

- Strategy Development for Aquaculture Products toward USA Market (KMI, 2012)

To promote the aquaculture products, KMI and Aqua-Int. Consulting Ltd. survey the USA market structure, technical status of USA and the preference of consumer. After all result will develop the strategy for exportation of identified products to USA

- Feasibility of off-shore cage system to be adapted in Korean sea (Jung & Seo Consulting Co, 2011)

Arrange the field tour for Norwegian and Swedish type of off-shore cage system and report the operational report including system details as well as species information which is being cultivated in the off-shore cage system in both site.

- Survey for the New Fishing Ground in Indian Ocean (NFRDI, 2011)

  Find out the feasible fishing ground for small scale fishing company in Indian Ocean, NFRDI looked for the countries where our fishing company can be set throughout the international cooperation, Mozambique, Sri Lanka and Timor Leste was surveyed for the feasibility of fishing potential and condition of fishing activities, as well as cooperative project was developed during the visit.

- Joint Project for Establishment of Global R&D Network for NFRDI (NFRDI, 2010)

  Establish the global R&D network of NFRDI, Aqua-Int Ltd participated field survey and analysis of 11 selected countries for the potential cooperation with NFRDI, Amongst selected countries ; Brazil, Peru, Indonesia, Vietnam, Malaysia, Spain, Germany and Turkey, as well as Mozambique, Sri Lanka and Timor-Leste, NFRDI will identify the prior country to start up cooperative R&D network in aquaculture.

- Preliminary study for the sustainable fisheries management for Cambodia and Sabah, Malaysia (FAO, 2009)

  Requested by FAO, I made field trip to Cambodia to collect information on fisheries policy and regulation for IUU and actual fisheries activities amongst community fisheries base in Cambodia.

- Establish the oversea station for R&D in aquaculture to promote exportation to Chinese market (MIFAFF, 2009)

  With NFRDI and KMI, Aqua-Int will conduct the local operation of R&D and develop the mass production technology for high valued marine species in Sabah, this project is sponsored by Korean government under oversea aquaculture development plan and Department of Fisheries in Sabah will jointly cooperated with this project. This project will be started from August this year for 3 years time and with 1 million US$ budgets size. The project will include market study and strategic plan for oversea aquaculture development along with R&D, as well as localization plan.

- Feasibility Study on the Establishment of Marine Aquaculture Station in Senegal (KOICA/NFRDI, 2009)

  With KOICA grants, Aqua-Int is jointly conducting the feasibility study for the all aspects of aquaculture production in Senegal with budget of 600,000 US$ in total. This is one year project including the establish the hatcheries station, and identification of appropriate species for commercialization, also train program for the local staffs. Aqua-Int. plays major role for coordinating all parts of study. Report will be in English and French by 2010.

- Certification Scheme of Fisheries Products in Korea (INFOFISH, 2006)

  By request from INFOFISH, I have compiled the provincial regulation of certification scheme for fisheries products as well as national level. This certification scheme is more important and demanded amongst customers a symbol of well being. Aqua-Int has introduced certification scheme for "organic" and "eco-friendly" and "quality products" in Korea (in English)

- Feasibility study for the Oversea Aquaculture Development. (KORDI 2000)

  This project is sponsored by Ministry of Maritime and Fisheries (MOMAF), Korea and Korea Ocean Research and Development Institute (KORDI) has appointed me as a project manager. I had made field trip for 7 countries (Philippines, Thailand, Iran, Malaysia, Oman, Turkey and Vietnam) and also 5 countries (China, Chile, Angola, Morocco and South Africa) for bench marking to identify the potentiality of oversea aquaculture development. It had included policy recommendation for the national frame of oversea aquaculture development as well as the supporting scheme for the aquaculture farmers who wish to explore oversea farms. (in Korean)

- Potential of Mariculture in Cambodia and Bangladesh (KORDI, 2006)

  KORDI appointed us to study the feasibility study of aquaculture development and establishment of R&D centre in those countries targeting the field of aquaculture and coastal resource management. We have conducted field trip and discussed with partner government to see the potential of R&D cooperation through the project. Also we proposed the strategy of budgets allocation on further implementation of the project. (in Korea)

- Feasibility study of milk fish production in Indonesia and Kiribati (MOMAF, 2006)

  Milkfish is one of cost effective species cultured in earth pond method and Indonesia is leading country to produce this species along with Philippines. Aqua-Int has conducted the application of milkfish products toward value added product along with PuKyoung National University, Korea. Also we study the feasibility of milkfish farming in Kiribati as this species has been used as bait for tuna fishing. (in Korean)

- Action plan for Traceability in Aquaculture (MOMAF, 2005)

  As a person who proposed the implementation of traceability system in fisheries industry to the Korean government, I take part in national project to conduct the pilot application of TS with selected species (flatfish, oyster and laver). Aqua-Int has arranged the field application of TS amongst flatfish farms and also involved in national legislation of TS toward fisheries industry. (in Korean)

- Traceability System in Europe under EU-Korea FTA task force project (MOMAF, 2005)

  Preparing the FTA with EU, MOMAF has appointed us to look through the status of implementation of traceability system in EU. We have made field trip to fish market and IT companies who developed software for TS. We did travel for 5 major countries, Norway, Denmark, UK and Netherland as well as Belgium to conduct the field survey and to collect relevant information for traceability system. (in Korea)

- The Status of Korea Aquaculture (Norway Embassy 2004)

  Market scan for the aquaculture industry in Korea with potential cooperation with Norwegian technology was the main objective of the project. We proposed the various ways of cooperation with Korean farmers and Korean government, particularly NFRDI as R&D body. (in English)

- APEC Marine Conservation Working Group annual meeting (Iquique, Chile 2004)

  With the topic of "standardization of aquaculture products in international trading", main discussion was concentrated on hygienic status and regulation of the import/export of aquaculture products amongst countries.
  After the 5 days meeting and workshop, APEC come up with statement and recommendation for the various types of products, such as live fish, fresh products, as well as frozen type of products. (in English)

- Marine Finfish Production in Sabah, Malaysia *Oplegnathus fasciatus*, (Aqua-Kosaba, 2003)

  Aqua-Int Ltd. has assisted to establish the local company in Kota Kinabalu, Sabah in Malaysia and arrange the technical cooperation with Department of Fisheries, Sabah to utilize their facility in Tg Badak, Tuaran. We provided technical staffs to conduct the production of juvenile fishes for the stripped seabream (Oplegnathus fasciatus), which are highly demanded from Korea and Japanese market. We managed to produce 300,000 tails of juvenile within 3 months time then moved to the cages in front of Gaya Island, but all fish were killed by illegal Filipino settler by dynamite bombing. Project was terminated by this incidence until now.

- Sustainable Development for Aquaculture in Peru (APEC/FWG, 2003)

  Representing the Korean government, I have participated the meeting for the topic of "application of aquaculture products". The title of my presentation was "Status of seaweed utilization in Korean and application toward marine biotechnology" and I was invited by Peruvian government to advise the sustainable development of aquaculture technology, in particular for land base aquaculture production. (oral presentation)

- Market Studies in Korea, Fisheries and Aquaculture. (Norway Embassy 2002)

  Requested by Norwegian Embassy in Seoul, I did conduct market scan for the fisheries and aquaculture products and propose the market strategy for aquaculture products and action plan for mutual interests. This was general review for the fisheries industry in Korea. (in English)

- Study of Aquaculture Development for Sustainable Production. (MOMAF, 2001)

  This project is based on the "law of aquaculture development" to review the aquaculture status and suggest the detail plan for sustainable aquaculture in national level. KMI (Korea Maritime Institute) was the major project coordinator and I have contributed the two chapter of report books for "oversea aquaculture development" and "sustainable aquaculture development through atomization and commercialization" It has includes all the aspect of aquaculture issues and plans for 5 years term. (in Korean)

- Status of Korean Aquaculture Industry. (EU/INVE 2001)

  EU delegates came to Korea to look around the status of Korean aquaculture, I was appointed as a consultant to design the field trip as well as accompanied with a delegates for 10 days. It included the visit to cage culture of rockfish, ground base grow-out farm for flatfish, and

hatcheries as well as research institutes and university. After entourage of aquaculture farms, I have participated to write up the report along with delegate. (in English)

ACADEMIC MEMBERSHIPS ----------

Director of Board Committee, The Korean Aquaculture Society 2003-2005
Director in International Cooperation, The Korean Society of Cave Environmental Sciences

PUBLISHED ARTICLES & REPORTS----------

Establishment of Global R&D network for NFRDI, NFRDI, 2011

Country survey for the new fishing ground in Indian Ocean, NFRDI, 2011

Effect of Oxolinic acid on the microbial community under simulated marine fish farm environment, Korean Society of Marine Environmental Engineering, 2006

Effects of suspended solids, pH and salinity on the chemical fate of oxolinic acid in the aquatic environment. Korean Society of Marine Environmental Engineering, 2006

The Status of Korean aquaculture, Report for Norwegian Embassy, Korea. 2004

Application of GIS for the aquaculture management, KORDI, 2001

Feasibility study of aquaculture development in oversea, MOMAF, 2000

A Marine microcosm to investigate the impact of Oxolinic acid on the microbial community, 1999. PhD research thesis. University of Stirling. UK

Development of Model System to Investigate Impact of Antibacterial Agent in Aquaculture Environment, Aquaculture News 1996, No 21, Institute of Aquaculture, University of Stirling

Study for Development of Bioactive Compounds with Special Reference to the Marine Toxin (II), KORDI, Sept. 1991

Studies on Bacterial Characteristics and ^{109}Cd Accumulation of *Vibrio sp.* S-1-2, Isolated from Eutrophic Coastal Area. (in Korean), K. J. Fish Pathol. 4(1), 31-39, 1991

Evaluation of Fatty Acids Profiles and Chemical Composition of Several Marine Phytoplankton as Live Foods for Fish Culture. KORDI, Feb., 1989

Evaluation of Fatty acids in *Dunaniella tetiolecta* at the various Culture Condition.(in English) J. Aquacul. Vol.2(1) 43-51, 1989

Bacterial Characteristics and ^{109} Cd Accumulation of *Vibrio sp*. S-1-2, isolated from Masan Bay. 1988, MSc Thesis.

ORAL AND POSTER PRESENTATIONS ----------

Oversea Aquaculture Development, reality and preparation, NFFA Pusan, NFRDI, Nov. 2007

The regulation and policy in Management of Aquaculture Environment in Korea, APEC. MRC working group. Santiago, Chile September, 2004

The status of Korean sea weed culture and it's Future – Marine Biotechnological view – APEC, FWG, Lima, Peru. October 2003

Development of a Model System to Investigate Impact of Oxolinic Acid in Aquaculture sediments. Annual Meeting of Society of Experimental Biology, St Andrews, 1995 April (poster)

Developing a Model System to Investigate Impact of Antibacterial Agents in shrimp Pond Environment. SETAC-EUROPE 7th Annual Meeting, University of Stirling, September 9-11, 1996 (oral and poster)

The Status of Seaweed Culture and its market structure in Korea. APEC-FWG. 14-16 October. Lima, Peru (oral presentation)

AWARDS ----------

- ORS (Oversea Research Student) award, British Government 1996 - 1997
- BC (British Council) Fellowship award 1995 - 1997
- Research Fellowship in NFUP 1987 - 1989

PERSONALS ----------

- **Nationality** Korean
- **Gender** male
- **Date of Birth** 26. 02. 1957
- **Marital Status** married
- **Health** good
- UK Full Driving License

PROJECT COUNTRIES ----------

- *Asia : Malaysia, Vietnam, Brunei, Myanmar, Taiwan, China, Hong Kong, Singapore, Indonesia, East Timor, Sri Lanka, Bangladesh, Iran, Turkey, Japan, Cambodia*
- *America : USA, Canada, Guatemala, Brazil, Chile, Peru*
- *Europe : UK, France, Spain, Germany, Italia, Belgium, Denmark, Netherland, Norway, Cyprus*
- *Africa : Senegal, Mozambique, Egypt,*
- *Middle East Asia : Oman*

Extra Activities ----------

Social Meeting ; Founder and chairperson of AQUA-INT,
PhD student meeting at the Institute of Aquaculture, University of Stirling, Scotland since 1994, Monthly seminar for academic topics and cultural interests Member of 12 nationality students.

Contributor ; regular contributor of fisheries/aquaculture related monthly magazine named '
"Uribada (Our Sea)"

Caving ; Leader of Cave Exploring Team (Konkuk University)	1978 - 1979
Leader of 90 Mulu Cave Expedition Team in Sarawak (West Malaysia)	1990 / 1991
Member of Grampian Speleology Group, Edinburgh, Scotland	1995 - 1999
Board member of Korean Society of Cave Environmental Research	2002 - 2004

Mountaineering club ; Member of Korean Alpine Federation (KAF)	since 1979
Obtained a Certificate from Korean Alpine School	

Founder and Coordinator for the Student Exchange Program
in Culture and Natural Experience (SEPCNE) between Korea and Sabah, Malaysia since 2005

Dum Spiro, Spero !

Potential Cooperation in Aquaculture

Duk-Hyun, YOON

Abstract

Production of high valued marine species such as grouper, snapper and shrimp could be an advantage of economic efficiency through stable production of aquaculture species and also through sustainable management of marine resources. This leads the sustainability of market access for the highly demanded products in oversea market. Improving aquaculture technology along with designing appropriate policy frame is equally important to be a firm ground of aquaculture development as well as marine resources management. In this regard, establishment of Marine Resources Management Centre could be one of potential cooperation between Korea and Myanmar due to that R&D along with extension of aquaculture technology to the farmer would be the paramount key to develop the aquaculture industry in systematic manner. It may include all aspects of aquaculture technologies and NFRDI and KMI has many years experience establishing international cooperation in that regards. In order to understand more on potential cooperation with Myanmar, the status of aquaculture industry and status of marine resources, industry scanning and feasibility study would be recommended as the first step of cooperation which also includes reviewing aquaculture policy and regulation of Myanmar. And for the second stage of cooperation, detail survey the potential sites for the coastal aquaculture by species, as well as industrialization strategy would be prepared for supporting the national policy. Third stage would be the construction and operation of the center together with institutional support from Korea as the long term aspects.

Key word : aquaculture, Marine Resource Management Centre, NFRDI, KIM, human resource development, capacity building, sustainable production, strategic cooperation

Introduction

Aquaculture production in Myanmar has been significantly increased since last 10 years. Marine aquaculture production with capture fisheries along the coast is contributing to the Myanmar economic through exportation, so increasing incomes of foreign currency. Major countries to import fisheries products from Myanmar are China, Thailand, Singapore, Kuwait, Malaysia, Saudi Arabia, Japan, Bangladesh and UK during 2009-2010, in order.

In 2008 the FAO reported that Myanmar was the 12th largest aquaculture producer in the world (excluding aquatic plants) and in the period 1990-2008 annual growth was 28.8% on average, by far the highest annual growth among the top 15 producers. Yet despite being a large producer of aquaculture products, Myanmar has not had a large impact on the world of aquaculture, partially due to lack of technology to produce the high valued species, such as grouper and snapper and economic and political sanctions imposed by various nations and also partially due to a high export tax levied by the Myanmar government itself on seafood exports. The restrictive tax of 10% on seafood exports has been reduced to 2% and this could open opportunities for Myanmar aquaculture sector to expand, improve and focus more on exportation of high value species.

Myanmar has high potential to develop the coastal aquaculture having 2,832 km long coastline and from 2011 to 2015, yearly aquaculture capacity expectedly raise almost 10%, and export turn over raise over 20%. However to secure of sustainable and systematic development Myanmar needs more international cooperation to adapt new technology and better management knowhow which has been through many other leading countries who have been through aquaculture development.

Table : Exportation value of aquaculture production in Myanmar
(International Livestock and Daily Expo. Vietnam 2012)

Year	Fish	Shrimp	Others	Total (Unit: Million USD)
2006-2007	240.77	121.70	103.69	466.16
2007-2008	315.46	109.74	135.82	561.02
2008-2009	273.27	88.85	121.11	483.23
2009-2010	309.86	56.33	131.40	496.59
2010-2011	342.44	68.66	144.41	555.52

Hatching technology is known to be the key component of aquaculture production in sustainable manner and it can be used not only for the mass production for the industry but also for the resources enhancement (marine ranching) as well as for recovery of endangered species. However amongst many countries at the beginning stage of aquaculture development are lacking the hatching technology and skilled man power as it would come from firm and various R&D outcomes combining with disease control, system development and socio-economic analysis and market study etc..

Korean aquaculture has been focused on marine fish production since three decades and claimed 64 species of marine species (including fish, molluscs, seaweed and crustacean) has been succeeded for artificial propagation so as to produce the seedling for mass production. However so far, only 10 species are adapted in the industry due to high market demand. Developing the hatching technology plays a important role to boosting the Korean aquaculture industry as a driving engines.

In this respect, I would like to suggest few of cooperative projects aiming to establish the Marine Resource Management Centre covering the aquaculture development and marine ranching program as well as marine resources management purpose as below.

Strategy of Cooperation

According to the report from U Hla Win (Fisheries Department, Myanmar), there is also an urgent need to consider the practical foundation on which to establish a sustainable aquaculture sector to ensure sustainable development.
The following are main issues identified from Myanmar's fast growing aquaculture sector:
• Hatching technologies of valuable marine species and its farming systems
• Improved management practices and codes of good practice for aquaculture sector.
• Minimize the harmful effects of farm bred species to the ecosystem..
• Diversification of animal and plant species for aquaculture.
• Improving the contribution of small scale aquaculture to rural livelihoods.
• Defining property rights and access to resources.
• Mitigate conflicts among common resource users
• A consistent supply of high quality and healthy seeds.
• Improving the efficiency of food through good aquaculture feed manufacturing practice and feeding techniques.
• Cost effective feed.
• Research on the dietary nutrient requirement and feeding habits of cultured species.
• Culture of species that can utilize good farm made feed rather than require high quality protein rich feed, etc.

Though, cooperation between Myanmar and Korea would contribute the development of Myanmar's aquaculture in terms of technology transfer, R&D cooperation as well as through joint venture. And for the firm and sustainable background of industry to conduct the various aspects of requirement for aquaculture development, Marine Resource Management Centre or Coastal Aquaculture Development Center would be suggested for the ultimate goal of

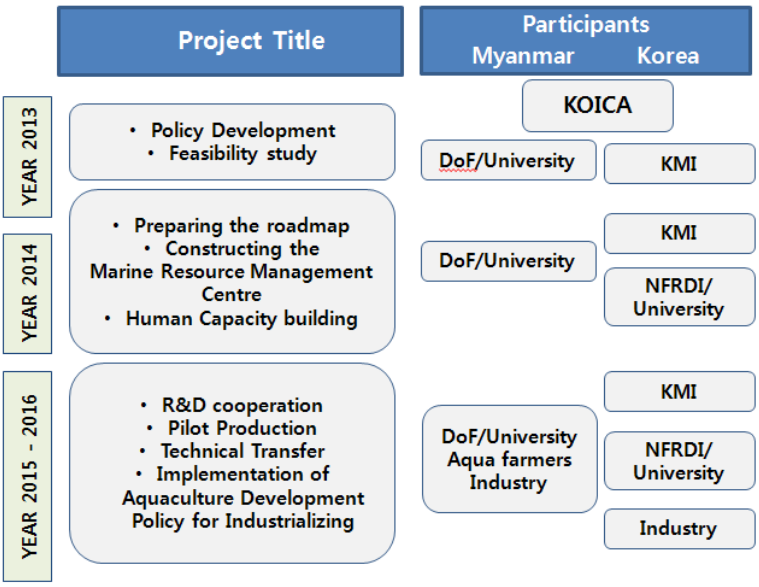

Figure Proposed projects scheme by the year

Advantage of establishment the Marine Resource Management Centre must cover the wide range of R&D to meet the demand and trouble shooting for farmers, and fundamental to train the farmers and capacity building of aquaculture related personnel as well practically feasible for the comprehensive transfer of new technology to the industry. Also constant cooperation until sustainable base of settlement of industry would be the another concerns when design for cooperation between Myanmar and Korea

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U Hla Win, Opportunities and Challenges in Myanmar Aquaculture, Aquaculture Asia, April-June 2004 (Vol. IX No. 2)

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FAO, National Aquaculture Sector Overview (NASO), 2010

Cooperation in Aquaculture

YOON Duk Hyun
Aqua-Int Consulting Ltd.
(dhykorea@gmail.com)

Understanding of Myanmar Aquaculture

1. Aquaculture Production

Fiscal Year	Area (Acre)		Total	
	Freshwater Fish	Shrimp and prawn	Acres	Production MT x (1000)
1996-1997	59389	47860	107243	82.79
1997-1998	57873	50870	108743	82.02
1998-1999	60566	53157	113723	91.17
1999-2000	61096	67476	128572	102.60
2000-2001	72502	101791	174293	121.95
2001-2002	90733	119784	210517	190.12
2002-2003	124112	199961	324073	252.01
2003-2004	155509	205091	360600	400.36
2004-2005	182452	208591	391043	485.22
2005-2006	197150	209942	407092	563.14

Source: Fishery statistics (2005-2006), Department of fisheries

2. Industrial Scan

In 2008, 771,000 MT of aquaculture production, mainly rohu, barb and tilapia, (19 species of freshwater fish, 3 species in shrimp/prawn, mud crab)

In 2008, 1,231 million US$ of production value not only for domestic consumption but also for exportation

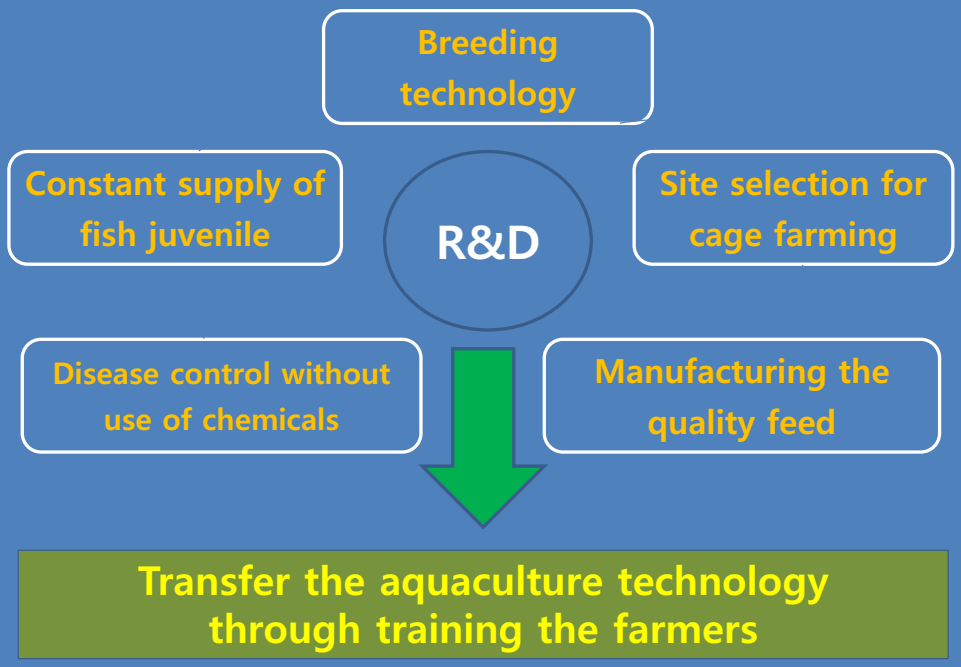
- Innovation of new technology/introduction of high value species
- Financial support and Technical Assistance through R&D, Extension
- Priority of use of water, land, fuel, electricity
- Exemption/Relaxation of tax and regulation

By U Zaw Min, U Kyaw Kyaw Naing, 2010

3. Advantage of Marine Aquaculture

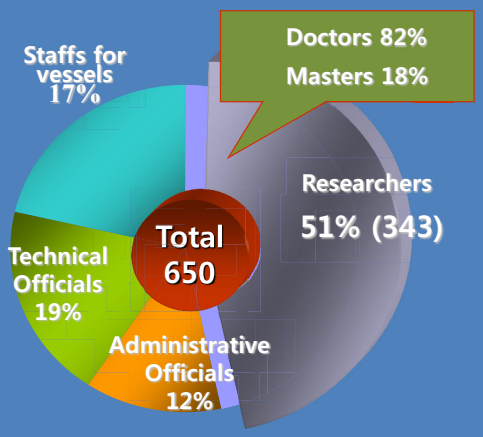
- Coastal Line : 2,832 km
- Environmentally free from pollution
  - ✓Not much industrialized area along the coast
- High Value Market Demand
  - ✓Grouper (*E coiodes, E. tauvina*) by wild catches
  - ✓Seabass (*Lates calcalifer*) for cage culture
  - ✓Pangasius (*Pangasius sutchi*) in delta region
- National Policy
  - ✓Promoting fisheries industry
  - ✓Increasing fish production
  - ✓Encouraging marine fish culture
  - ✓Upgrading socio-economic status of fisheries community
  - ✓Conserving the fisheries resources and environment

4. Requirements for Marine Finfish Culture



Status of Korean Aquaculture

1. NFRDI (National Fisheries Research and Development Institute)



- Fisheries Stock, Utilization and Industrialization of Fish and Fish Products
- Genetic Breeding and Fisheries Biotechnology
- Sustainable stock management and stock enhancement
- Development of aquaculture technology
- Seafood sanitation and safety, disease control of aquatic animal
- Transfer new technology to farmers/fishing community

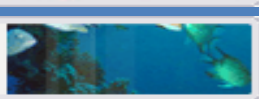
2. KMI (Korea Maritime Research Institute)

FISHERIES & FISHING COMMUNITY

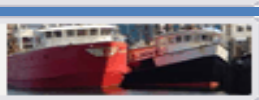
COASTAL & OCEAN POLICY RESEARCH

POLICY & MARKET ANALYSIS

AQUACULTURE OUTLOOK



PORT RESEARCH



SHIPPING, LOGISTICS & MARINE SAFETY RESEARCH

KOREA DOKDO RESEARCH CENTER

- Conducting the research activities and consulting service on the fields of marine affairs, fisheries, shipping and port related policies
- Information providing for the industry/Government organization
- Supporting the national/ provincial plan for sustainable development policy
- Holding international conference/seminar on current issues of above fields

111 staffs (93 researchers)

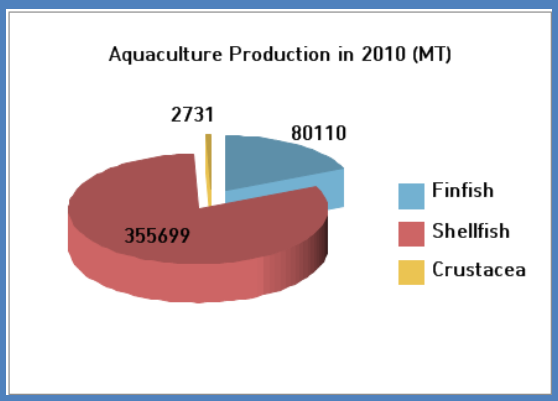
www.kmi.re.kr

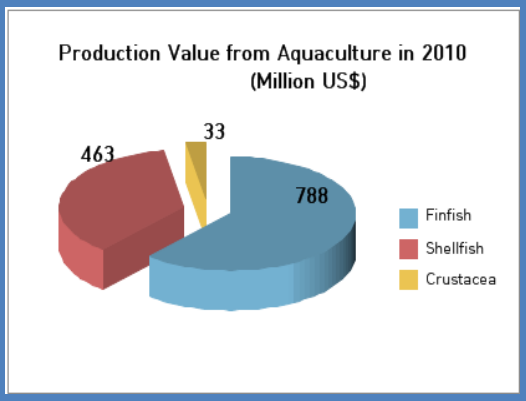
3. Universities for Aquaculture Course

Bukyoung Natl. University	: www.pknu.ac.kr
JoenNam Natl. University	: www.yosu.ac.kr
Mokpo Natl. University	: www.mokpo.ac.kr
Jeju Natl. University	: www.cheju.ac.kr
Kunsan Natl. University	: www.kunsan.ac.kr
Kangnung Natl. Univ.	: www.kangnung.ac.kr
GyongSang Natl. Univ.	: www.gsnu.ac.kr
YongNam University	: www.yu.ac.kr
Korea Maritime Univ.	: www.hhu.ac.kr
Inha University	: www.inha.ac.kr
Sunchunhyang University	: www.sch.ac.kr

4. Industry Scan

- Accumulated experiences through t/e for 3 decades
- Intensive farming although small scale
- Rather segmented industry
- More than 85 species of aquatic species, but only around 15 species are under commercialized



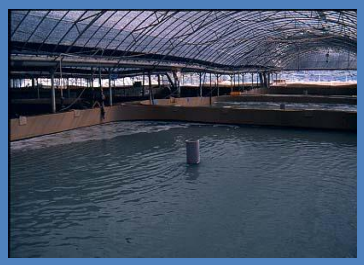


Marine Fish Farms

Large size of hatcheries

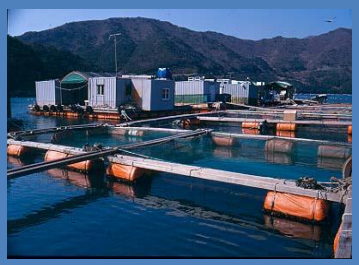
Cage culture for marine fish

Medium size hatcheries



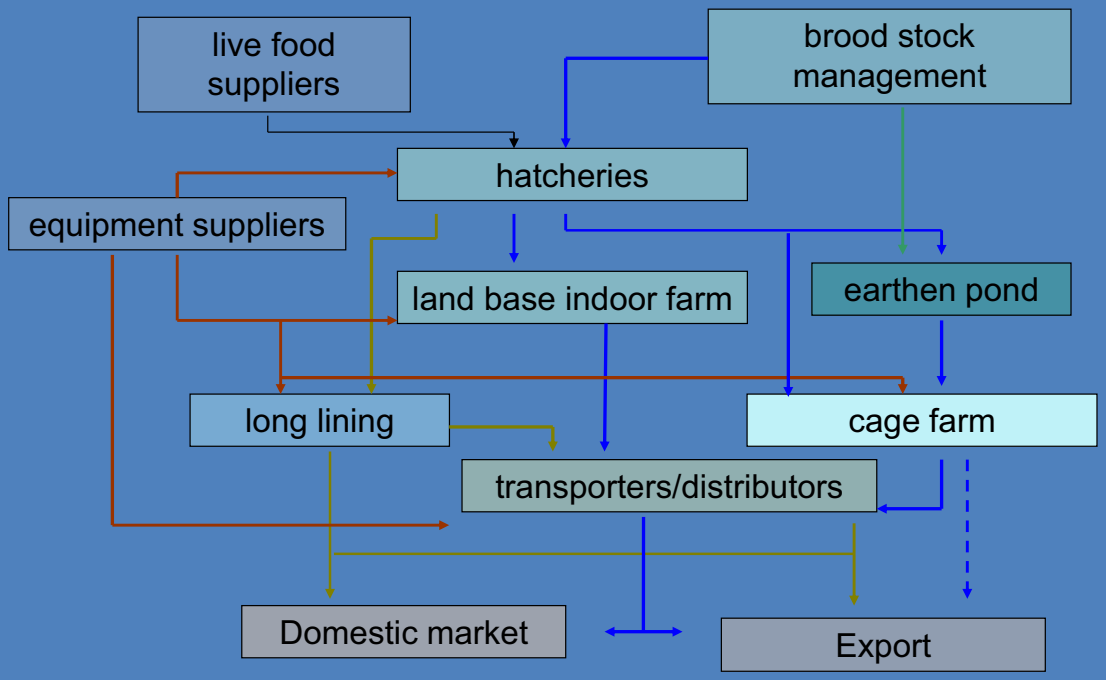
Land-based tank for flatfish grow-out

Off-shore cage recently developed in Korea



Wooden-frame cages with accommodation

5. Segment of Aquaculture Industry



5. Farmed species by Region

6. Snapshot of Korean Aquaculture

다시마
Kjellmaniella crassifolia
해조 마스크팩
광천김
굿데이
Healthy Food
Various application
Environmentally friendly

Constraints of Korean Aquaculture

- Deterioration of coastal environment
  - -> more frequency of disease outbreak and red tides
  - -> no more place to develop 75% of 176,000 hr (133,000 hr) has occupied (2009)
- Low price of fisheries products from China, Asian countries
  - -> Over saturated market for certain species
  - -> High labor cost induce the higher production cost and recognized as 3D industry amongst youth

Restructure of aquaculture industry for sustainable direction

- Reduce the use of moisture pellet
- Integrated coastal management
- Oversea aquaculture development
- Atomization of production system
- Offshore cage culture

Strategy for Cooperation

1. Components of Aquaculture Development

Technic Development

- Hatching technology for high value species
- Enforce the disease control network and the food safety
- Improving aquaculture system for best efficiency
- Supplying the good quality of feed
- Developing the transportation and storage system

National Plan

- Socio-economic analysis by region or species
- Policy development for sustainable production
- Oversea market survey and build up strategy

Capacity Building

- Educating the R&D staffs
- Training the Farmers
- Enhancing the Government capacity
- Supporting the Fisheries Association
- Nurturing the Management Skill

Industrialization

- Inviting the Foreign Investment
- Exploring the Oversea Market
- Establishing the Processing Facilities
- Reducing the tariff in Aquaculture Equipment
- Identifying the Aquaculture Development Area

2. Strategy

- Has to meet the demands from Myanmar
- Must be systematic and continuous manner
- Would be integrated firm from R&D to Extension
- Increase of socio-economic impacts
- Emphasize on capacity building and industrialization
- Base on the national level of roadmap

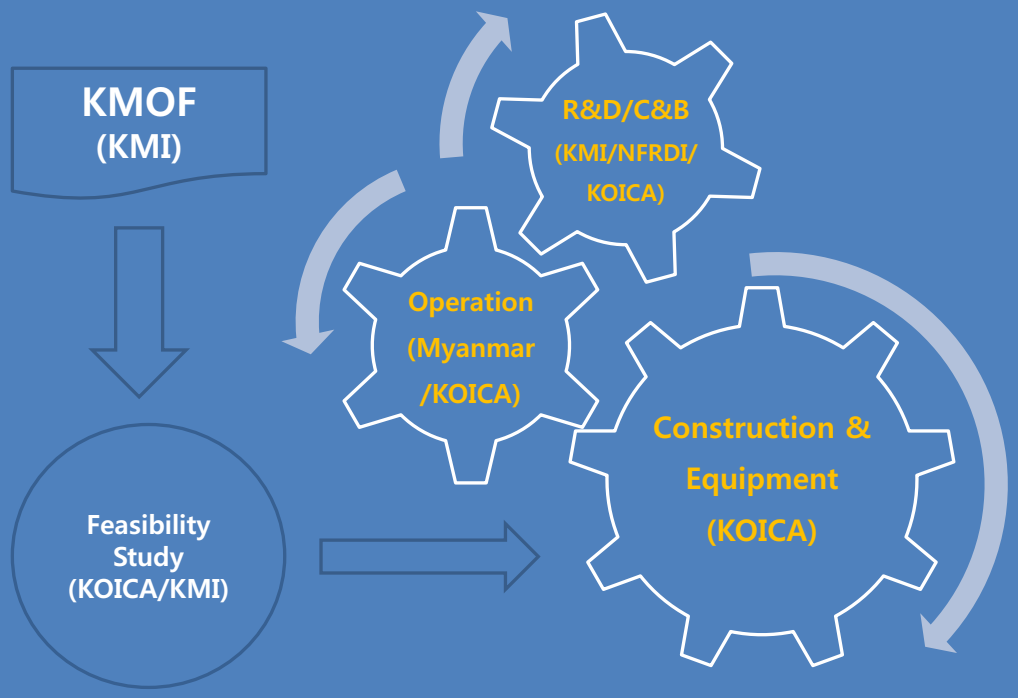
3. Proposed Project (MRMC)

	Project Title	Participants: Myanmar	Participants: Korea
YEAR 2013	• Policy Review • Feasibility study for Marine Resource Management Centre (MRMC)	KOICA DoF/University	KMI
YEAR 2014	• Preparing the National Plan for Aquaculture Development • Constructing the MRMC • Starting on Capacity Building for R&D staffs and Farmers	DoF/University	KMI NFRDI/ University
YEAR 2015 - 2016	• R&D cooperation • Pilot Production of selected High Valued Species • Technical Transfer/Extension • Implementation of Aquaculture Development Policy for Industrializing	DoF/University Aqua farmers Industry	KMI NFRDI/ University Industry

4. Major Facility/Function of MRMC

- Experimental Facility for R&D for University/DoF
- Laboratory Facility for Disease/Nutrition/Analysis
- Production Facility for Pilot Production/Extension
- Lecture Facilities for Education/Seminar
- Storage Facilities for Feeds/equipment keeping
- Earth Pond for fish Nursery/shrimp production
- Office Facilities for Administration/Management

5. Budget Allocation



Thank you !!!

Prof.Swe Thwin CV

Name	Swe Thwin
Gender	Male
Date of Birth	16 January 1945
Place of Birth	Yangon
Nationality	Myanmar
Marital Status	Married
Education	BSc (Honours) 1966 Yangon University, PhD 1973
	University of Queensland, Australia
Employment	Mandalay University Zoology Department 1967 to 1972
	Mawlamyine University Marine Science Department 1972 to 2007
Last Post	Head of Marine Science Department Mawlamyine University Retired 2007
Others	National Adviser BOBLME Programme Present
	Adviser Myanmar Fishery Federation Present

A Paradigm Shift for Sustainable Fishery Resources Management

Swe Thwin[1]

Prof. Swe Thwin (Retired), Department of Marine Science, Mawlamyine University, Republic of Union of Myanmar +95-9-862-4754 chair.mccs@gmeil,com

Abstract
The present state of marine fisheries of Myanmar and management measures practiced reviewed It is concluded that the fishery is over exploited and the management based only upon the control of fishing effort is not effective. There are other factors aside from fishing that affects the resource, some of these seemingly unassociated with the industry, nevertheless are part of the ecosystem. It is noted that restoration of degraded ecosystems could be one of the approaches towards sustainability.

Keyword
Myanmar, marine fishery, management, paradigm shift

Introduction
Fisheries contribution to GDP of Myanmar is 9.9%, highest in the Bay of Bengal countries. Fisheries are of major socio-economic importance in terms of employment, food security and local revenue generation. In addition to those involved in direct production of fish, there are people involved in other ancillary activities, such as processing, net and gear making, ice production and supply, boat construction and maintenance, manufacturing of fish processing equipment, packaging, marketing and distribution. Others are involved in research, development and administration connected with the fishery sector. No official data exist on the estimated numbers of people involved in these other activities, but some estimations indicate that, for each person employed in capture fisheries and aquaculture production, there are about four jobs produced in the secondary activities, including post-harvest (FAO 2008).

Country
Myanmar is located between north latitude 9° 32' to 28° 31' and east longitude 91°10' to 101°11'. With a land area of over 676,577 square kilometers, largest country in mainland South East Asia. Myanmar shares the Bay of Bengal and the Andaman Sea with India Bangladesh and Thailand. The continental shelf approximately covers 230,000 sq. km., narrow on the Rakhine coast and widens southward to the Tanintharyi coast eventually merging with the Sunda shelf. The Deltaic Coastal Zone formed by the Ayeyarwady, Sittaung and Thanlwin rivers is a flat alluvial plain with a network of tributaries of the Ayeyarwady River. These rivers together with the Sittaung and Thanlwin deposited enormous quantities of sediments. The annual sediment discharge of the Ayeyarwady River has been estimated at 250 million tons. The Taninthary Coastal area is the longest coastal zone of Myanmar and is bounded by Andaman Sea in the west. This coastal zone covers south of the Gulf of Mottama upto the mouth of Pakchan River. Myeik Archipelago extends from Mali Island to Similand Island and contains about 800 islands covering an area of about 34,340 square kilometer lies up to 30 km off shore. Coral reef surrounds the outer islands and mangroves cover much of the inner islands. Myanmar has a monsoon climate, two tropical monsoons the South West that prevails through May to October and brings summer rains.

Fishery Resources
At this juncture marine fishery resource of Myanmar waters is anybody's guess. Fishery surveys in the EEZ of Myanmar are few and far in between. Systematic survey by R/V Fridtjof Nansen of NORAD in 1979-80 and ten years later by FRTV Chulabhorn of DOF, Thailand in 1989 were the only two major surveys ever carried out. During the past 22 years except for infrequent monitoring "surveys" in collaboration with SEAFEDC the most recent one in 2007, no scientific studies on fish resources exist. Any mention of fishery resource of Myanmar still goes back 32 years to the results of Fridtjof Nansen." It was found that the maximum sustainable yield (MSY) in the coastal area of a depth ranging from 0 to 200 m was 300,000 - 350,000 t for the entire shelf (13-24 kg/ha/year) and 220,000 – 370,000 t for the shallow water, less than 50 m depth, which gives the maximum yield density of 20 – 33 kg/ha/year. The pelagic resource was estimated by acoustic survey method in 1979-80. The pelagic resource stock was 100,000 metric ton. Half of this standing stock was estimated as Maximum Sustainable Yield (MSY)

in Myanmar and it seems that most of the pelagic species are still not fully exploited." (Myint Pe 2010) And it is next to impossible trying to manage a fishery without reliable and up to date scientific data. Some Bay of Bengal countries, notably Malaysia and India, conduct routine stock assessments to guide management. Myanmar, have very little information on the status of their stocks. (BOBLME Transboundary diagnostic analysis – Volume 2)

The Fleet

A marine capture fishery of Myanmar is classified as Inshore Fishery and offshore fishery.

Characteristics of inshore fishery are:

- 5 nautical miles from shore (Rakhine coast)
- 10 nautical mile from shore (Ayeyawady and Tanintharyi coast)
- Maximum length of vessel 30 feet with maximum engine power of 15 hp

Characteristics of offshore fishery are:

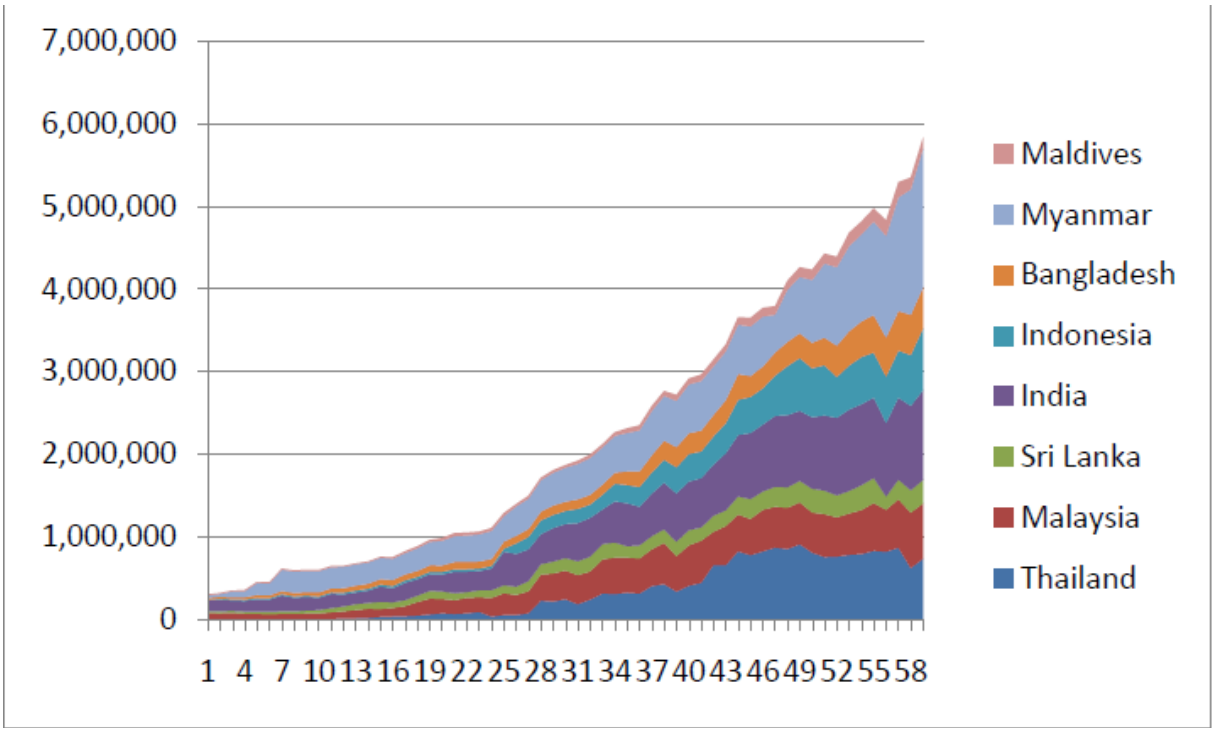
- outer limit of inshore fishery to outer limit of EEZ
- engine power more than 15 hp
- bottom trawl, purse seine, surrounding net, drift net, and long line

Yield

The current estimated production for the BOBLME (statistics for year 2008) is approximately 6 million tonnes valued at USD 4 billion (SAUP, 2010) and (FAO Fishstat, 2010). Myanmar is the top fishing nation with a total catch of 1.472 million tonnes in 2006. India was second, followed by Thailand and Bangladesh Fisheries in the BOBLME target a wide range of species that include sardines, anchovies, scads, shads, mackerels, snappers, emperors, groupers, congers, pike-eels, tunas, sharks, ornamental reef fish, shrimps, crabs, lobsters, octopus, gastropod and bivalve shellfish, sea cucumbers and seaweeds. Over 40% of the 2008 catch from the BOBLME (2.8 million tonnes) as classified by FAO Fishstat, is designated as "Marine fish not identified elsewhere" ("nei"), while a further 26% (1.7 million tonnes) falls into the three 'miscellaneous' categories used by FAO, based on International Standard Statistical Classification of Aquatic Animals and Plants which divides commercial species into 50 groups on the basis of their taxonomic, ecological and economic characteristics. The imprecise nature of the data introduces considerable unreliability into any conclusions that may be drawn from them. (Table 1).

	Indonesia*	Malaysia	Thailand	Myanmar	Bangladesh	India**	Sri Lanka	Maldives	Total*
FAO statistics									
Tonnes ($10^{3)}$	569.5	586.7	867.9	1,375.7	479.8	991.5	239.3	184.2	5,295
Country statistics									
Tonnes(10^3)	571.1	640.0	891.4	1,380.0	486.0	919.9	216.0	184.2	5,289
Sea around us Project (Production in BOBLME country EEZs)									
Tonnes (10^3)	365.3	465.4	206.8	1,838.2	555.0	1,183.2	144.0	40.2	4,798
USD (10^6)	159	572.0	175.0	1,270.0	127.0	993.9	131.0	74.5	3,581

Table 1. Estimates of marine production and value for each country of the Bay of Bengal, 2006.



With the exception of Myanmar and Bangladesh, the catch of marine fish in the BOBLME countries has either been static or declining over the past decade The most obvious decline has been in the Thailand Andaman Sea landings that declined from 909,500 tonnes in 1998 to 735,300 in 2008. In Malaysia, catches levelled off as earlier as 1990 and remained static until 2006 (a slight increase has been recorded in 2007 and 2008). On the western side of the BOB, catches in India and Sri Lanka have been relatively static since the late 1990s, although India has shown a recent small incease. Most of the tsunami affected countries (Indonesia, Thailand, India and Sri Lanka) show a decreased catch in 2005 but a quick rebound back to previous levels in 2006. The exceptions to the stagnating trend in Bangladesh and Myanmar need comment. Both these countries provide the least detailed statistics, so it is difficult to examine which fish are contributing the increases. The increase in Myanmar is particularly spectacular, increasing from 681,000 tonnes to 1,679,010 tonnes over the last decade. This amounts to an average increase of almost 10% per year. It is difficult to understand this increase when landings in Thailand, which catches a significant proportion of its catch in Myanmar waters, declined over the same period. The statistics of Myanmar (and Bangladesh) require further verificationOver all BOBLME countries, the current yield exceeds the sum of the potential yields, indicating that as a region, the fishery is overexploited. And Myanmar has exceeded her MSY by 59%, a level of exploitation that no natural resource can sustain.

Discussions

As a result of increasing fishing effort, the status of fishery resources has changed substantially over the past few decades. Although total landings increased over the past 20 years, catch per unit effort (CPUE) dropped rapidly (Myint Pe 2010). In the first half of the 20th century, large pelagic and demersal predatory fish species (e.g., Serranidae, Lutjanidae, and Scombridae) were the major catch components (Nakken and Sann Aung 1980). Recent catches are dominated by species characterized by small size and high growth rate, such as small pelagic fishes and invertebrates (and the amounts of previously abundant adults of large, predatory, high-value food fishes have declined markedly. Despite well-documented accounts of the serious physical impact of trawling activities on fragile benthic organisms such as corals, sponges, and gorgonians that are important for providing shelter and food for fishes the bottom-trawling fishery continues in Myanmar. Ecological processes called Odum's Ratchet (Pitcher 2001) that have compromised Myanmar fisheries will likely continue to occur if current fishing patterns continue. In an Odum's Ratchet scenario, fishing depletes the large long-lived species over generalist, k-selected species, leading to simpler ecosystems with higher volatility as well as lower value and trophic levels (Pitcher 2001; Pauly et al. 1998a; Pitcher and Pauly 1998). Large high value species with specialized niches are rapidly lost (Christensen and Pauly 1998). Consequently, small fish begin to dominate landings—a process evident in Myanmar—replacing large high-value fish. This ecological mechanism suggests that, unless the situation is mitigated, future disasters will occur at an increasing rate (Pauly et al. 1998b). Hence, fishery management that aims to restore fisheries and marine resources in Myanmar is urgently needed.

In 2010 Alder *et al.* conducted an evaluation 50 countries who jointly account for 95% of the world's marine fisheries landing since 1950, and for their compliance to the FAO Code of Conduct for Responsible Fisheries. Myanmar is one of the countries

assessed. Based on the assessment Kleisner and Pauly 2011 conducted a study on eight BOBLME countries as to their sustainable use of the resources within their EEZs using fourteen indicators of marine living resource management. Myanmar received five of the lowest scores. Myanmar makes a relatively small investment in the establishment of MPAs, a higher proportion of the catch comes from bottom trawling in the EEZ, ranks fairly low in the commitment to uphold the FAO Code of Conduct and to protect marine mammal species, and the mariculture sector has a negative social impact.

The present-day marine ecosystem in Myanmar waters is depleted and dominated by species of small size and low trophic level, whereas the past ecosystem was underexploited and dominated by abundant high-trophic-level species. Restoring the depleted marine ecosystem would increase total potential benefits (ecological, social, and economic) from the ecosystem. Thus, restoration is a sound economic policy, and fishery management must focus on past abundance and direct policies toward achieving the level of past ecosystems. This concept represents a paradigm shift from the current most widely used fisheries management system that aims at mere sustainability and often leads to conflict over scarcity (Ludwig et al. 1993; Pitcher and Pauly 1998) to a system that focuses on ecological, social, and economic benefits from the ecosystem on which many different resource users rely.

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A Paradigm Shift for Sustainable Fishery Resources Management

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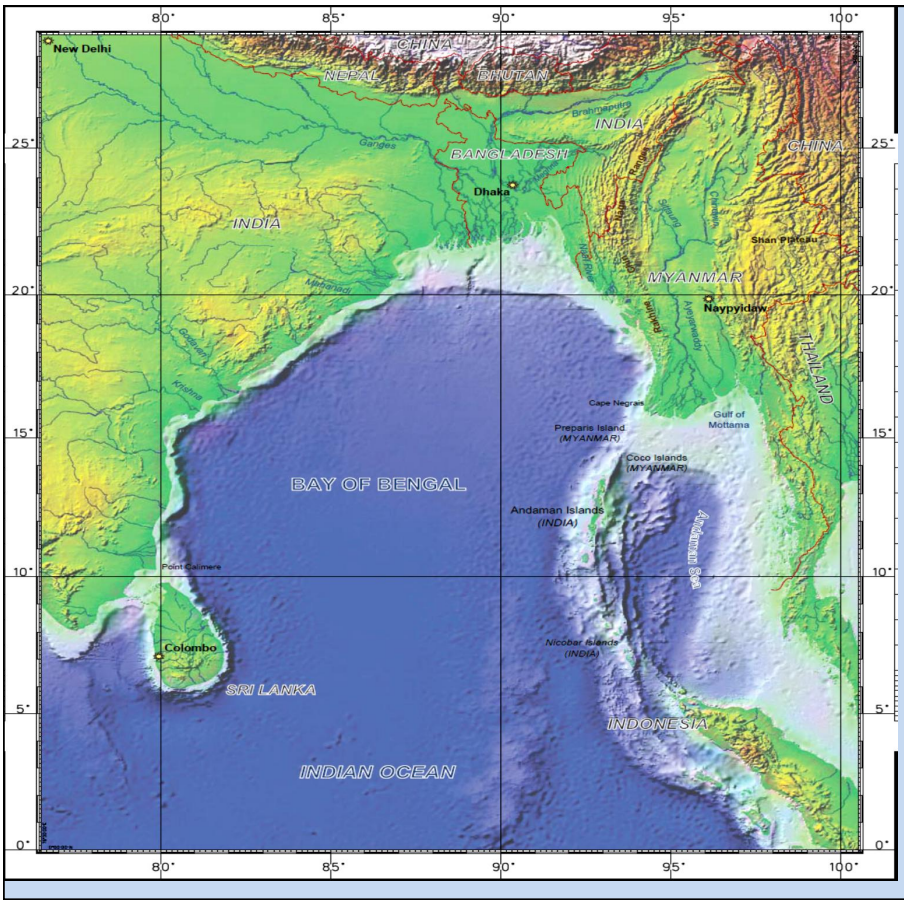


located between n lat 9° 32' to 28° 31' and e long 91°10' to 101°11'.

land area over 676,577 km^2

shares the Bay of Bengal and the Andaman Sea with India Bangladesh and Thailand.

continental shelf 230,000 km^2 narrow on the Rakhine coast and widens southward to the Tanintharyi coast eventually merging with the Sunda shelf.

Fisheries contribution to Myanmar

9.9%, of GDP highest in the Bay of Bengal countries.
major socio-economic importance in terms of
employment
food security
local revenue generation

In addition there in ancillary activities

processing
net and gear making
ice production and supply, boat construction and
maintenance

Fisheries contribution 2

ancillary activities

manufacturing of fish processing equipment
packaging, marketing and distribution

research, development
administration connected with the fishery sector.

No official data exist on the estimated numbers of
people
estimations indicate that, for each person employed in
capture fisheries and aquaculture production
about four jobs produced in the secondary activities,
including post-harvest (FAO 2008).

Fish are also very important for food security and make up a significant proportion of the daily intake of protein in many coastal communities and in marginalized highland communities.

Nations around the Bay of Bengal all achieved recent gains in reducing the number of people who are undernourished

Thailand and Myanmar reducing levels by 40% and 60%, respectively (FAO, 2009).

Fish also provides a valuable supplement for a diversified and nutritious diet.

Not only does it provides high-value protein, but also represents an important source of a wide range of essential micronutrients, minerals and fatty acids.

Globally, fish provides on average 30 kilocalories per person per day (FAO, 2008)

Myanmar, have well above average level.

Resource

At this juncture marine fishery resource of Myanmar waters is anybody's guess.

Fishery surveys in the EEZ of Myanmar are few and far in between
Systematic survey by
- R/V Fridtjof Nansen of NORAD in 1979-80
- FRTV Chulabhorn of DOF, Thailand in 1989

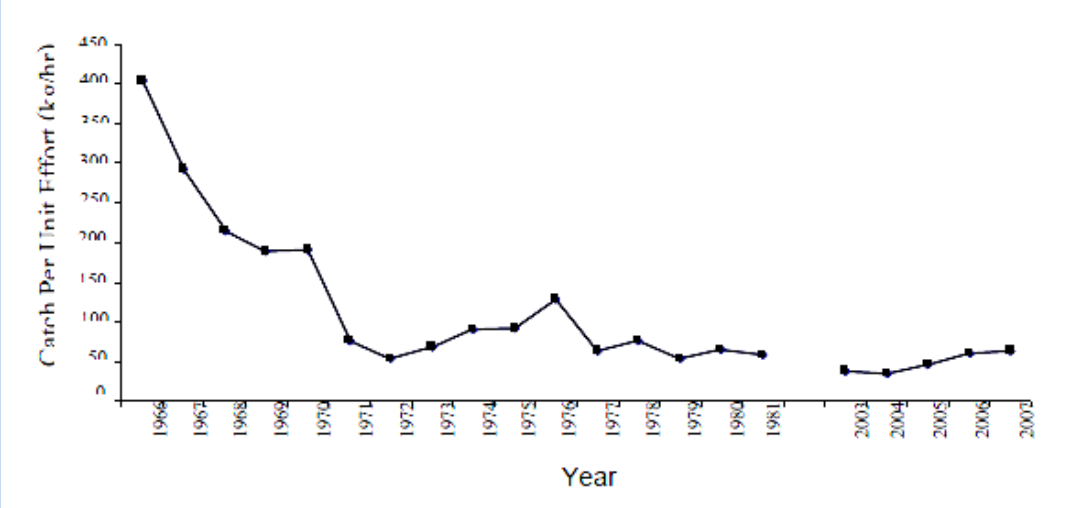
During the past 22 years except for infrequent monitoring "surveys" in collaboration with SEAFEDC the most recent one in 2007, no scientific studies on fish resources exist.

32 years ago it was found that

Maximum sustainable yield (MSY) in the coastal area 0 to 200 m deep was 300,000 - 350,000 t for the entire shelf (13-24 kg/ha/year)

For the shallow water, less than 50 m deep 220,000 – 370,000 t (20 – 33 kg/ha/year)

Pelagic resource was 100,000 metric ton. Half of this standing stock was estimated as Maximum Sustainable Yield (MSY)



Catch rate (kg/hr) of the total fish taken in the standard bottom trawl of the research vessel in the Andaman Sea from 1966 to 1981 and 2003 to 2007. (BOBLME Transboundary diagnostic analysis – Volume 2)

The Fleet

Number of fishing vessels registered

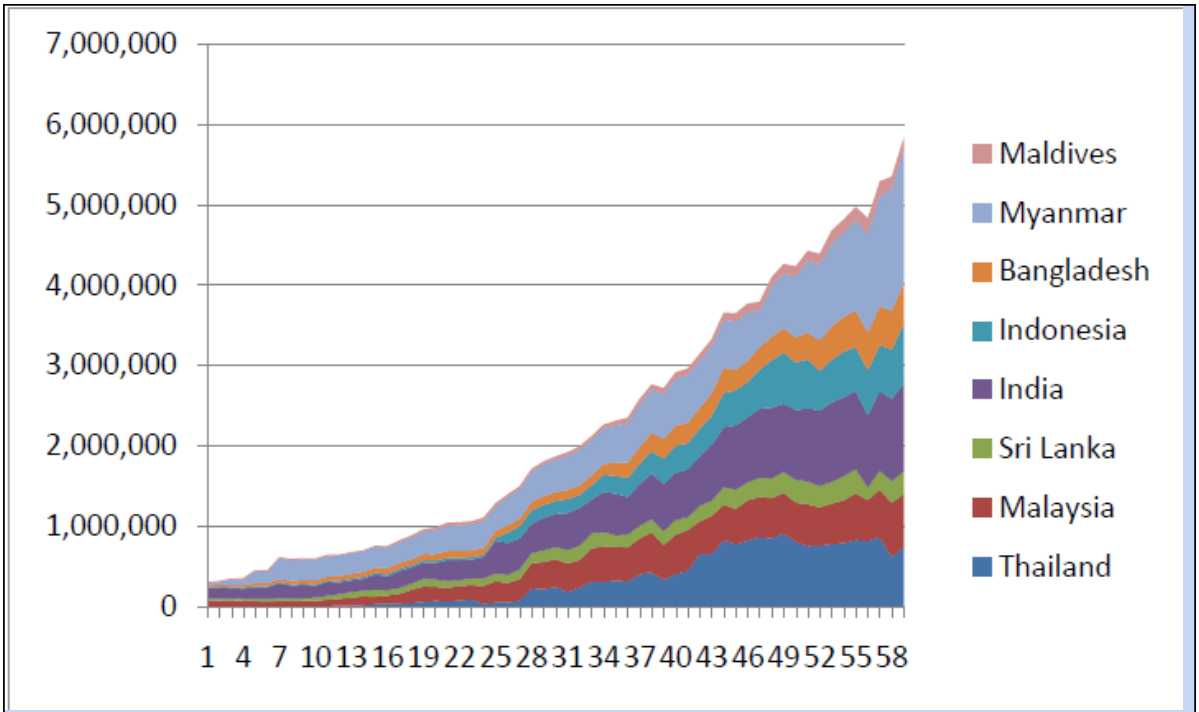
inshore fishery

Year	Mechanized	Non Mechanized	Total
2004-2005	14176	16687	30863
2005-2006	14099	16361	30480
2006-2007	14284	16284	30568
2007-2008	14289	15219	29508
2008-2009	14052	14645	28697
2009-2010	13788	17054	30842

offshore fishery

Type of gear	National	Foreign
Trawl	895	256
Purse seine	163	50
Stow net	458	-
Drift net	146	
Long line	3	
Squid cast net	35	13
Fish trap	112	-
Total	1814	369

Thi ha (2010)



Catches of marine fish from BOBLME countries, 1950 to 2008. ***Source: FAO Fishstat (2010)***

Country	Marine fish "nei"	Herrings, sardines, anchovies	Miscellaneous pelagic fishes	Miscellaneous demersal fishes	Miscellaneous coastal fishes	Shrimps, prawns	Squids, cuttlefish, octopus	Shads	Tunas, bonitos, billfish	Sharks, rays, chimaeras	Others
Indonesia	3.3	20.7	23.3	3.2	16.4	6.3	2.3	0.2	13.2	2.9	10.8
Malaysia	34.5	2.2	31.2	1.1	9.0	8.1	5.0	1.8	3.3	1.0	3.4
Thailand	45.6	8.6	16.4	1.3	13.7	2.6	4.8	-	2.6	1.1	2.1
Myanmar	97.9	-	-	-	-	2.0	-	-	-	-	0.1
Bangladesh	35.9	-	-	-	11.2	-	-	40.0	0.3	1.0	10.7
India	28.3	8.5	10.0	3.0	25.1	8.6	1.4	1.7	5.1	5.0	3.4
Sri Lanka	4.5	23.5	10.3	4.5	-	-	0.2	-	48.7	1.6	2.2
Maldives	11.8	-	-	-	-	-	-	-	87.7	0.4	0.1
BOBLME	**42.6**	**8.4**	**12.6**	**1.7**	**11.3**	**4.5**	**1.8**	**3.6**	**8.5**	**1.9**	**3.1**

Source: FAO Fishstat (2010)

	Potential yields (PY)						Landings		
	Demersal	Pelagic	Others	Total	PY/ km^2	PY/ mgC	Peak landing	Landings 2008	Difference
Indonesia[1]	235.4	1067.8	29.7	1332.9	2.72	2405	887.6	830.3	-502.6
Malaysia[2]	155.5	62.0		217.5	3.16	159	677.1	669.7	452.2
Thailand[3]	159.2	200.8		360.0	4.04	507	909.6	753.3	393.3
Myanmar[4]			1050.0	1050.0	2.02	1117	1679.0	1679.0	629.0
Bangladesh*[5]			939.5	939.5	5.73	550		497.6	-441.9
India[6]	413.6	500.5	263.0	1177.1	0.92	1163	1085.9	1085.9	-91.1
Sri Lanka[7]	80.0	170.0		250	0.48	411	303.2	285.0	35.0
Total				**5327.0**				**5800.8**	

Source[1] Duta (pers comm); Source[2] Abu Talib (pers comm.; Source[3]. Panjarat (2008); Source[4] FAO Country profiles (2010); Source [5] APFIC (in press); Source[6] GOI (2007); Source[7] Blindheim & Forn, (1980)

Estimates of the potential yield (PY) (1,000 tonnes), PY per area of EZZ (PY/km2), PY per unit of primary productivity (PY/mgC) and actual yield (both peak landings and 2008 estimates) and the difference between current landings and PY for BOBLME countries.

Management Measures

Prohibition of fishing gear

Under the present fishery laws fishing gear that is destructive to the environment and the fisheries resources are banned
pair trawling
electric fishing
fishing using poisons, chemicals and explosives.

mesh size regulations

purse seine	not less than 3.5" to 4.0"
bottom trawls	not less than 2.0" to 3.0"

Closed Area.

o trawling zones are designated as 5 miles from the coast in Rakhine coast, and 10 miles in the Ayeyawady and Tanintharyi coasts.

Closed Season

All fishing is prohibited during the months of June July and August, to protect the juveniles migrating into the inshore mangrove nursery areas. (ThiHa 2010)

In addition to that fish and crab refugia protected area for sharks andmarine turtles were also established.

Effective ?

Although total landings increased over the past 20 years, catch per unit effort (CPUE) dropped rapidly

In the first half of the 20th century, large pelagic and demersal predatory fish species (e.g., Serranidae, Lutjanidae, and Scombridae) were the major catch components.

Recent catches are dominated by species characterized bysmall size and high growth rate, such as small pelagic fishes and invertebrates
the amounts of previously abundant adults of large, predatory, high-value food fishes have declined markedly.

Despite well-documented accounts of the serious physical impact of trawling activities on benthic ecosystem bottom-trawling fishery continues

Ecological processes called Odum's Ratchet (Pitcher 2001) that have compromised many of the global fisheries will likely continue to occur if current fishing patterns continue.

Odum's Ratchet Scenario

fishing depletes the large long-lived species over generalist, k-selected species, leading to simpler ecosystems with higher volatility as well as lower value and trophic levels

Large hig hvalue species with specialized niches are rapidly lost

Consequently, small fish begin to dominate landings replacing large high-value fish.

This ecological mechanism suggests that, unless the situation is mitigated, future disasters will occur at an increasing rate

Hence, fishery management that aims to restore fisheries and marine resources in Myanmar is urgently needed.

The present-day marine ecosystem in Myanmar waters is depleted and dominated by species of small size and low trophic level, whereas the past ecosystem was underexploited and dominated by abundant high-trophic-level species

Restoring the depleted marine ecosystem would increase total potential benefits (ecological, social, and economic) from the ecosystem

Restoration is a sound economic policy, and fishery management must focus on past abundance and direct policies toward achieving the level of past ecosystems

This concept represents a paradigm shift from the current most widely used fisheries management system that aims at mere sustainability and often leads to conflict over scarcity

TOPIC 2 :

Korea-Myanmar cooperation in maritime, ports, and logistics

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EDUCATION

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Dr. Sung-Woo Lee is a director at the International Logistics Research Department, Korea Maritime Institute, a public think-tank in Korea specializing in the area of maritime transport and international logistics. He has been involved in various governmental projects, many of which are associated with urban planning and port development. He was previously affiliated with the Centre of Urban Planning and Environmental Management at the University of Hong Kong as a visiting researcher. His interests include managerial and strategic aspects of international logistics and maritime transport, port-city interaction and globalization. He is a member of International Association of Maritime Economists and is a guest editor of International Development Planning Review.

Details

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- Economic analysis of Maritime industry
- Logistics Integration and China logistics evolution
- International logistics business model in Asia

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Theo Notteboom(ed.), "Current Issues in Shipping, Ports and Logistics, UPA, Belgium(2011)

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Member of the Korea Planner Association (KPA) (1996 – On).
Member of the International Association of Maritime Economists (IAME) (2004 – On).
Member of the Korea Shipping and Logistics Association (2006 – On).

COOPERATION WAY FOR KOREA-MYANMAR IN LOGISTICS

by
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ABSTRACT

Average growth rate in terms of global merchandise trade recorded around 8.4% in 2010. It is almost 3times higher than that of global GDP. It means global logistics market very quickly increasing now because it depends on global merchandise trade. In this reason, logistics market of new market like ASEAN has increased quickly. ASEAN is one of highest economic growth region in the world. In these days, they define which their main obstacle of economy growth is logistics. In this context, ASEAN reinforces their logistics infrastructures and system to grow regional growth. Myanmar is one of big potential country in AESAN. However, the country just now opens their local market to global. As mentioned above, logistics issue is also very important for fast and continuous growth for Myanmar economy. Korea is the number 4th country to trade with Myanmar. In addition, Korea has a unique success growth model from developing country to developed country. In this respect, Korea and Myanmar can cooperate several sectors to boost each other economy. Notably, logistics is important cooperation sector to boost Myanmar future. Korea has the number of excellent logistics companies, construction companies and so on. Korean government has many program of cooperation for overseas in logistics field. Based on this situation, Korea and Myanmar need to set up a blueprint for logistics cooperation relationship. The cooperation program consists of infra structure development, establishing of national plan, mutual exchange of logistics knowledge and establishing high-level ministerial meeting.

Keywords: Logistics industry, Cooperation, Knowledge share program, Logistics standardization, Joint development

1 INTRODUCTION

Average growth rate in terms of global merchandise trade recorded around 8.4% in 2010. It is almost 3times higher than that of global GDP. It means global logistics market very quickly increasing now because it depends on global merchandise trade. In this reason, logistics market of new market like Asia and ASEAN has increased quickly. Notably, ASEAN is one of highest economic growth region in the world. In these days, they define which their main obstacle of economy growth is logistics. In this context, ASEAN reinforces their logistics infrastructures and system to grow regional growth. Myanmar is one of big potential country in AESAN. However, the country just now opens their local market to global. As mentioned above, logistics issue is also very important for fast and continuous growth for Myanmar economy. Korea is the number 4th country to trade with Myanmar. In addition, Korea has a unique success growth model from developing country to developed country. In this respect, Korea and Myanmar can cooperate several sectors to boost each other economy. Notably, logistics is important cooperation sector to boost Myanmar future.

2 ASEAN LOGISTICS MARKET TRENDS

Boosting Trading Volume in ASEAN

ASEAN had USD $2.4trillion amount of trade in 2011, and it shows 9.8% of average growth rate, higher than the world average growth rate(7.7%). In accordance to the Table 1, trade volume of ASEAN member states are increasing, especially in the CLMV(Cambodia, Lao PDR, Myanmar, Vietnam) region. Since CLMV countries show the highest economic growth compared to other countries in the region, many other countries, including South Korea, are very much interested in that region. Currently, a number of Korean companies are seeking for business opportunities in the area.

Table 1. Trade Volume in ASEAN countries

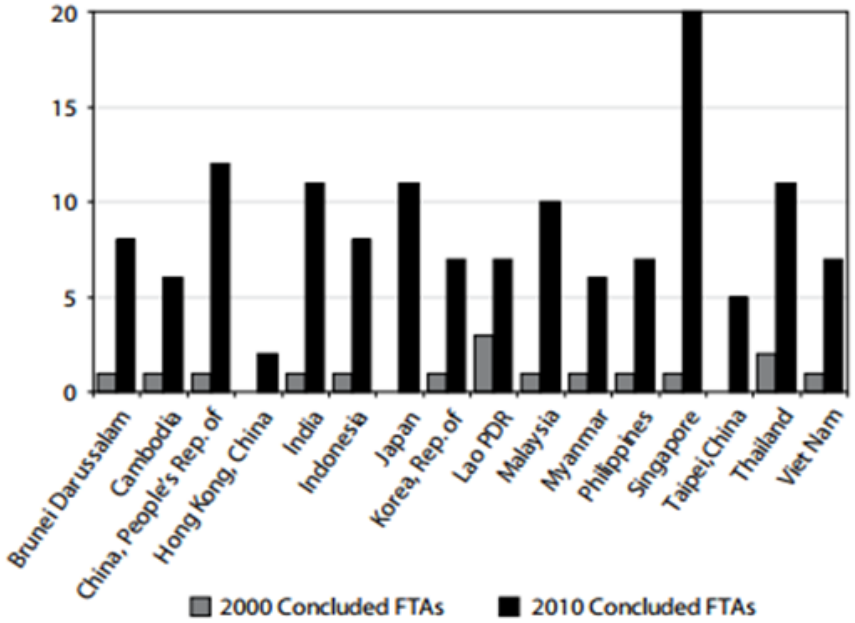
	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	ASEAN	World
	Million $									Trillion $	
1981	1	371	1	234	13	142	488	170	7	0.1	3.9
1991	1	551	2	712	16	218	1,256	669	47	0.4	7.1
2001	28	873	11	1,616	54	652	2,380	1,272	312	0.7	12.5
2011	169	3,810	76	4,150	216	1,083	7,779	4,553	2,144	2.4	36.2
CAGR	19.5%	8.1%	16%	10.1%	9.9%	7.0%	9.7%	11.6%	21.0%	9.8%	7.7%

World Bank, n.d. http://databank.worldbank.org (Accessed 30.09.2012)
UNESCAP, 2009.ASEAN and Trade Integration. http://www.unescap.org/tid/publication/swp109.pdf

Promoting Free Trade

From 1992, ASEAN countries are promoting free trade and regional integration by expanding RTAs(i.e. FTA) and any other bilateral/multilateral economic agreements within and out the region. Due to such actions, ASEAN is emerging as a major regional hub linking both ASEAN member states and other major economies such as China, Japan, US, EU, and Korea.

Table 2. Growth of Concluded FTAs in ASIA and ASEAN countries



ADB, n.d. FTA database. www.aric.adb.org. (Accessed. August,2010)

Promoting Logistics Industry

Currently, ASEAN member states show poor condition of transport infrastructures, and the countries are realizing that such poor condition will impede the growth in transport and logistics(T&L) sector growth. As you can see in Table 3, Cambodia, Lao PDR, and Myanmar were all ranked 100 or lower in 2010. This is partly to be expected in view of their Least Developed Country (LDC) status. For ASEAN, border clearance processes, infrastructure, and the quality and competence of logistics services providers are scored lower than the other areas. These logistics functions are deserving of further research and analysis to identify the precise causes of this performance gap. For improved transport infrastructures, ASEAN countries should invest more financially and technically.

Table 3. Average LPI score in the developing region

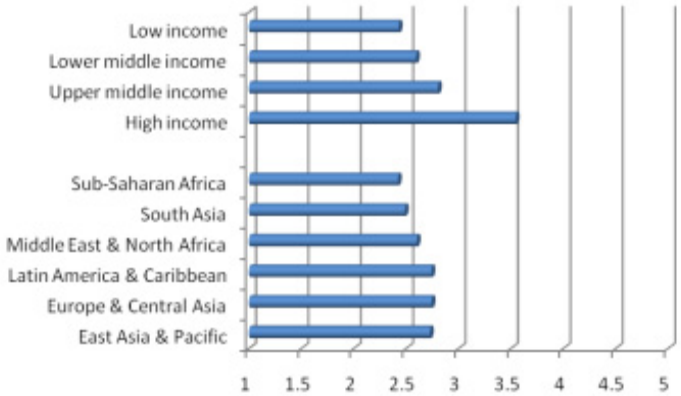


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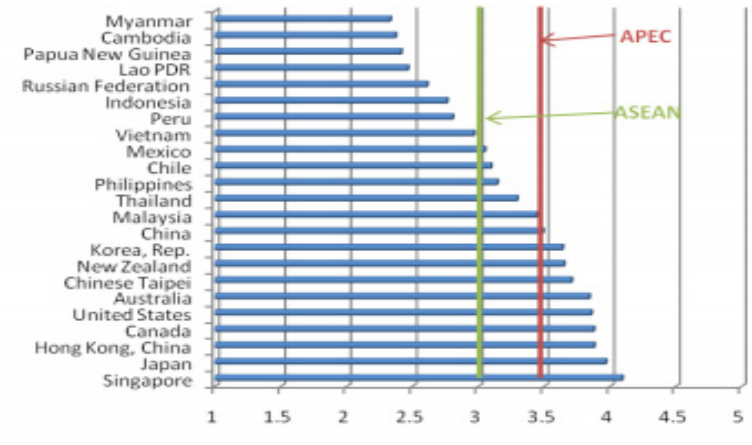
Table 4. International LPI scores in APEC and ASEAN



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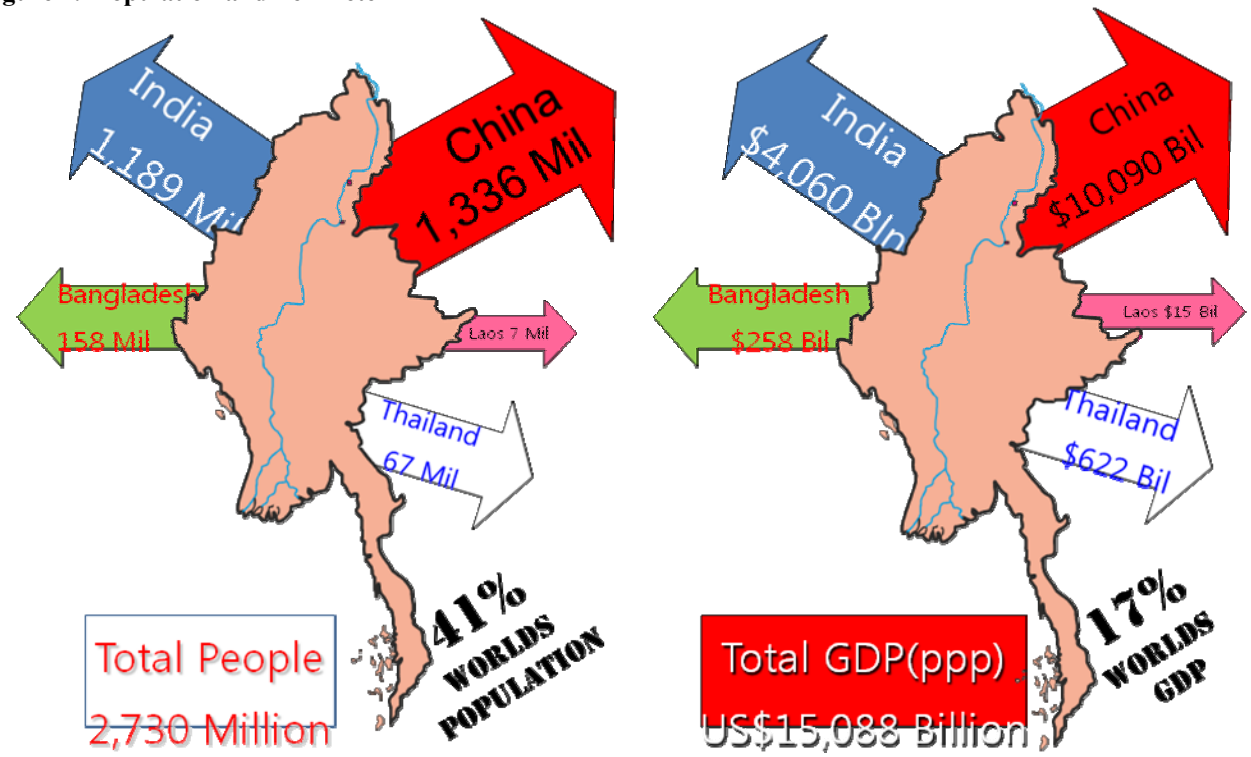
3 POTENTIAL OF MYANMAR

Reviewing Myanmar Potential

Myanmar is the 28th most populous, 2nd largest landmass in ASEAN region and the 40th largest country in the world. It showned *Figure 1*.

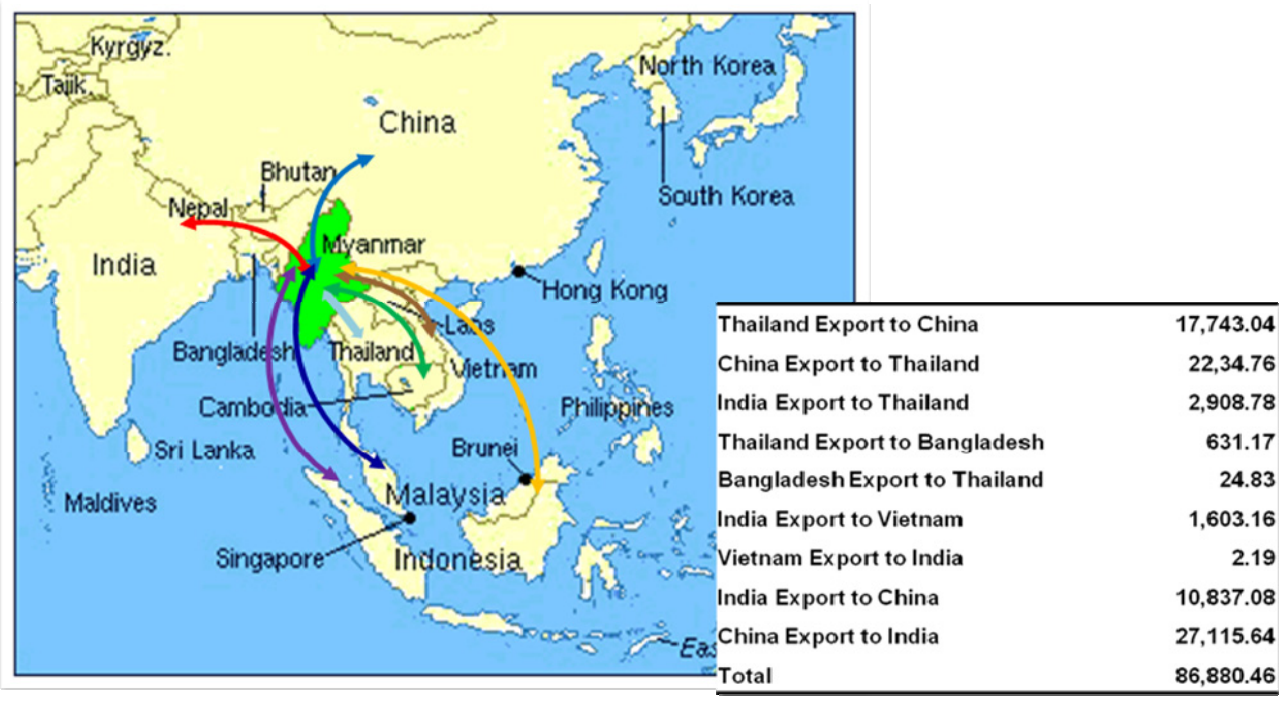
Figure 1. Population and Perimeter



Strategic Location of Myanmar

Through Myanmar total regional trade in 2008, 8,688billion US dollor , That Myanmar is emerging as the major regional logistics hub in ASEAN

Figure 2. Strength of Location



Thailand Export to China	17,743.04
China Export to Thailand	22,34.76
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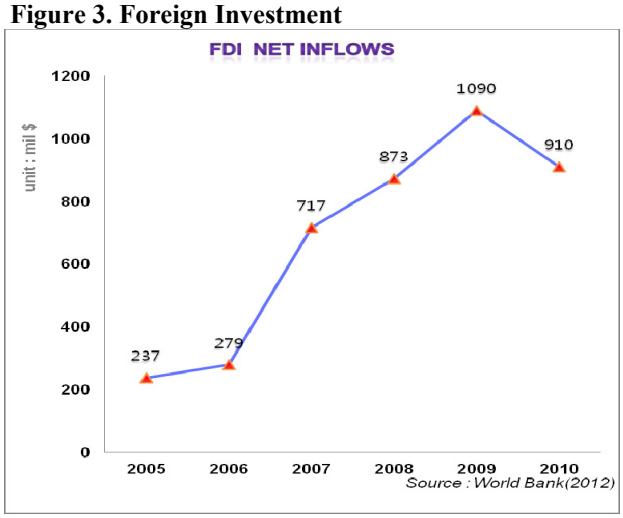
Vietnam Export to India	2.19
India Export to China	10,837.08
China Export to India	27,115.64
Total	86,880.46

Increasing Foreign Invvestment

Myanmar government approves 36,078million US$ amount of FDI.

Figure 3. Foreign Investment



Sr. No.	Particulars	Existing Enterprises		
		No.	Approved Amount	%
1	China	32	9,603	26.6
2	Thailand	61	9,568	26.5
3	Hong Kong	38	6,308	17.5
4	**Republic of Korea**	**47**	**2,938**	**8.2**
5	U.K *	51	2,659	7.4
6	Singapore	74	1,818	5.0
7	Malaysia	38	975	2.7
8	France	2	469	1.3
9	U.S.A	15	243	0.7
10	Indonesia	12	241	0.7
...	.....	...	....	...
	Total	454	36,077	100.00

4 COOPRATION WAY FOR KOREA AND MYANMAR

Korea-Myanmar Cooperation Plan

Korea and Myanmar need to set up a blue print for logistics cooperation and relationship.

1. Infra structure development, port, port distripark, dry port, logistics park
2. Establishing of National plan of port and National logistics
3. High-level Ministerial meeting of logistics ministers, marine directors meeting, port directors meeting
4. Mutual exchange to promote of logistics educational program, improvement of logistics system, eco-logistics and business round table

Korea Knowledge Share Program

Korean companies and government should share diverse experiences and skilful know-how about infrastructure development, IT, logistics security, warehouse management to Burmese logistics sector.

1. Programmes on management and development of seaports and dry port that could share Korea's advanced seaport and dry port development experiences, know-how in addition port management of experiences and skills
2. Programmes on logistics security and green logistics technology , which is implementing education programmes related to lotisctics security and environment-friendly logistics technology and know-how
3. Progorammes on distribution standardization in Myanmar, which related to size, material, quality and information in logistics sector
4. Programmes on logistics infrastructure development plan and management

Promoting Logistics Standardization

North and East Asian countries, Korea, China and Japan, are trying to standardize logistics equipments including unit load system. In order to increase efficiency to logistics Korea and Myanmar should work together for logistics standardization.

Table 5. ISO Standard of Pallet

Division	Size
▪ **Rectangle**	▪ 1,200x800 ㎜
	▪ 1,200x1,000 ㎜ (2nd priority)
	▪ 1,219x1,016 ㎜ (48x40 inch)
▪ **Square**	▪ 1,100X1,100 ㎜ (1st priority)
	▪ 1,140x1,140 ㎜
	▪ 1,067x1,067(42X42 inch)

Joint Development and Operation for Sea Ports

Myanmar provided economic aid to Korea in 1950's as a friend, In our position, Korea should support and share of successful "Korea's development model" on infrastructure development and operating skills with Myanmar. It needs to have a balance in Myanmar FDI and consider more of collaboration or cooperation with Korea. The projects relating to plan of development port in Myanmar are described in *Table 6*.

Table 6. Development of Port Projects

Project	Contents
▪ **Kyauk Phyu Deep Sea Port**	▪ China National Petroleum Corporation has constructed of Onshore Gas Terminal(OGT) and It will be completed in 2013
	▪ 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, 2 cruise liners and 12servisce ships.
	▪ It needs to be diversification of investment in Kyauk Phyu, It has to consider of operation port by JV
▪ **Yangon Inner port**	▪ Myanmar Port Authority planned to develop a general berth and oil berth at inner port including dredging of depth
	▪ In the project will be built 4 general berth and 14 oil berth at inner port , further consider of berth to add in it
	▪ It could be invested from Korea and also operate together.
▪ **Thilawa Port**	▪ Japan government are proceeding of feasible study of Thilawa port project and signed the MOI of development of Thilawa port project with MNPED(National Planning and Economic Development of Myanmar)
	▪ It will be constructed 17 berths handling of bulk, container and general cargo.
	▪ It will be considering of financial support and planned of development on BOT basis.
▪ **Dawei Deep Sea port**	▪ Italian-Thai Development Public Company Limited and Myanmar Port Authority signed MOU.
	▪ It will be built 22 berths with handling of bulk, contained, LNG, general and liquid cargo.
	▪ It could cooperate with Korea in operation and logistics service.

Joint Development and Operation for related in Logistics Facilities

Korean and Burmese government should cooperate together on SEZ development and management, simultaneously they both should attract Korean companies to have a business in SEZ.

Table 7. SEZ and Industry Zone

Thilawa Speccial Economic Zone	Dawei Industrial Zone
▪ Special Industrial Zone - 9.3 ㎢	▪ Heavy Industry Zone – 38.3 ㎢
▪ Local Industrial Zone – 1.74 ㎢	▪ Medium and Heavy Industry Zone – 44.7 ㎢
▪ Singapore Myanmar Development Industrial Zone – 1.0 ㎢	▪ Medium Industry Zone – 58.6 ㎢
▪ Sea ports and container yard Thilawa Special Industial Zone – 12.8 ㎢	▪ Light Industry Zone – 38.3 ㎢

5 CONCLUSION

Well structured and improved transport infrastructure and system will be the key for Myanmar's economic growth. Korean and Burmese government should work together to find a way to create a "win-win situation" for both countries by implementing and studying South Korea's development model in Myanmar's transport and logistics(T&L) industry. Just like Korea received assistance from Myanmar in the 1950's, It is time for Korean government, companies, and people to support Burmese transport and logistics industry, which will considerably affect Myanmar's economic development or growth in a positive terms.

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KOREA MARITIME INSTITUTE

Cooperation Way for Korea-Myanmar in Logistics

S-W Lee, Director
Int'l Logistics Research Department

Contents

International Logistics Trends

ASEAN Logistics Market Trends

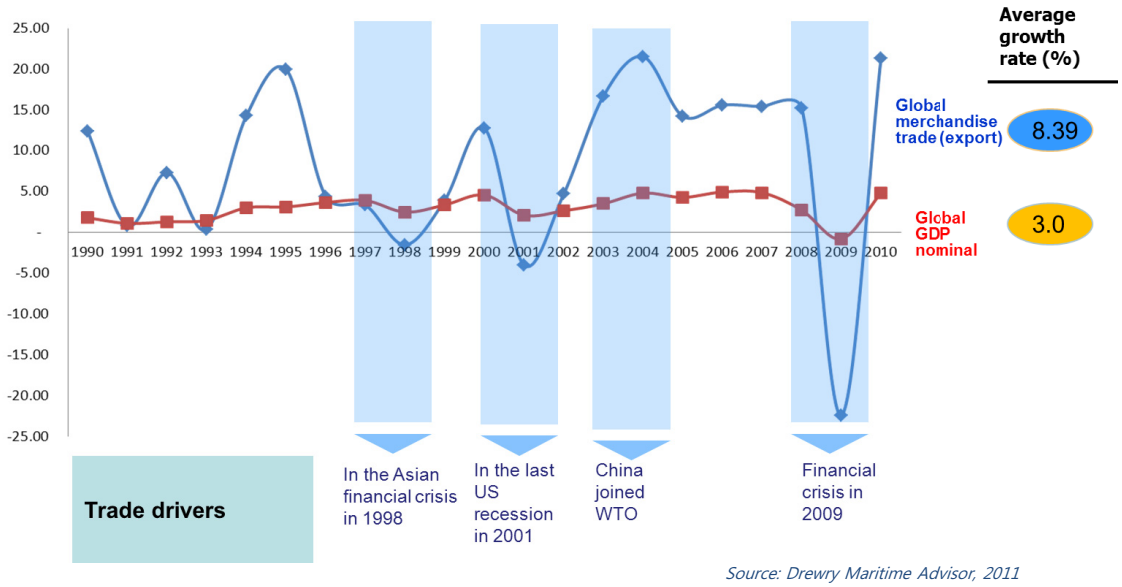
Potential of Myanmar

Cooperation Way for Korea and Myanmar

INTERNATIONAL LOGISTICS TRENDS

Increasing Global Trade

- Ave. growth rate in terms of Global Merchandise Trade recorded 8.4% (2010)



Source: Drewry Maritime Advisor, 2011

Risk management in Int'l Logistics

Standard SCM

- Focused on cost & Inventory control
- Poor risk management for emergencies

World Disaster events

- 2011 Japan Earthquake and Tsunami
- 2011 Thailand Floods
- A need for improved production and

Need for SCM 2.0

- √ Risk Management
- √ Energy efficiency
- √ Customer oriented

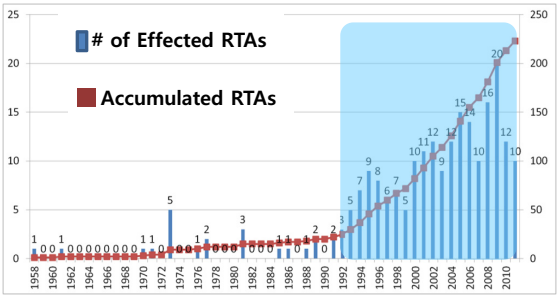
- √ Standardization of logistics components
- √ Diversification of procurement sites
- √ Securing adequate inventories

- √ Increase in port demand for secure areas
- √ Expansion of Transport and warehouse business

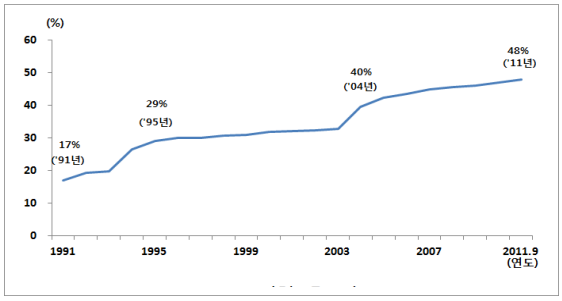
Growth in Global Logistics Market

- Major economies(EU, US, China, Japan) trying to **expand FTAs**
- NAFTA**: Increasing trade** between US → North America & Caribbean
  - ✓ Purpose is to impose preferential tariff rates to clothing and finished textiles
  - ✓ 93% of US Fiber exports : North and Central America, Caribbean
- **Back-to-Back C/O** in Korea-ASEAN FTA
  - ✓Acknowledging origins of those products being Exported as original state
  - ✓Increase in demand for distribution bases(Singapore)
- Increase in **Value-added exports** (by utilizing FTA agreements, provisions on origins)

Status of RTA's in the world



Portion of FTAs in global Trade



Growth in Asian Logistics Industry

- Asia's T&L sector expanding rapidly, in line with the region's stellar economic growth
  - ✓ Asia's widening manufacturing base, Deeper intra-Asian trade integration, Rising household incomes, High urbanization rates and widespread government efforts to improve infrastructure have boosted demand for T&L services
  - ✓ 9 out of 10 biggest container ports in the world were in ASIA (2009)
- # of players in Asia's T&L sector, homegrown and global, is rising
  - ✓ Total combined revenues: US$66.1billion (2004) → US$140.8 billion (2009)
- Competition in Asia's T&L sector is intensifying
- Rising domestic demand in Asia will change the nature of trade in the region, creating new growth opportunities

Source: The Economist Intelligence Unit, 2012. Asia Competition Barometer. Transport and Logistics.

ASEAN LOGISTICS MARKET TRENDS

Boosting Trading Volume in ASEAN

- CLMV(Cambodia, Lao PDR, Myanmar, Vietnam) are the countries with low economic development among the ASEAN region
- However CLMV market shows robust economic development, Korean companies are very much interested in them

(Ex) Markets near the Thailand-Myanmar-Cambodia-Lao PDR-Vietnam-China network

Trade volume in ASEAN countries

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	ASEAN	World
	Million $										Trillion $	
1981	46	1	371	1	234	13	142	488	170	7	0.1	3.9
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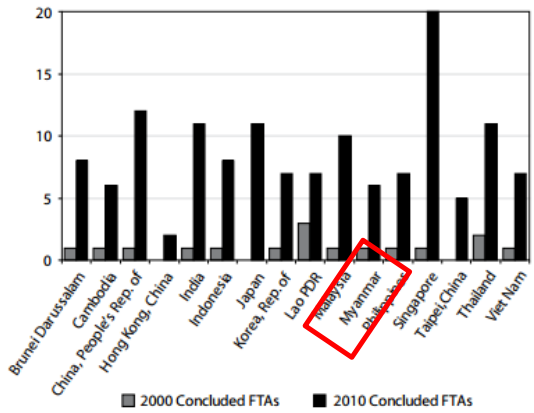
CAGR	4.6%	19.5%	8.1%	16.0%	10.1%	9.9%	7.0%	9.7%	11.6%	21.0%	9.8%	7.7%

Promoting Free Trade Agreement

√ASEAN countries, from 1992, trying to promote FREE TRADE and Regional Integration by expanding FTAs with other various countries

Growth of Concluded FTAs in Asia



FTA = free trade agreement.
Note: FTAs in Asia cover all FTAs with at least one Asian economy. Here, Asia includes the 16 economies included in the figure.
Source: ADB's FTA Database (available: www.aric.adb.org), downloaded August 2010.

- ASEAN is emerging as the major regional hub linking ASEAN members with the region's larger economies
  - ✓ PRC(2009), Japan(2006), and Korea(2006)
  - ✓ Recently implemented regional agreements with India, Australia & New Zealand jointly
  - ✓ FTA discussions with the EU
- Unique concept of SEZ(Special Economic Zone) used in ASEAN Region
  - ✓ IMT GT
  - ✓ GMS

Promoting Logistics Industry (1)

√ASEAN member states realized that Logistics Industry will improve the regional economic growth by enhancing transport infrastructures

- Poor transport infrastructures impede economic growth for T&L industry in ASEAN region
  - ✓ South-East Asia possess poor level of transport infrastructures in all aspects
  - ✓ Low logistics/transport efficiency eventually leads to low economic growth in the region despite the adequate supply of natural resources and labor
- Investment needed for transport/logistics infrastructure in the region (similar to the North-East Asian Economic Model)

Source: The Economist Intelligence Unit, 2012. Asia Competition Barometer. Transport and Logistics.

Promoting Logistics Industry (2)

√ASEAN's evolving manufacturing footprints will affect the region's T&L industry by shifting demand to newer markets

◆ Several broad trends are causing a rethink of Asian manufacturing

(ex) rising wages in China

- ✓ Such leads to the flight of low-cost manufacturing away from the south and coastal areas of that country to inland provinces and neighboring countries such as Vietnam

◆ T&L firms need to adapt to such rapid changing dynamics to maintain profitability

- ✓ North-East Asia: US$85 per Container/ South-East Asia: US$1,236 per Container
- ✓ According to World Bank report(2008), 10% of transport cost reduction will lead to 20% increase in trade volume

Logistics Roadmap for Priority Integration

√ **Logistics Roadmap was officially signed at 39th ASEAN Economic Ministers Meeting in Manila, Philippines, August 2007**

◆The objectives of the Logistics Roadmap are:

1. Create an ASEAN single market by 2015 by strengthening ASEAN economic integration through liberalization and facilitation measures in the area of logistics services;

2. Support the establishment and enhance the competitiveness of an ASEAN production base through the creation of an integrated ASEAN logistics environment

Source: ASEAN Secretariat, n.d. ASEAN Cooperation on Transport Facilitation and Logistics.

Major Policy Areas for the Roadmap

I. Encourage the Integration of the ASEAN National Logistics Systems
   – by increasing communications at the regional level to identify actions in the logistics sector to support and facilitate trade flows between ASEAN Member Countries

II. Encourage the Progressive Liberalization of Logistics Services
   – to make them better able to respond to the opportunities available for ASEAN integration and increasing competitiveness

III. Increase Trade, Logistics and Investment Facilitation
   – to identify the means needed to improve transport logistics facilities and the priorities for investment

IV. Build ASEAN Logistics Capacity
   – by encouraging human resource development in the sector, and an environment conducive to developing the sector

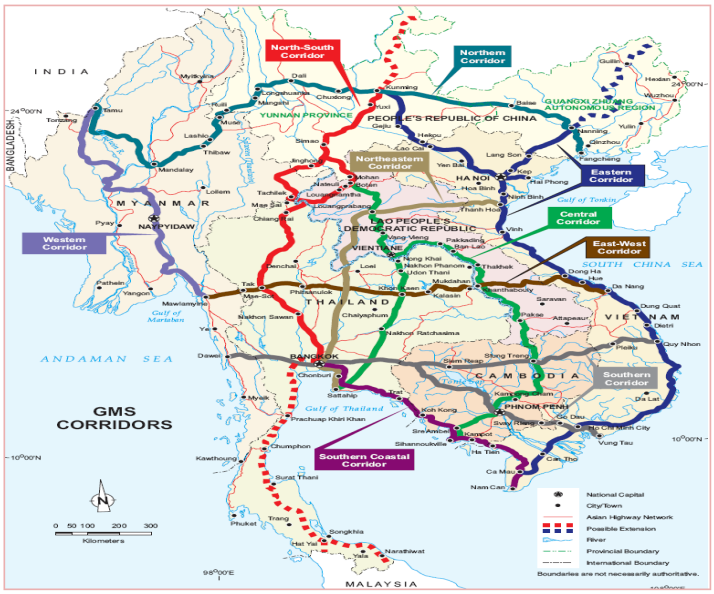
V. Promote ASEAN Logistics Service Providers by identifying them and providing channels for their greater participation in the sector

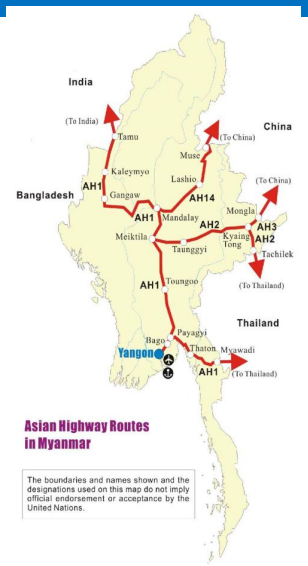
VI. Promote Multimodal Transport Capacity (especially containerized transport)

Source: ASEAN Secretariat, n.d. ASEAN Cooperation on Transport Facilitation and Logistics.

Integration of Logistics Market

√8 Transport corridors for economic growth as well as the integration in the Greater Mekong Sub-region





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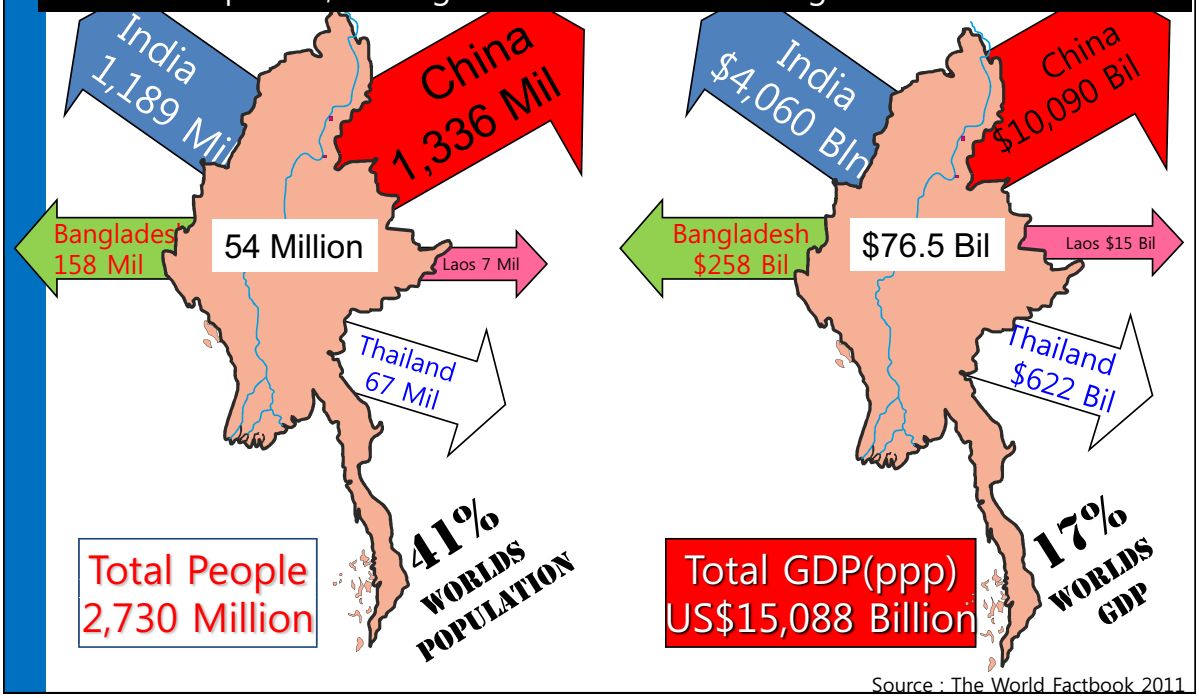
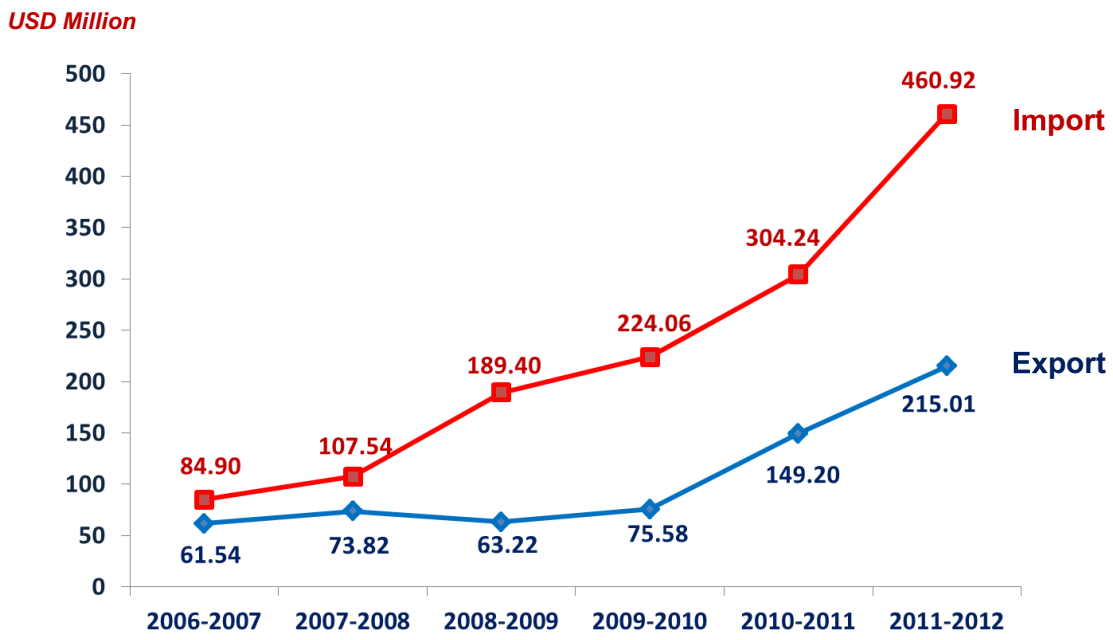


Source : The World Factbook 2011

Status and Trends of Korea-Myanmar Trade



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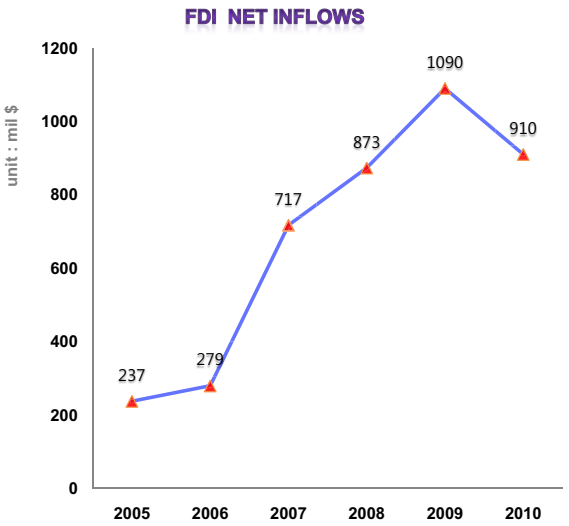
	Total	454	36,077	100.00

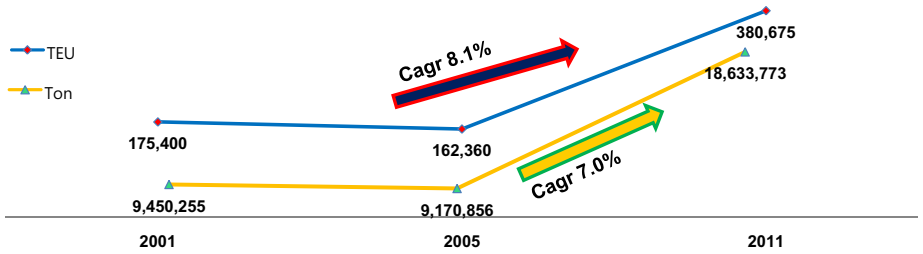
Source : Myanmar Investment and Company Administration(2011.10.30)



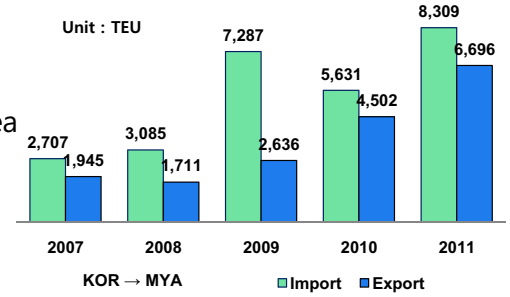
Source : World Bank(2012)

Status and Trends of Korea-Myanmar Trade

- **Myanmar's cargo throughput rise 7.5% cagr**
  - Container throughput 380,675TEU and Cargo handled 18,633,773tons in 2011



- **Korea-Myanmar Container Traffic**
  - The trade container traffic between Korea and Myanmar have achieved strong growth with an average annual growth rate of 34.3%

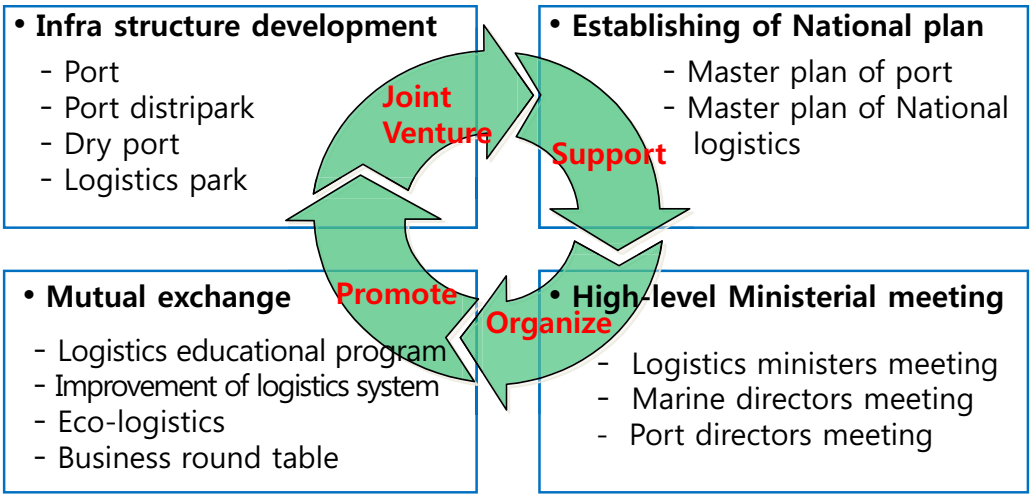


21

COOPERATION WAY FOR KOREA AND MYANMAR

Korea-Myanmar Cooperation Plan

√ Korean and Myanmar need to set up a blueprint for logistics cooperation relationship



Korea Knowledge Share Program

√ Korean companies and gov't should share diverse experiences and skillful know-how(Infrastructure development, IT, Logistics Security, Warehouse Management) to Burmese logistics sector

I. **Programmes on Management & Development of Seaports and Dry ports**
   – Sharing Korea's advanced seaport/dry port development experiences/know-how and port management experiences/skills

II. **Programmes on Logistics Security and Green Logistics Technology**
   – Implementing education programmes related to logistics security and environment-friendly logistics technology and know-how
   (ex) AEO certificate programme

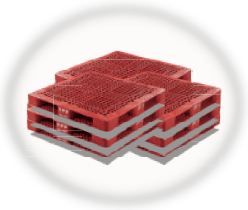
III. **Programmes on Distribution Standardization in Myanmar**
   – Programmes related to size, material, quality, and information in logistics sector

IV. **Programmes on Logistics Infrastructure Development Plan and Management**

Promoting Logistics Standardization

√ North-East Asian countries (Korea, China and Japan) are trying to standardize logistics equipments including unit load system

√ Korea and Myanmar should work together for logistics standardization



ISO Standard of Pallet

Size

Division	Size
Rectangle	- 1,200×800mm
	- 1,200×1,000mm (2nd priority)
	- 1,219×1,016mm (48×40inch)
Square	- 1,100×1,100mm (1st priority)
	- 1,140×1,140mm
	- 1,067×1,067mm (42×42inch)

Material

1st priority Plastic

Wooden

Steel

Highly Pressed paper

+

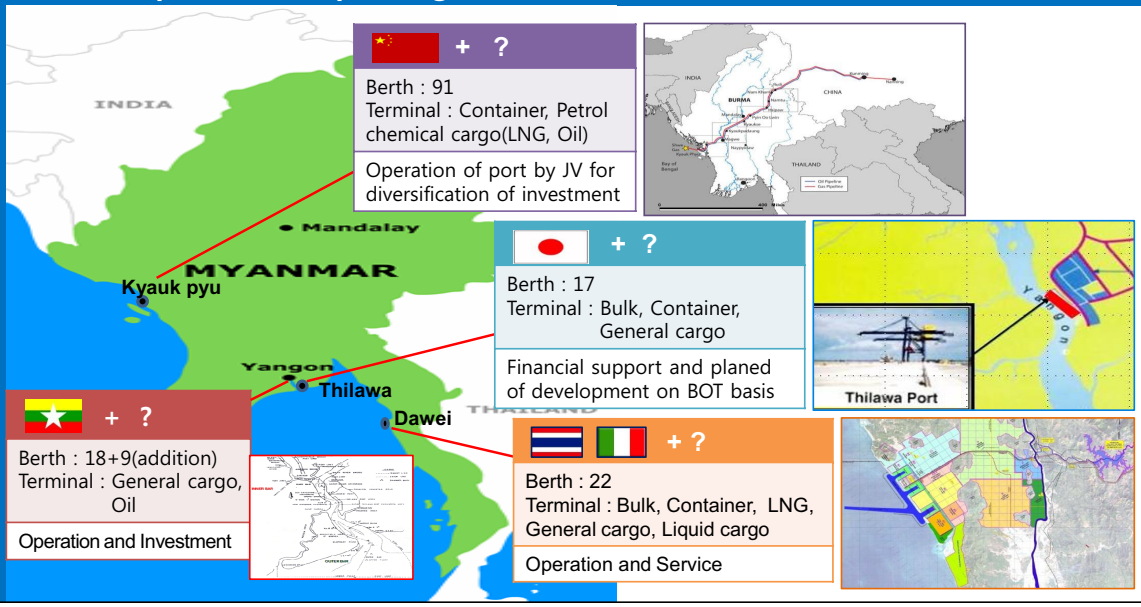
Quality

Strength, Stiffness, Durability etc.

Joint Development & Operation for Sea Ports

√ Myanmar provided economic aid to Korea in 1950's as a friend

√ Korea should support and share "successful Korean model" on infrastructure development and operating skills



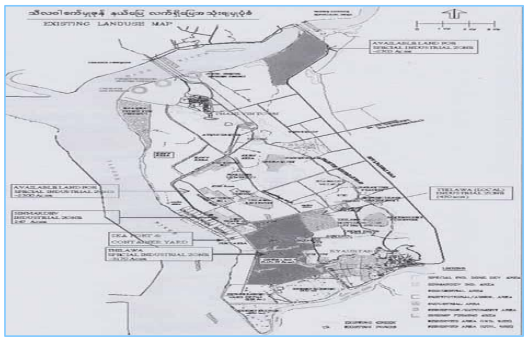
Joint Development & Operation for related in Logistics Facilities

√ Korea and Myanmar government cooperate together on SEZ development and management

√ Korea and Myanmar government should promote Korean companies in SEZ

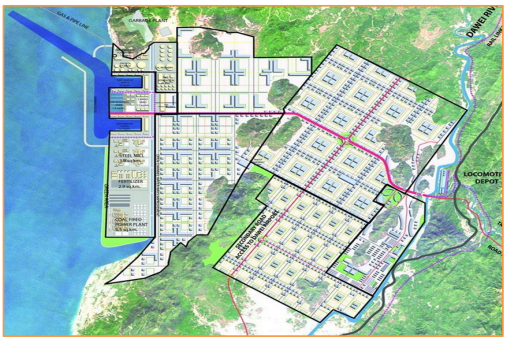
Thilawa Special Economic Zone

Special Industrial Zone(For FDI)- 9.3㎢
Local Industrial Zone – 1.74㎢
Singapore Myanmar Development(SINMARDEV) Industrial Zone – 1.0㎢
Sea ports and container yard
Thilawa Special Industrial Zone – 12.8㎢



Dawei Industry Zone

Heavy Industry Zone – 38.3㎢
Medium and Heavy Industry Zone – 44.7㎢
Medium Industry Zone – 58.6㎢
Light Industry Zone – 38.3㎢



THANK YOU

Lee, Sung Woo, Director

E-mail: waterfront@kmi.re.kr

Curriculum Vitae

PERSONAL INFORMATION

Name	Myo Nyein Aye (Mr.)
Position	Assistant General Manager, Myanma Port Authority, Ministry of Transport.
Nationality	Myanmar
Date of Birth	11th February 1971
Passport No.	OM 159040
Permanent Address:	No. 16(C), Manawhayi Avenue, Manawhayi street, Dagon Township, Yangon, Myanmar. Tel; +95 1 2302048, +95 9 448003410

CURRENT STATUS

PhD candidate (from Sept. 2010 to date),

under the International Exchange & Cooperation for Shipping, Port and Logistics program, Korea Maritime University, Busan, Republic of Korea.

Contact Address:	Room 502 (C), student dormitory, Korea Maritime University, 1, Dongsam-dong, Youngdo0ku, Busan, 606-719, Korea.
Mobile:	(+82) 10 2292 7141
E-mail:	myonyeinaye@gmail.com

ACADEMIC BACKGROUND

2007 - Master of Science in Maritime Affairs, World Maritime University, Malmo, Sweden.

Majoring in Port Management, GPA: 3.51 (/4.0)

Research Study: ***"Benchmarking for container terminals: Data Envelopment Analysis"***

1997 - Master of Information Science (M.I.Sc), University of Computer Studies, Yangon, Myanmar

Majoring in Information System, GPA: 4.5 (/5.0)

Passed with Distinction, Thesis Paper: ***"Lifting flow over the arbitrary body"***

1995 - Bachelor of Engineering (B.E), Yangon Institute of Technology, Myanmar

Majoring in Aeronautical Engineering

Passed with Credit

Achievements in professional education and training:

- **10th May, 1999 – 16th July, 1999**

  Training on Multimedia System Development Course

  Center of the International Cooperation for Computerization (CICC), Japan

- **3rd July, 2000 – 23rd August, 2000**

  Training Course in BASIC DIPLOMATIC SKILLS,

  Ministry of Foreign Affairs, Yangon, Union of Myanmar

- **23rd April, 2001 – 29th June, 2001**

  Training on Economies in Transition for Middle-Level Manager course

  Mekong Institute, Khon Koen, Thailand.

- **29th April, 2002 – 28th May, 2002**

  Advanced Multimedia Web Designing and Development Techniques training programme

  Institute of Computer Technology, University of Colombo, Colombo, Sri Lanka.

- **2nd September, 2003 – 1st November, 2003**

  Training on 5th IT Internship Program in Computer Networking System

  Korea International Cooperation Agency (KOICA), Korea

- **28th October, 2003**

  CCNA 1 Networking Basics,

  Cisco Systems, Networking Academy
  Chungbuk Human Resources Development Institute, Okchon-Gun, Korea

- **17th September, 2007 – 21st September, 2007**

  Seminar on Logistics in Maritime Dangerous Goods Transport,

  World Maritime University, Malmo, Sweden

- **17th September, 2007 – 21st September, 2007**

  Workshop on the International Ship and Port Facility Security (ISPS) Code and SOLAS Amendments, 2002 (CSO/SSO/PFSO duties & responsibilities),

  World Maritime University, Malmo, Sweden

- **1st September, 2009 – 3rd September, 2009**

  Training of Trainers Workshop (TOT) on Training Fundamentals and Multimodal Transport,

  United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) in association with Myanmar Maritime Universiry (MMU) & Myanmar International Freight Forwarder's Association (MIFFA), Yangon, Myanmar

- **16th November, 2009 – 19th November, 2009**

  Regional Training of Trainers Workshop (TOT) on Multimodal Transport and Logistics,

  United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Bangkok, Thailand.

- **30th November, 2009 – 4th December, 2009**

  The International Cooperation Program for Port Management Information System,

  Korea Maritime Institute (under the international cooperation program of the Ministry of Land Transport and Maritime affairs, The Republic of Korea

- **10th May, 2010 – 24th June, 2010**

  Training on the Improvement and integration of the cargo transport in Asia region,

  JICA (Chubu), Nagoya, Japan.

- **17th August, 2010 – 20th August, 2010**

  "Training of Trainers" and "Foundation Course in Transport and Logistics",

  United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Myanmar International Freight Forwarder Association (MIFFA) and Ministry of Transport (MOT), Yangon, Myanmar.

Skills

- Good in English: Speaking, listening, reading and writing (IELTS: 6.5, 2005)
- Mother tongue: Myanmar
- Skillful in IT especially in Windows Applications, Microsoft Office Package, etc. and some knowledge about Networking

WORK EXPERIENCES

2010 Oct. – to Date **Assistant General Manager**

Myanma Port Authority, Ministry of Transport.
(That position has been appointed after starting the study program at Korea Maritime University. So that, there will be no specific responsibility until end of the study.)

2011 Sept. – 2012 June. **Part-time lecturer**

Shipping Management Department
Korea Maritime University.

Responsibilities:

- Preparing the course contents about "Maritime Business English" and "Maritime Economics" for undergraduate students
- Lecturing, presenting and discussion about the maritime topics

2011 Jul. – 2012 June **Myanmar Supervisor (Part-time staff)**

KTM Co., Ltd. (Shipping Management Company)
Centum IS Tower Rm. 1801, #1209, Jaesong-dong,
Haeundae-gu, Busan, Korea

Responsibilities:

- Arranging for recruiting of the Myanmar seafarers to the vessels under the company management
- Cooperation and coordination tasks between Yangon branch office and main office in Busan, Korea
- Monitoring, controlling, evaluating and reporting the situation of the working crews on-board

1999 Nov. – 2010 Oct. **Manager**

Traffic Department, Myanma Port Authority,
Ministry of Transport.

Responsibilities:

- Management of the cargo handling equipments and drivers for the equipments at Traffic department, Myanma Port Authority
- Supervising the daily operation of the Bo Aung Kyaw multipurpose terminal as an area manager
- Preparing the periodically report about port performance and port productivity with analysis to the head of department of the traffic department, Myanma Port Authority
- In-Charge of the Information Technology matters related with Myanma Port Authority

1998 Nov. – 1999 Nov. **Assistant Manager**

Computer Division, Myanma Port Authority,
Ministry of Transport.

Responsibilities:

- Maintaining the hardware and software systems of the Local Area Network and PCs at the Computer Division of Myanma Port Authority
- Preparing the monthly report to the Managing Director related with data passing through computer system such as Combined Bill and others
- Supervising the staff to ensure the daily tasks of the Computer Division

1996 July – 1998 Nov. **Junior programmer**

Computer Division, Myanma Port Authority,
Ministry of Transport.

Responsibilities:

- Maintaining the Payroll system program which has been developed with COBOL programming language
- Maintaining the PCs and related accessories at the Computer Division of Myanma Port Authority
- Transferring some program from Lotus 123 to Excel according to update the system

Other experiences

2012 July. – 2012 Sept. **Consultant**

United Nations Economic and Social Commission for Asia and the Pacific
Bangkok, Thailand.

Responsibilities:

- To carry out studies on the social and economic issues of Myanmar and Mandalay area;
- Research on transport infrastructure and facilitation issues related to dry port;
- Analyze the capacity required for dry and draft 5 chapters of study report;

2009 July. – to Date **Part-Time Lecturer**

Multimodal Transport and Logistics Training
Ministry of Transport.

Responsibilities:

- Prepare the course notes and presentation to be in line with the UNESCAP syllabus for the certificate course on Multimodal Transport and Logistics certificate course
- Lecturing the designated modules for the course

2001 – 2005 **Part-Time Lecturer (Voluntary Based)**

Post Graduate Diploma in Multimedia Arts (PGDMA) Yangon Institute of Education,
Ministry of Education.

Responsibilities:

- Preparing and designing the multimedia development module to submit the proposal to Education Higher Authority (the design of the diploma is to equip the multimedia technology to the teacher for the facilitation of the multimedia classrooms in 2001)
- Prepare the course notes and presentation for the multimedia system development of the education
- Lecturing the designated module for the diploma course

PROFESSIONAL MEMBERSHIP

Executive Committee Member (2001-2005), Myanmar Computer Professional Association (MCPA)

Fellow Member, Myanmar Computer Professional Association (MCPA)

Secretary (2001-2005), Computer Teaching Committee, Ministry of Transport.

Chairman (2007), Student Computer Committee, Student Council, World Maritime University, Sweden.

Member, Friends of WMU as Sasakawa Fellow

Member, Myanmar National Logistics Body, Information Technology Working Committee

Member, working committee of the e-Port Management System development, Myanma Port Authority

Focal person, ASEAN-ROK Transport Cooperation Project,

Copy of Passport

Official Status :

Official, Ministry of Transport.

UNION OF MYANMAR

PASSPORT

Type PO
Country code MMR
Passport No OM159040
Name MYO NYEIN AYE
Nationality MYANMAR
Date of birth 11 FEB 1971
Sex M
Place of birth MONYWA
Date of issue 23 AUG 2010
Authority MOFA, NAY PYI TAW
Date of expiry 22 AUG 2015
Holder's signature

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OM159040<5MMR7102110M1508226<<<<<<<<<<<<<<<6

Establishing of Dry Port in Myanmar and Korea's cooperation

Myo Nyein Aye
Myanma Port Authority, No. 10, Pansodan Street, Kyauktadar Township, Yangon, Myanmar.
+95 9 448003410, myonyeinaye@gmail.com

ABSTRACT
Dry Port is one of the essential instruments for the development of the integration of maritime, port and logistics especially for both of land locked countries and countries which has potential wide hinterland. Myanmar has wide land and long coastline. Up to now, Yangon has been predominant major port in Myanmar with long and rich history. In Myanmar, containerization was introduced in 1981 and the first container terminal has operated since 1990. According to the speedy development of container utilizing and traffic within the first 5 years, inland container deport (ICD) had been considered to build at the short distance of existing wharf. That ICD was built with the cooperation and assistant of Korea and started her operation in 1999. Nowadays, the time has given favour again and there are so many driving forces to build the dry port in Myanmar as a hub and logistics distribution center of middle part of Myanmar and nearby countries, China and India. Recently, the prefeasibility study of dry port in Myanmar has been carried out under the arrangement of UNESCAP and funding of Korea Maritime Institute (KMI). We believed that this is the right time to establish the dry port in Myanmar and thanks to Korea's cooperation.

KEYWORD
Dry Port, Cooperation, Logistics

INTRODUCTION
Myanmar is situated at the most western part of South East Asia region and it has long coastal line with 2,229 kilometer. Myanmar has been a member of ASEAN (Association of South East Asia Nations) since 1997 and a member of Greater Mekong Sub-region (GMS) countries as well. Myanmar has a total of nine ports catering mainly for its seaborne and coastal trade spreading over the whole coastline. Up to now, Yangon has been taken the premiere port of Myanmar and more than 90% of the maritime exports and imports are handled there. Maritime related sectors are vital roles for the enhancement of regional economic development and economy of country itself. One of the important factors to assist the development of maritime sectors is establishment of dry port at the right time and right place in the country. The chronological events of the dry port development in Myanmar have been closely related to the supports and cooperation from Korea. At this moment, Myanmar has already proposed seven potential sites of international importance for dry ports in accordance with the liberalized economic policy of the newly elected government. Additionally, pre-feasibility study of establishing a Dry Port in Mandalay region (middle part of Myanmar) has been recently carried out under the guidance of UNESCAP. Myanmar government is also ready to sign the intergovernmental agreement on dry ports which has been drafted in July 2012.

DRY PORT CONCEPT
Dry port can be simply understood as inland mirror of ocean port. According to the definition that was agreed at the Ad Hoc Intergovernmental Meeting on Dry Ports in Bangkok on 20-22 June 2012, a dry port of international importance ("dry port") shall refer to an inland location as a logistics centre connected to one or more modes of transport for the handling, storage and regulatory inspection of goods moving in international trade and the execution of applicable customs control and formalities (UNESCAP, 2012a). Dry port are usually located inland from sea ports and linked to the sea by single mode of transport or more. Dry ports may be established and effective utilized whether a country has sea ports or is land-locked (UNCTAD, 1991). According to the distance between dry port and related ports, there are three type of dry ports; a) Distant dry port, b) Midrange dry ports and c) Close dry ports (Roso et al., 2008). Main functions of the dry port are transport logistics attributes, warehouse logistics attributes, international port attributes and value-add logistics services. Various authors and scholars noted down the benefits of the dry port with different points of view. Some of tangible or direct benefits are (Roso, 2008);

- Increases seaport capacity
- Increases seaport productivity
- Reduces congestion at seaports and in the seaport cities
- Reduces risk for road accidents and road maintenance cost as well
- Lowers environmental impact
- May serve as a depot
- Improves seaport's access to areas outside its traditional hinterland

Moreover, there are also some intangible or indirect benefits, such as, job opportunities for the local peoples, gain market share for rail and intermodal operators, and so on.
On one hand, dry port operation can deliver many benefits to the players of the scene, but, on the other hand, there are bunch of difficulties to establish the dry port operations such as, big investment amount of the dry port project will be needed, there is no specific and single policy or regulation exclusively designated for dry ports, usually low Internal Rate of Return (IRR) for the dry port projects and so on.

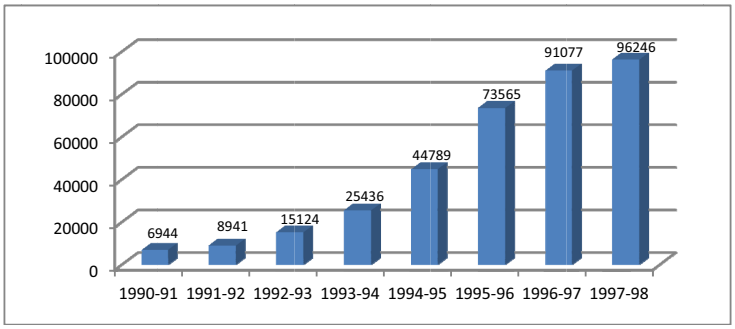
Last, but not least important thing is that there must be right time and right place for the implementation of the dry port for the harmonization of maritime, port and logistics sectors.

PORT DEVELOPMENT AND DRY PORT ESTABLISHING IN THE PAST

The Yangon Port which is the river port and premier port of Myanmar lies along the Yangon River at the Yangon city. All ports of Myanmar are administered by single organization Myanma Port Authority (MPA) under the management of Ministry of Transport. Before 1988, Myanmar practiced the Socialist system and almost all the wharves were under the management of the MPA accordingly. Containerization has started in Myanmar since 1981 by MV. Sittwe and MV. Mawlamying which are the vessels from Myanma Five Stars Line (state own shipping line at that time). At the beginning stage, containers were carried together with general cargo as semi-container ship. Introduction of fully containerization in Myanmar was modernized on 31st July 1990 at Bo Aung Kyaw wharf.

During the short terms after starting the dedicated container terminal, the total seaborne traffic in the port of Yangon increased by 40.8% in 1992-93 (compare to that of 1991-92). Container traffic in the port of Yangon also grew by 69.2% in 1992-93 and 72.6% in 1993-94 (compare to those of respective preceding years). At that time, there was only one container terminal and it could not be extended because of the lack of backup area. To cope with the sea borne traffic growth resulting from the economic liberalization program of the country, port development had been carried out by inviting local and foreign investment at Yangon and Thilawa Port area. At the same time, the Inland Container Depot project has been introduced to improve the efficiency of cargo handling operation, decrease stress due to increasing traffic in existing container yard and contribute to economic development.

Figure 1. Container Throughput at Yangon Port (1990-91 to 1997-98)

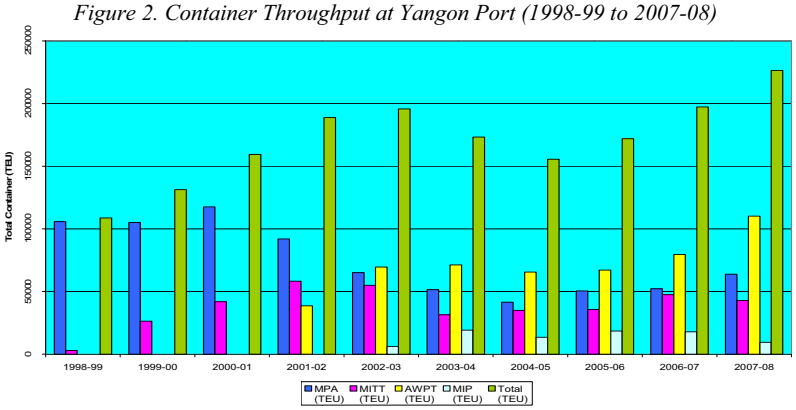


Source: *Myanma Port Authority*

In 1993, Memorandum of Understanding (MOU) was signed between Ministry of Transport (Myanmar) and Samsung Corporation (Korea) for the construction of the inland container depot in Myanmar. "Feasibility study for Inland Container Depot" was undertaken by MPA study team in 1994 and the construction of ICD at the port of Yangon was fully recommended according to the study report. According to the MOU, in 1996, the government of the Republic of Korea had decided to grant the Economic Development Cooperation Fund (EDCF) loan amounting to approximately fifteen million US Dollars to be extended to the Myanma Port Authority of the Union of Myanmar for the implementation of Inland Container Depot Project of Yangon Port. That dry port is a kind of closed dry port (short distance between existing port) which has the area of 60,419 Sq. m and container storage capacity of 2,822 TEUs, and it could be opened in 1999.

According to the market situation of the containerized cargo after opening of ICD, there were mainly two negative impacts on the ICD operation. They are; a) Container traffic has been distributed to private terminals that were allowed with the economic development policy of the country and b) Some investors in the manufacturing sectors terminated their factories because of the negative impacts from the political weather at that time. Figure 2 shows the distribution of the container throughputs to the private terminals namely Myanmar International Terminals, Thilawa (MITT), Asia World Port Terminals (AWPT) and Myanmar Industrial Port (MIP). The decrease of total container throughput will be also noticed after 2002-03 financial year because of some economic sanction from United States (US) and Europium Union (EU).

Figure 2. Container Throughput at Yangon Port (1998-99 to 2007-08)



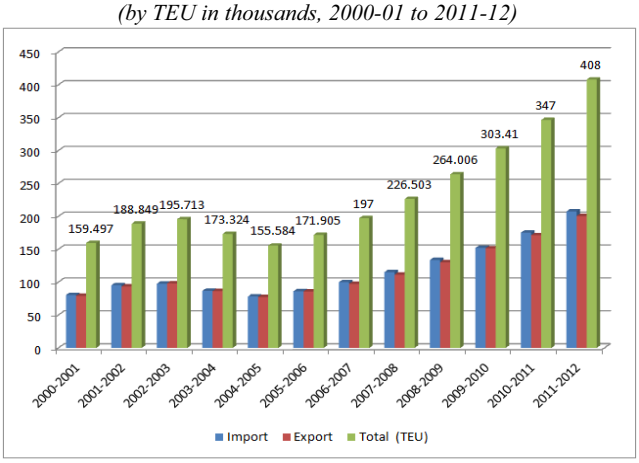
Source: *Myanma Port Authority*

As a consequence of unfavourable market situation of containerized cargo in Yangon port during these periods, ICD could not be used in effective way that the study report analyzed. The lesson learnt from past experience is that timing and harmonizing of the establishment of dry port is quite important.

CURRENT SITUATION OF PORT SECTOR DEVELOPMENT

The Yangon Port (including Thilawa terminal area) at present is the only international port for the country and it can accommodate 24 ocean liners at 24 wharves (18 at Yangon Port and 6 at Thilawa port). All these port areas are situated on the bank of the Yangon river. Yangon port is about 32 km inland from Elephant Point on the Gulf of Martaban which is the mouth of the Yangon river and Thilawa port is just half way to the Yangon port from the mouth of Yangon river. For all vessels calling to the Yangon Port, pilotage is compulsory if they are over 200 GRT. Yangon Port is accessible by vessels of 167m LOA, 9m draft, 15,000 DWT and Thilawa Port is accessible by vessels of 200m LOA, 9m draft, 20,000 DWT. The number of vessels calling at Yangon Port in the 2011-12 fiscal year was 1833. The port handled more than 408,000 TEUs and 20.408 million metric tons of cargo in the same fiscal year. Figure 3 show the trend of containerized cargo handling in Yangon port for last 12 years. It shows gradual development of container throughput at Yangon Port (about 15% to 18% annual increase of containerized cargo for 7 years continuously).

Figure 3: Volume of containers handled in port of Yangon (including Thilawa)
(by TEU in thousands, 2000-01 to 2011-12)



Source: *Myanma Port Authority*

In parallel, it may need to upgrade existing port infrastructure which shall include, but not be limited to, wharf strengthening, installation of modern cargo handling facilities, providing navigation aids and other related facilities to cater for 35,000 DWT vessels and to cope with the growth of seaborne cargo traffic. MPA has been implementing the Joint Venture plan for the existing Sule conventional wharves to upgrade as multipurpose container terminals. MPA has been also planning to conduct a detailed feasibility study on Yangon River Improvement and Strengthening of Existing Port Facilities by inviting foreign and local interested parties to cooperate.

Apart from the Yangon port development projects, Myanmar has other potential projects related to implementation of the deep seaports in Kyauk Phyu (western part of Myanmar in Rakhine State at Bay of Bengal) and Dawei (Southern part of Myanmar in Tanintharyi Division) area.

POSSIBILITY OF DRY PORT ESTABLISHMENT IN MYANMAR

Myanmar is located at the strategic location that is potentially become as a regional hub of Asia. She also has long coast line. Moreover, Asia Highway network and Trans-Asian Rail (TAR) Network have been passing through Myanmar. The Myanmar government well understood that the geographical location of the country itself favours the country to be a land-bridge connecting South-East Asia and South Asia as well as with China. If Myanmar can use her geographical advantages to neighboring countries, actively participate in the international & regional cooperation, and can upgrade and develop transport infrastructures with her own resources, Myanmar will have great potential for it to be a regional hub of the continental South East Asia and Greater Mekong Sub-region (GMS) (Country report, 2012).

Maritime traffics and trade of Myanmar have been increasing year by year and border trade between neighbouring countries, especially with China, has been also boosting annually. Additionally, regional development conditions and political situation are potentially favourable to establish the dry port in Myanmar.

UNESCAP member countries have to consider the following suggestions by the secretariat of UNESCAP about the implementation of a dry port in their respective countries; a) prioritizing development of dry ports in their country; b) assessing challenges and opportunities for development of dry ports; and c) institutionalizing development of dry ports at the national level (UNESCAP, 2012b).

Myanmar, as a member of UNESCAP, involved the meeting with the officials from UNESCAP in December 2011 under the project of "Capacity building for dry port planning through prefeasibility studies of selected dry ports in ASEAN Subregion" which is financially supported by Korea Maritime Institute (KMI). According to the requirement of UNESCAP and regional development of the country, Mandalay region has been selected as the planned or potential dry port (as a distance dry port) in Myanmar for prefeasibility study.

COOPERATION OF KOREA

Korea is the leading country in the maritime and logistics industries. Ministry of Land, Transport and Maritime Affairs (MLTM), Korea noted that Korea seeks to plan the role of the main logistics hub of the Northeast Asian economy and take the initiative in the region's economic evolution.

International Port and Logistics Development Cooperation Program (IPDCP) is the one of the cooperation programs from Korea that provides the assistant to the developing countries related to the port and logistics issues. MLTM has been currently engaged in active implementation of maritime and port related infrastructure cooperation projects in various countries. Especially in port and shipping sectors, Korea has been taking the leading role with its wealth of knowhow and technological competitiveness accumulated through operation and development of its ports.

Roadmap towards an integrated and competitive maritime transport in ASEAN has been carried out with the objective to promote the progressive liberalization of maritime transport services in ASEAN. According to that roadmap, there are specific measures for various maritime sectors. For the shipping and port sectors, measure 5 (Develop a database of maritime trade movements to and from within ASEAN) and measure 7 (Identify required improvement areas in ASEAN network port performance and capacity, based among others, on regular forecasts of maritime trade and requirements) has been implemented by the cooperation of the Republic of Korea.

Development of dry port is important for Myanmar to improve multimodal transport and logistics system. Recently, "Pre-feasibility study of the establishing of dry port in Myanmar" had been carried out under the project "Capacity building for dry port planning through prefeasibility studies of selected dry ports in ASEAN subregion" that has been under the guidance of UNESCAP and funded by Korea Maritime Institute (KMI).

Myanmar also already proposed some possible projects to the ASEAN-ROK Transport Cooperation Roadmap. One of them is "Establishing Dry Ports in Myanmar". It was selected in the 27 joint projects for the period 2010-2015. So, extensive cooperation and support from Korea for the establishing of dry port will be highly expected.

CONCLUSION

In Asia, some dry ports have proved to be very successful but some dry ports have been struggling with business. UNESCAP suggested that dry port must be developed at the right time, in the right place, with the right functions and services, with the right management and strategy, and with the right support from government and industry. Regarding to the implementation of the dry port in Myanmar, the right cooperation will be also one of most important factors to be considered. Positive Political Reforms have seen improvements these years and they signal the future development in trade and economy. Thus, it is highly appropriate to consider the extension of Korea-Myanmar cooperation to be the right time. Finally, the New Investment Law has been approved by the President of Union of Myanmar. As the Law favours Foreign Direct Investment, investment from Korea in Dry Port of Myanmar can be regarded as a potential business cooperation creating win-win situation for both countries in addition to previous co-operation.

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KMI

Establishing of Dry Port in Myanmar and Korea's cooperation

Korea-Myanmar Ocean Forum

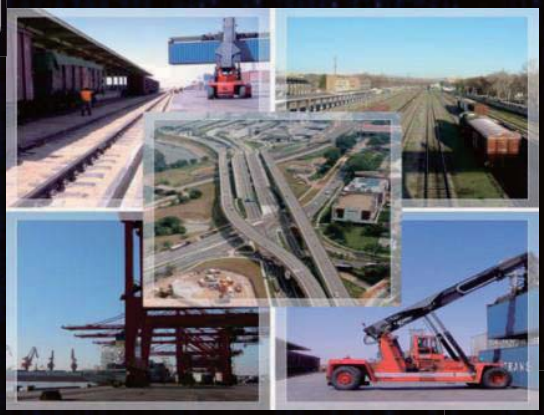
7th November, 2012

Myo Nyein Aye

Contents

- Introduction
- Dry port concept
- Port development and dry port establishing in the past
- Current situation of port sector development
- Possibility of dry port establishment in Myanmar
- Cooperation of Korea
- Conclusion

Introduction



Introduction

- Myanmar is situated at the most western part of South East Asia region
- Long coastal line with 2,229 kilometer.
- member of
  - the United Nations (UN),
  - Association of Southeast Asian Nations (ASEAN),
  - Bay of Bengal Initiative for Multi Sectoral Technical and Economic Cooperation (BIMST-EC)
  - the Greater Mekong Sub-region (GMS)

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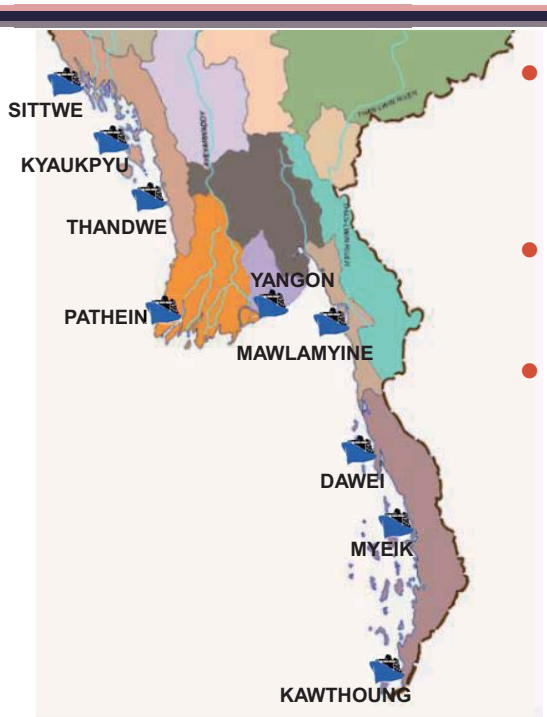
Introduction



- Myanmar has a total of nine ports catering mainly for its seaborne and coastal trade
- Spreading over the whole coastline
- Yangon is the main port city of Myanmar (former capital city)

Introduction

Maritime related sectors

- Vital roles for the enhancement of regional economic development and economy of country itself
- Establishment of dry port at the right time and right place is also important

Introduction

Dry port development in Myanmar

- Closely related to the supports and cooperation from Korea.
- Myanmar has already proposed seven potential sites of international importance
- Pre-feasibility study of establishing a Dry Port in Mandalay region (middle part of Myanmar) has been recently carried out
- The intergovernmental agreement on dry ports is also ready to be signed

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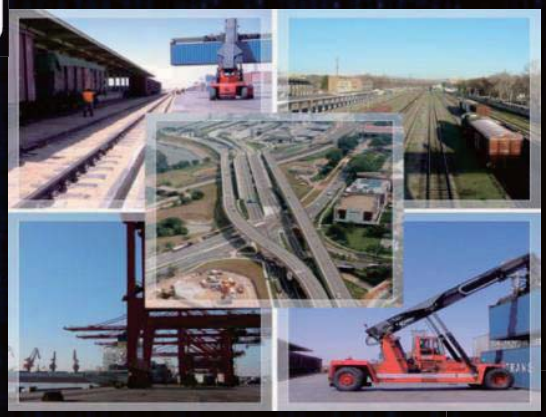
Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port concept



Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port concept

Dry port

- Inland mirror of ocean port

An inland location as a logistics centre connected to one or more modes of transport for the handling, storage and regulatory inspection of goods moving in international trade and the execution of applicable customs control and formalities

(Definition from Ad Hoc Intergovernmental Meeting on Dry Ports)

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Dry port concept

Dry port

- Usually located inland from sea ports and linked to the sea by single mode of transport or more.
- May be established and effective utilized whether a country has sea ports or is land-locked

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Dry port concept

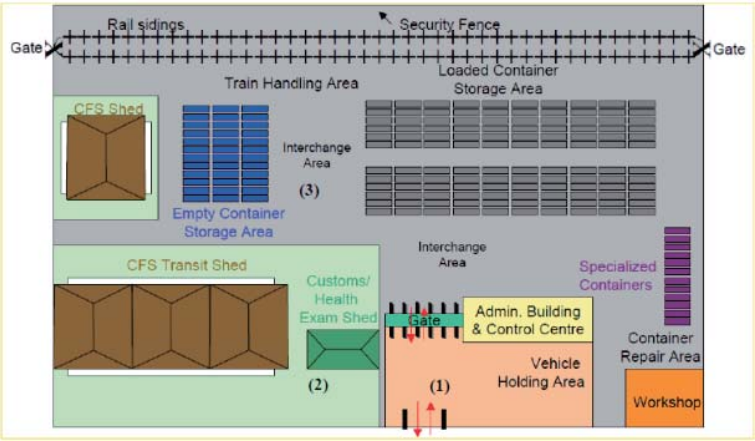
Types of dry port

- a) Distant dry port,
- b) Midrange dry ports
- c) Close dry ports

Dry port concept

Main functions of the dry port

- transport logistics attributes,
- warehouse logistics attributes,
- international port attributes
- value-add logistics services.



Dry port concept

Benefits of the dry port (direct)

- Increases seaport capacity
- Increases seaport productivity
- Reduces congestion at seaports and in the seaport cities
- Reduces risk for road accidents and road maintenance cost as well
- Lowers environmental impact
- May serve as a depot
- Improves seaport's access to areas outside its traditional hinterland

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Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port concept

Benefits of the dry port (indirect)

- job opportunities for the local peoples
- gain market share for rail and intermodal operators

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Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port concept

Some drawbacks of the dry port

- big investment amount of the dry port project will be needed,
- no specific and single policy or regulation exclusively designated for dry ports
- Internal Rate of Return (IRR) for the dry port projects will be very low

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Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port concept

Important factors

- there must be right time and right place for the implementation of the dry port
- the harmonization of maritime, port and logistics sectors

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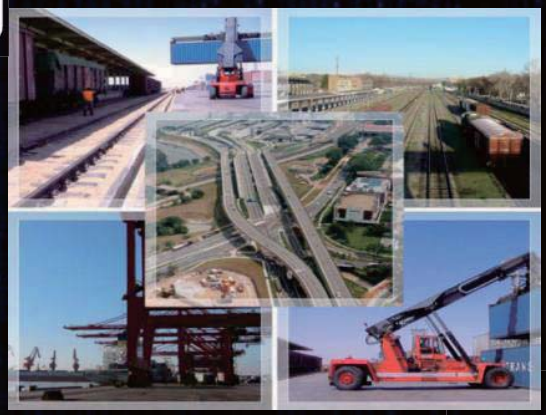
Establishing of Dry Port in Myanmar and Korea's cooperation

Port development and dry port establishing in the past



Port development

- The Yangon Port is the river port and premier port
- All ports of Myanmar are administered by single organization Myanma Port Authority (MPA) under the management of Ministry of Transport.

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Port development

- Containerization has started in Myanmar since 1981 by MV. Sittwe and MV. Mawlamying which are the vessels from Myanma Five Stars Line.
- Containers were carried together with general cargo as semi-container ship.
- Introduction of fully containerization in Myanmar was modernized on 31st July 1990 at Bo Aung Kyaw wharf.

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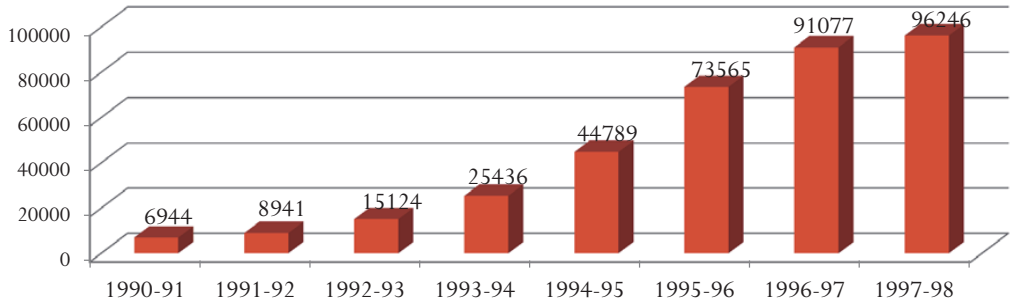
Establishing of Dry Port in Myanmar and Korea's cooperation

Port development

- Total seaborne traffic in the port of Yangon increased by 40.8% in 1992-93 (compare to that of 1991-92).
- Container traffic in the port of Yangon also grew by 69.2% in 1992-93 and 72.6% in 1993-94



Container Throughput at Yangon Port (1990-91 to 1997-98)

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Establishing of Dry Port in Myanmar and Korea's cooperation

Port development

To cope with the sea borne traffic growth

- port development had been carried out by inviting local and foreign investment at Yangon and Thilawa Port area
- the Inland Container Depot project has been introduced
  - to improve the efficiency of cargo handling operation,
  - decrease stress due to increasing traffic in existing container yard
  - contribute to economic development.

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Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port establishing in the past

the government of the Republic of Korea had decided to grant the Economic Development Cooperation Fund (EDCF) loan

1996

1994

"Feasibility study for Inland Container Depot" was undertaken by MPA study team

1993

Memorandum of Understanding (MOU) was signed between Ministry of Transport (Myanmar) and Samsung Corporation (Korea)

Inland Container Depot

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Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port establishing in the past

Inland Container Depot

- (EDCF Loan of Exim Bank, Korea)
- That dry port is a kind of closed dry port

- **Container Yard Area**
  - **– 60419 Sq. m**
- **Container Storages Capacity**
  - **– Laden - 1962 TEUs**
  - **– Empty - 800 TEUs**
  - **– Reefer - 60 TEUs**
  - **– Total - 2822 TEUs**
- **Opened in 1999**

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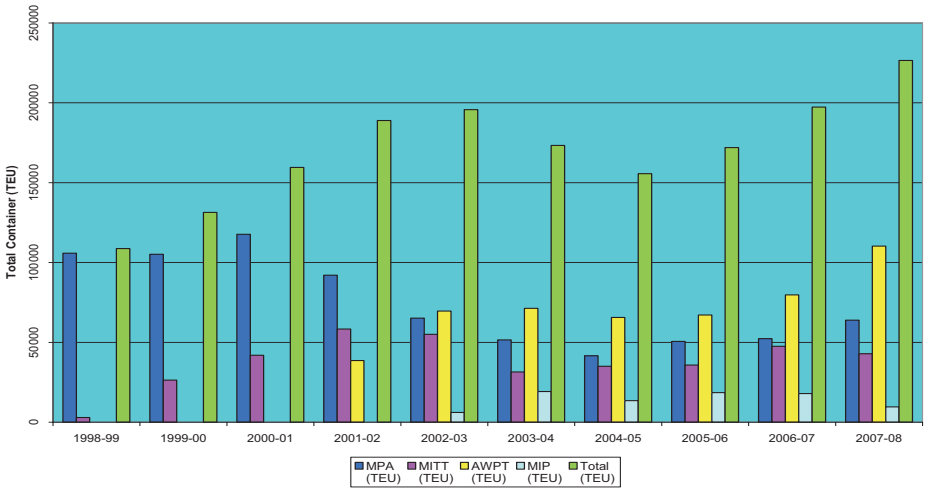
Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port establishing in the past

Situation changed

- Container traffic has been distributed to private terminals
- Some investors terminated their factories



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Establishing of Dry Port in Myanmar and Korea's cooperation

Dry port establishing in the past

As a consequence of unfavourable market situation

- ICD could not be used in effective way that the study report analyzed.
- The lesson learnt from past experience is that timing and harmonizing of the establishment of dry port is quite important.

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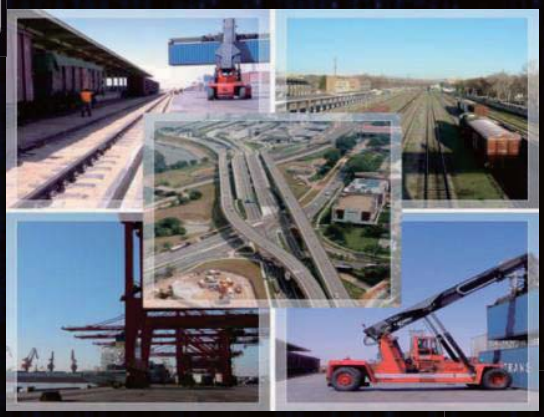
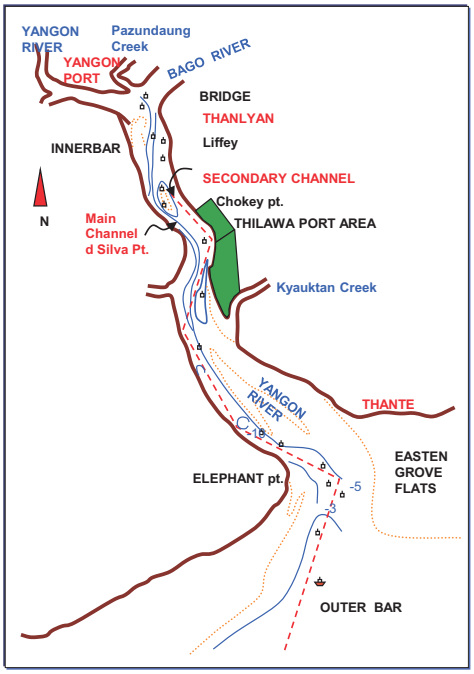
Current situation of port sector development



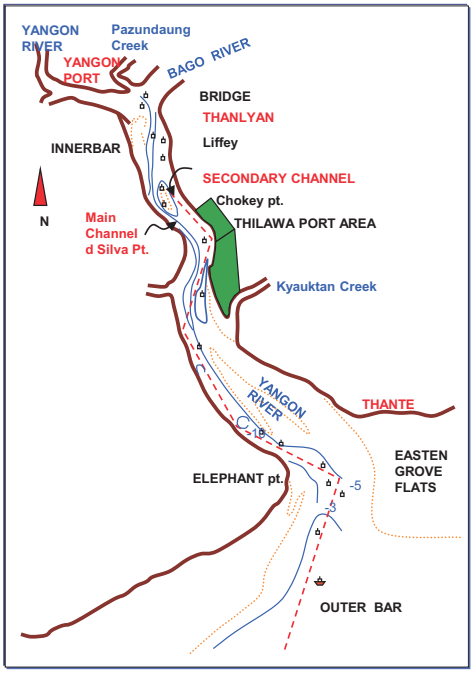
Current situation of port sector development

- The Yangon Port is the river port and premier port of Myanmar
- lies along the Yangon River at Yangon city.
- It can accommodate 24 ocean liners at 24 wharves (18 at Yangon Port and 6 at Thilawa port).



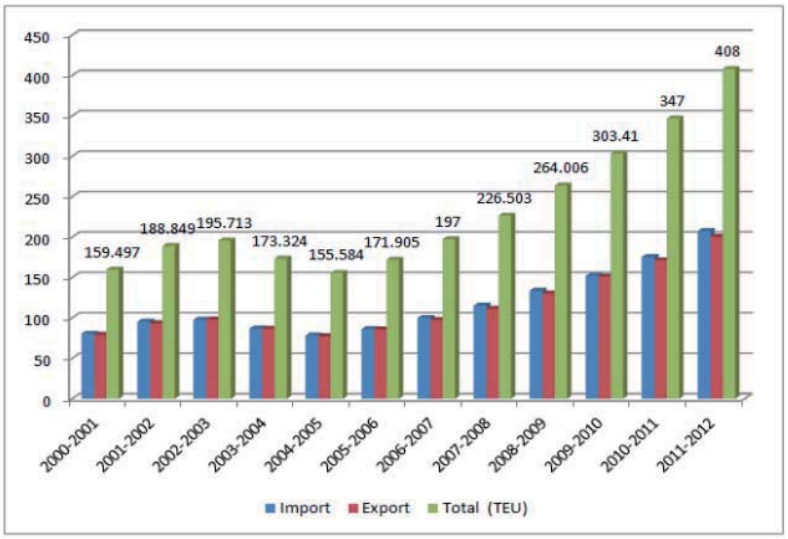
Current situation of port sector development

- **Yangon Port**
  - *15000 DWT*
  - *LOA 167 m*
  - *Draft 9 m*
- **Thilawa Port**
  - *20000 DWT*
  - *LOA 200 m*
    (for cruise vessel up to 268 m)
  - *Draft 9 m*



Current situation of port sector development

- *Volume of containers handled in port of Yangon (including Thilawa)*
  (by TEU in thousands, 2000-01 to 2011-12)



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Current situation of port sector development

- Need to upgrade existing port infrastructure
  - wharf strengthening,
  - installation of modern cargo handling facilities,
  - providing navigation aids and other related facilities
  - to cater for 35,000 DWT vessels
  - to cope with the growth of seaborne cargo traffic.
- Joint Venture plan for the existing Sule conventional wharves upgrading
- Detailed feasibility study on Yangon River Improvement and Strengthening of Existing Port Facilities by inviting foreign and local interested parties to cooperate.

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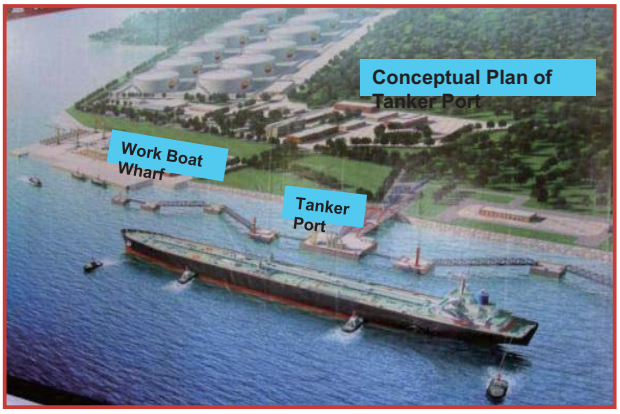
Current situation of port sector development

Potential deep seaports development

- Kyauk Phyu
  (western part of Myanmar in Rakhine State at Bay of Bengal)



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Establishing of Dry Port in Myanmar and Korea's cooperation

Current situation of port sector development

Potential deep seaports development

- Dawei
  (Southern part of Myanmar in Tanintharyi Division)

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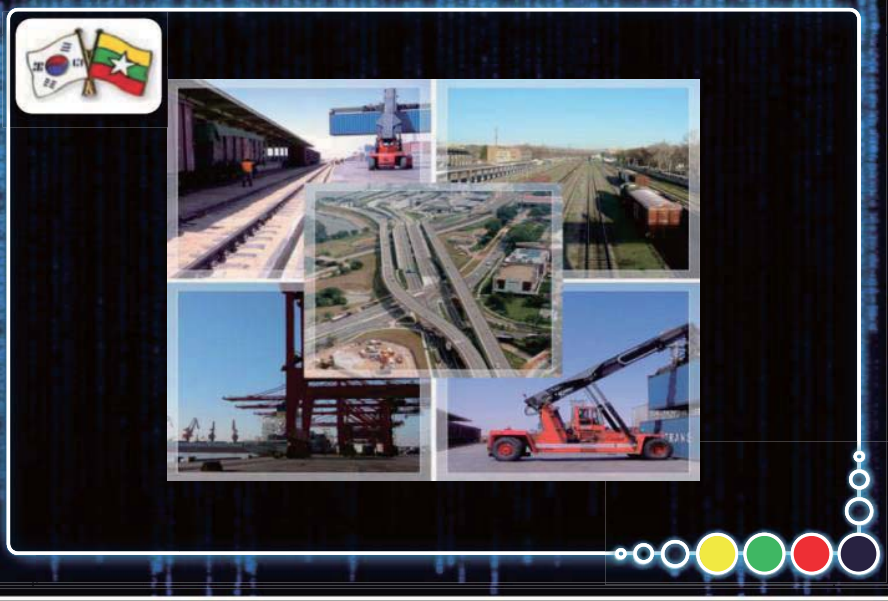
Establishing of Dry Port in Myanmar and Korea's cooperation

Possibility of dry port establishment in Myanmar



Possibility of dry port establishment

Myanmar

- the strategic location that is potentially become as a regional hub of Asia
- Long coast line.
- Asia Highway network and Trans-Asian Rail (TAR) Network have been passing through
- he country to be a land-bridge connecting South-East Asia and South Asia as well as with China.

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Possibility of dry port establishment

Myanmar

- Great potential for it to be a regional hub of the continental South East Asia and Greater Mekong Sub-region (GMS)

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Possibility of dry port establishment

Myanmar

- Maritime traffics and trade of have been increasing year by year
- Border trade between neighbouring countries, especially with China, has been also boosting annually.
- Regional development conditions and political situation are potentially favourable to establish the dry port in Myanmar.

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Possibility of dry port establishment

Some key recommendations from UNESCAP

a) prioritizing development of dry ports in their country;

b) assessing challenges and opportunities for development of dry ports;

c) institutionalizing development of dry ports at the national level

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Possibility of dry port establishment

UNESCAP meeting

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

- "Capacity building for dry port planning through prefeasibility studies of selected dry ports in ASEAN Subregion" in 2011
- Financially supported by Korea Maritime Institute (KMI).

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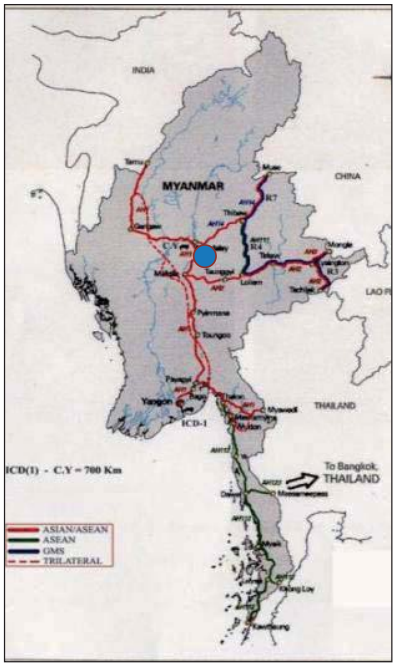
Possibility of dry port establishment

Proposed location

- Mandalay region has been selected as the planned or potential dry port (as a distance dry port) in Myanmar for prefeasibility study.



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Establishing of Dry Port in Myanmar and Korea's cooperation

Cooperation of Korea

Establishing of Dry Port in Myanmar and Korea's cooperation

Cooperation of Korea

The Republic of Korea

- The leading country in the maritime and logistics industries.
- Seeks to plan the role of the main logistics hub of the Northeast Asian economy and take the initiative in the region's economic evolution.

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Establishing of Dry Port in Myanmar and Korea's cooperation

Cooperation of Korea

International Port and Logistics Development Cooperation Program (IPDCP)

- Provides the assistant to the developing countries related to the port and logistics issues.
- Active implementation of maritime and port related infrastructure cooperation projects in various countries.

- Especially in port and shipping sectors, Korea has been taking the leading role

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Establishing of Dry Port in Myanmar and Korea's cooperation

Cooperation of Korea

Cooperation of Korea in ASEAN

- Roadmap towards an integrated and competitive maritime transport in ASEAN
  - measure 5 (Develop a database of maritime trade movements to and from within ASEAN)
  - measure 7 (Identify required improvement areas in ASEAN network port performance and capacity, based among others, on regular forecasts of maritime trade and requirements)

Cooperation of Korea

Cooperation for Dry port

- Development of dry port is important for Myanmar to improve multimodal transport and logistics system
- "Pre-feasibility study of the establishing of dry port in Myanmar" had been carried out
  - under the guidance of UNESCAP
  - funded by Korea Maritime Institute (KMI).

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

KMI

Cooperation of Korea

ASEAN-ROK Transport Cooperation Roadmap.

- "Establishing Dry Ports in Myanmar".
- It was selected in the 27 joint projects for the period 2010-2015.
- Extensive cooperation and support from Korea for the establishing of dry port will be highly expected.

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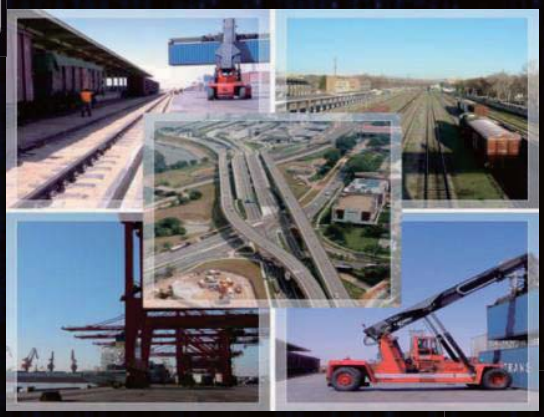
Establishing of Dry Port in Myanmar and Korea's cooperation

Conclusion

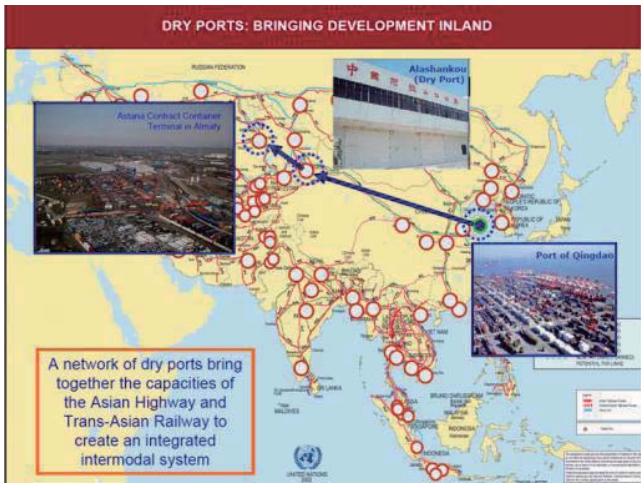


Establishing of Dry Port in Myanmar and Korea's cooperation

Conclusion

In Asia

- Some dry ports have proved to be very successful but some dry ports have been struggling with business.



Conclusion

UNESCAP 's Suggestion

- Dry port must be developed
  - at the right time,
  - in the right place,
  - with the right functions and services,
  - with the right management and strategy,
  - with the right support from government and industry.

the right cooperation will be also one of most important factors to be considered

Conclusion

Korea-Myanmar cooperation

- Positive Political Reforms have seen improvements
- They signal the future development in trade and economy.
- Highly appropriate to consider the extension of Korea-Myanmar cooperation to be the right time.

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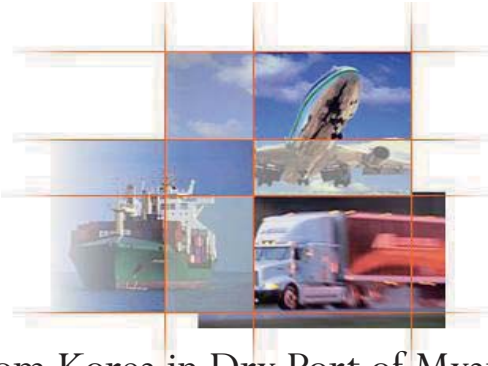
Establishing of Dry Port in Myanmar and Korea's cooperation

Conclusion

- the New Investment Law has been approved



- Investment from Korea in Dry Port of Myanmar can be regarded as a potential business cooperation
- creating win-win situation for both countries in addition to previous co-operation.

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Establishing of Dry Port in Myanmar and Korea's cooperation

Establishing of Dry Port in Myanmar and Korea's cooperation

Thanks for your kind attention!

Myo Nyein Aye

TOPIC 3 :

Korea-Myanmar cooperation in marine industries

Brief Curriculum Vitae

Dr. An is the senior researcher in Marine Industry & Tourism Research Department, Korea Maritime Institute (KMI). He is a Ph.D. in Accounting (minor Finance).
His main research areas are valuation, earnings quality, and corporate governance based on accounting and finance methodology. Current research topics are focused on offshore industry and marine technology valuation.

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Cooperation between Korea and Myanmar in Maritime Industries

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Abstract

Myanmar possesses a long coastal line of 2,832 kilometer, several ocean and maritime related businesses have been developed over the years. The major areas of such business include shipping and seafarers, fisheries & aquaculture, port & shipbuilding, and offshore oil & gas exploration and production. In this regard, Myanmar cooperated with some foreign countries to do such kind of business by inviting participation in terms of technical know-how and capital investment. This paper will present the five cooperation ways between Republic of Korea and Union of Myanmar in developing marine industries. In addition, a feasible business for further cooperation will also be discussed in the paper.

Keywords: Marine Industries, Shipbuilding, Offshore Plant, Business Cooperation

I. Trend of Korea's Marine Industries

Korean government pronounced "Ocean Plan 21 in Korea" as a comprehensive national plan on the ocean. This plan targets increase of GDP contribution by ocean industry from 5.6% in 2009 to 7.6% in 2020. In this plan, marine technology development is one of the major sub-plans.

National requirement and growth potential of Marine industry lead continuous growth of R&D budget investment for Marine Technology Sector. Annual growth rate of budget is 20% for recent 5 years ('07~'11). Even though R&D investigation of Korea is lower than USA (12.4 times) and Japan (3.1 times) in Marine Technology Sector, Korea is one of the major marine investment countries in the world.

II. Strength of Korea's Marine Industries

Korea has several strong marine industries. First of all, Korea is the best country in the shipbuilding industry. As of 2010, the total sales of 'Big 4' Korean shipbuilders, Hyundai Heavy Industry, Samsung Heavy Industry, Daewoo Ship & Marine, and STX Offshore & Shipbuilding were $44.8 billion which is 60% of global shipbuilding market. If this trend continues, the market share will increase as 70% ($58.9 billion) of global market in 2015.

Second, Korea is the number one country in the area of offshore plant construction. Korean 'Big 4' shipbuilders dominate new offshore plant construction order. Korean shipbuilders are the only company to construct mega-sized offshore plant including FPSO, FSO, FSRU.

Third, Korean national explore and production companies, Korea National Oil company (KNOC) and Korea Gas company (KOGAS) are vitally investing many oil and gas field across the world. In addition, Korean private company, Daewoo International is a major concessionaire of Shwe offshore gas field in Myanmar.

Forth, Korean company has leading technology on offshore windfarm as a renewable energy sector. Korean government announced "Offshore Windfarm Roadmap" to invest US$ 82billiion by 2019 as well as.

In summary, Korea is one of the leading marine technology countries and continuously invests marine R&D.

III. Potential of Myanmar

Despite global economy depression since 2008, Myanmar's economy has been steadily increased. Real GDP growth in Myanmar is projected to increase to 6 percent in FY2012/13, from an estimated 5.5 percent in the current year, driven by commodity exports and higher investment on the back of improved business confidence. In addition, inflation rate is gradually decreasing so that Myanmar's economy can be expected to approach stable stage.Myanmar's long-term economic potential is high. With appropriate reforms, Myanmar could turn to its advantage its rich natural resources (natural gas, gems, minerals, and forestry products), a young labor force, and proximity to some of the most dynamic economies in the world, lifting growth and improving living standards.

Traditionally, Myanmar's core industry was agriculture. Even though agriculture is still major industry, manufacturing sector is rapidly increasing as well as transportation and communication sector. It means the central axis of Myanmar's industry is moving to manufacturing. For example, the proportion of agriculture of GDP was 57.24 percent in 2000, while manufacturing proportion of GDP was only 7.62 percent. However, in 2008, agriculture proportion of GDP dropped 40.28 percent, whereas manufacturing proportion of GDP was doubled (16.82%). Thus, Myanmar's economy gradually is becoming gradually industrialization.

Myanmar is a country which owns huge natural gas deposits mainly in three offshore areas including Mottama, Rakhine and Taninthayi. Accordingly, many countries not only from member countries of the Association of South East Asian Nations such as Thailand, Indonesia, Malaysia, Singapore and Vietnam, but also from other regions such as China, South Korea, India, Australia, Britain, Canada and Russia are now cooperating with the MOGE to strengthen the offshore oil & gas exploration and production commitment by a production sharing contract (PSC). Myanmar's rich resources furnish the potential for substantial long-term increases in income, exports and living standards.

IV. Cooperation between Korea and Myanmar

Korea ranked 10th major trade partners with Myanmar and 33 Korean companies are doing business across various Myanmar's industries. In order to expand cooperation between Korea and Myanmar, several feasible cooperation ways would be suggested.

In Myanmar, shipbuilding sector needs to be developed in accordance with the future prospect. There are some reasons to cooperate effectively between Myanmar and Korea on shipbuilding business such as: (1) Korea is one of the major shipbuilding countries in Asia, and it is possible to share knowledge and technical know-how of shipbuilding with Myanmar, (2) there is a strong enough labor force in Myanmar so that the production costs will be lower (3) Myanmar belongs to strategic location for shipbuilding business.

The education of marine human resources is appropriate for the cooperation between Myanmar and Korea with some critical reasons such as: (1) the demand for Asian crewmembers continues to trend upwards as their great skill and lower costs become more attractive to ship owners, (2) the shipping industry become more flexible to recruit its crewmember from alternate sources including developing and newly industrialized countries as a result of the development of open registries for ships.

The offshore oil & gas exploration and production is a suitable cooperative business for Korea and Myanmar with a number of reasons including: (1) Myanmar is rich in energy resources such as oil, natural gas, (2) high demand for oil and natural gas is from neighboring countries, especially China, (3) transporting natural gas through pipeline is expected to be a right position in line with the project of regional multimodal development corridor such as Kyaukphyu-Mandalay-Kunming multimodal development corridor.

Cooperation between Korea & Myanmar in Marine Industries

November 06 , 2012

KMI 한국해양수산개발원
KOREA MARITIME INSTITUTE

Senior Researcher
Ph.D Yohan An

Contents

1 Trends of Korea's Marine Industries

2 Strength of Korea's Marine Industries

3 Potential of Myanmar

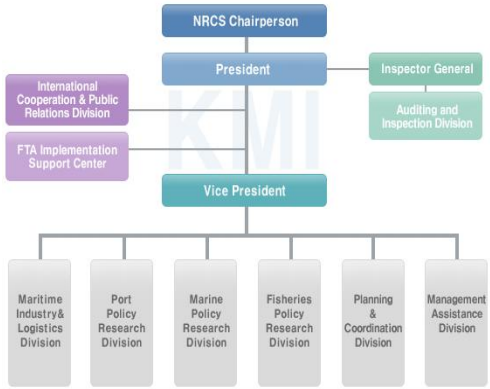
4 Cooperation Between Korea and Myanmar

At a Glance

KMI FUNCTIONS

- **Think tank for developing national policies on marine affairs and fisheries**

- Study, research and consulting related to marline affairs, fisheries, shipping and port related policies
- Collecton, analysis and distribution of Information on marine affairs, fisheries, shipping and port Industries in Korea and other countries
- Cooperation and information exchange with fisheries-related industry, academia, research institute and government agencies overseas
- Research activities conforming to KMI's mission and joint research with related institutes at home and abroad



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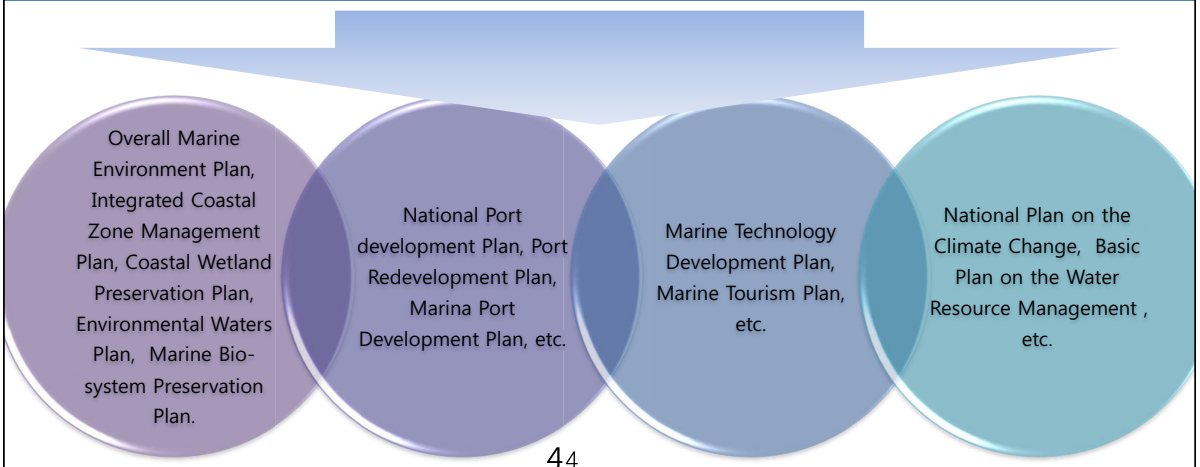
1. Trends of Korea's Marine Industries

- Ocean Plan in Korea
  - Comprehensive national plan on the ocean
  - Increase of GDP contribution by ocean industry from 5.6%(2009) to 7.6%(2020)

The 2nd National Ocean Plan(2011-2020)



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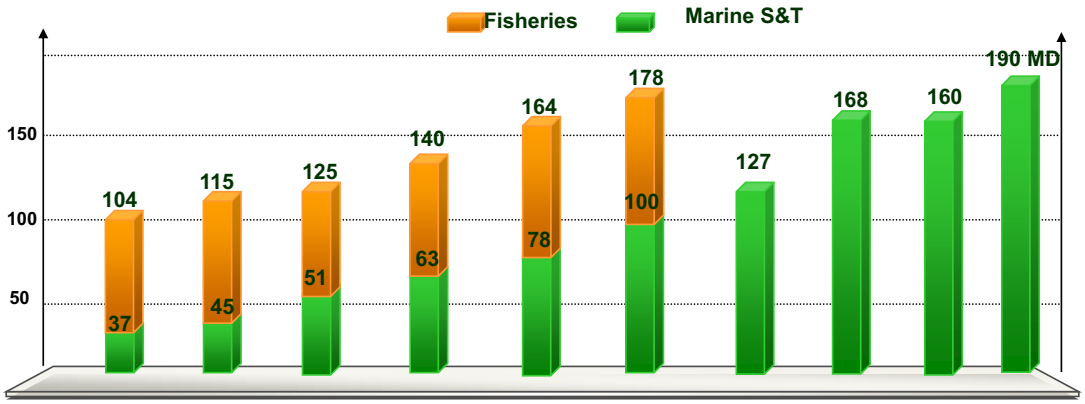
1. Trends of Korea's Marine Industries

National requirement and growth potential of Marine industry lead continuous growth of R&D budget investment for Marine Technology Sector

- Annual growth rate of budget is 20% for recent 5 years ('07~'11).



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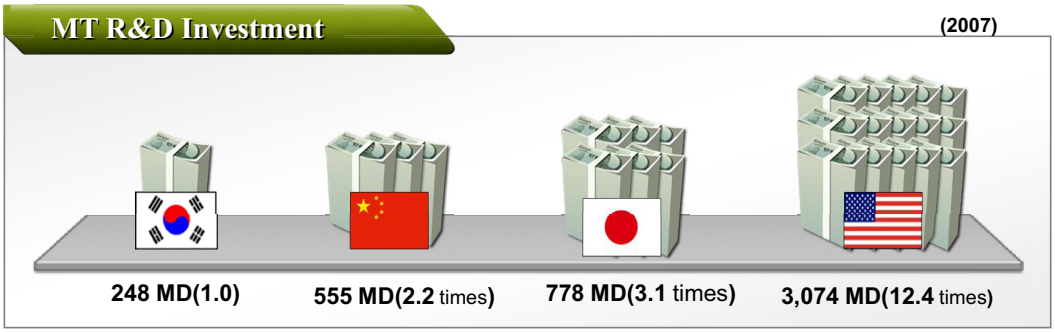
1. Trends of Korea's Marine Industries

✓Korea is one of the major marine investment country in the world

✓ R&D investigation of Korea is lower than USA (12.4 times) and Japan (3.1 times) in Marine Technology Sector



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2. Strength of Korea's Marine Industries

1) Shipbuilding

- ◆ The total sales of Korea's 'big 4' shipbuilders are $44.8 billion in 2010, which is 60% of global market.
- ◆ If this trend continues, the market share will increase as 70%($58.9 billion) of global market in 2015.

	1940's	1950's	1960's~1980's	1990's~2000's	2010's
England	Price Competitiveness	Technology competitiveness Diversity of Products	Gov't subsidy	Privatization Disposal by sale	
America	Wartime Defense industry		Special ship	Subsidy, warship	
W.Europe		Price Competitiveness	Restructuring, Product specialization	Subsidy, Knowledge industry	
Japan		Gov't lead industry	Price Competitiveness	Technology competitiveness Diversity of Products	
Korea			Gov't lead industry	Price Competitiveness	Technology competitiveness High-tech Products
China				Gov't lead industry	Price Competitiveness

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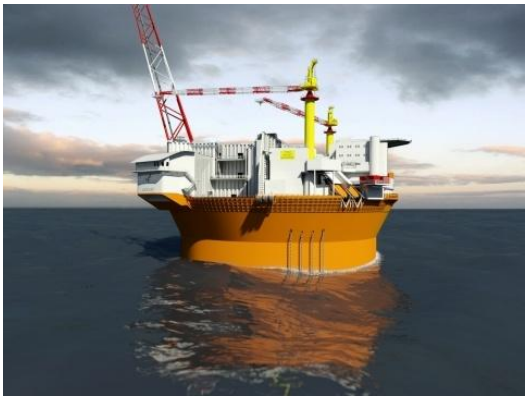
2. Strength of Korea's Marine Industries

2) Offshore Plant - Construction

World No. 1

HYUNDAI HEAVY INDUSTRIES CO.,LTD. | SAMSUNG HEAVY INDUSTRIES | DSME | stx Offshore & Shipbuilding



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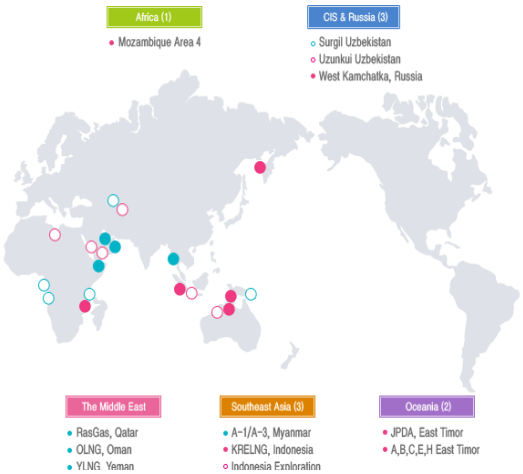
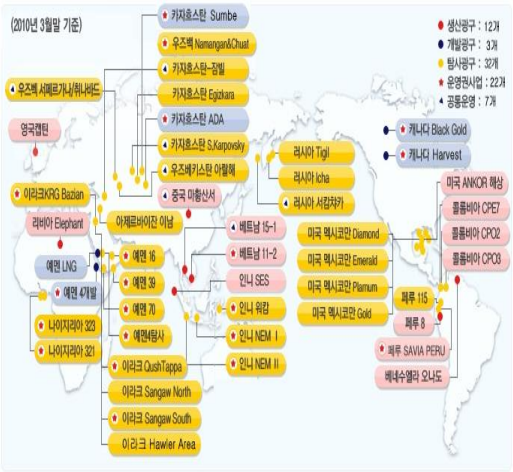
2. Strength of Korea's Marine Industries

2) Offshore Plant – E&P





2. Strength of Korea's Marine Industries

3) Renewable Energy – Offshore Windfarm

- Korean government announced "Offshore Windfarm Roadmap" to invest US$ 82billiion by 2019
- Offshore Windfarm will be placed at west coastline and Jeju Island in Korea
- Target power generation will be 2,500MW

3. Potential of Myanmar

√ In spite of global economy depression, Myanmar's economy is steadily growing (3 years GDP growth is above 5%)
√ Inflation rate has been decreased

MAIN ECONOMIC INDICATORS

Surface Area:	676,6 1000 sq km **
Population:	62,4 Millions of inhabitants - 2011 (estimates after 2006) *
Current GDP:	36,1 Billions of euros - 2011 (estimates after 2009) *
GDP per capita:	577,8 Euros - 2011 (estimates after 2006) *
Exports-to-GDP ratio:	14,2 % (2010) ***
Imports-to-GDP ratio:	21,7 % (2010) ***
Trade-to-GDP ratio:	35,9 % (2010) ****

* : IMF (World Economic Outlook) *** : IMF (DoTS & WEO)
** : World Bank (World Development Indicatotrs)
**** : Trade-to-GDP ratio = (Exports + Imports) / GDP

	2008	2009	2010	2011
Real GDP growth (%, estimates after 2009) *	3,6	5,1	5,5	5,5
Inflation rate (%, estimates after 2009) *	22,5	8,2	8,2	6,7
Current account balance (% of GDP, estimates after 2009) *	-2,2	-1,3	-1,4	-3,0

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3. Potential of Myanmar

√ Rapid Industrialization after 2000

	2000	2008	Changes (2000→2008)
GDP	100.00	100.00	0.00
Agriculture	57.24	40.28	-16.96
Mining	0.59	0.87	0.28
Manufacturing	7.16	16.82	9.66
Electricity, gas, and water	0.13	0.73	0.59
Construction	1.80	4.23	2.43
Trade	24.04	21.13	-2.91
Transport and communications	6.01	12.77	6.76
Finance	0.10	0.07	-0.03
Public administration	1.54	1.37	-0.17
Others	1.38	1.73	0.36

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3. Potential of Myanmar

√ Sufficient Oil and Gas Reserves
√ Myanmar's Core Economy Driver

Current Status of Myanmar's Oil & Gas

Items	Reserves	World Portion	Production (daily)	World Ranking
Petroleum	3,200 mbb	0.25%	6,791 tbb	74th
Gas	16 tcft	1.07%	442 Mmcf	35th

Source: Central Statistics Organization in Myanmar(2011)

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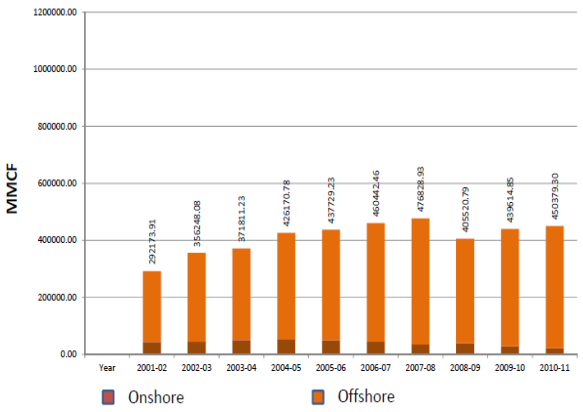
3. Potential of Myanmar

Outlook of Myanmar's Gas Industry

Domestic Gas Supply Projects on 2013
(*unit in mmcfd*)

Project	Demand	Supply	Ratio(%)	Remark
Onshore+ Offshore	590	240	41	Present
Zawtika	73	100		2013
Yadana		50		2013
Shwe	130	100		2013
Total	793	490	62	2013

Gas Production
(Onshore And Offshore)



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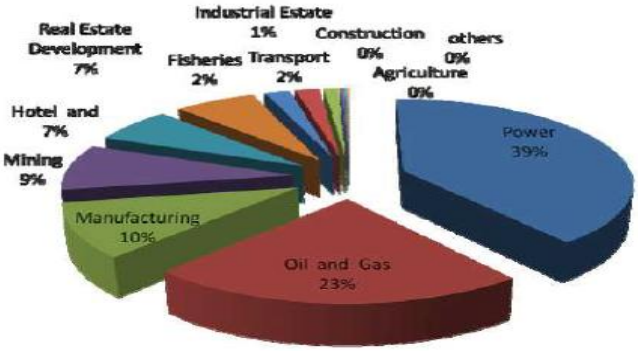
4. Cooperation Between Korea and Myanmar

The Major Trade Partners

Rk	Partners	Mio euro	%
	Extra EU27	3 215 053,0	100,0%
1	United States	444 708,0	13,8%
2	China	428 287,8	13,3%
3	Russia	306 627,1	9,5%
4	Switzerland	212 894,7	6,6%
5	Norway	140 059,6	4,4%
6	Turkey	120 176,0	3,7%
7	Japan	116 415,1	3,6%
8	India	79 676,2	2,5%
9	Brazil	73 481,3	2,3%
10	South Korea	68 475,6	2,1%

	No. of Frims	Amount
Thailand	58	7391.843
U.K	50	1860.954
Singapore	71	1520.213
China	29	1333.939
S. Korea	33	660.747
Hong Kong	32	510.218
France	2	469.000
Switzerlamd	7	269.085
Malaysia	4	266.701
U.S.A	15	243.565



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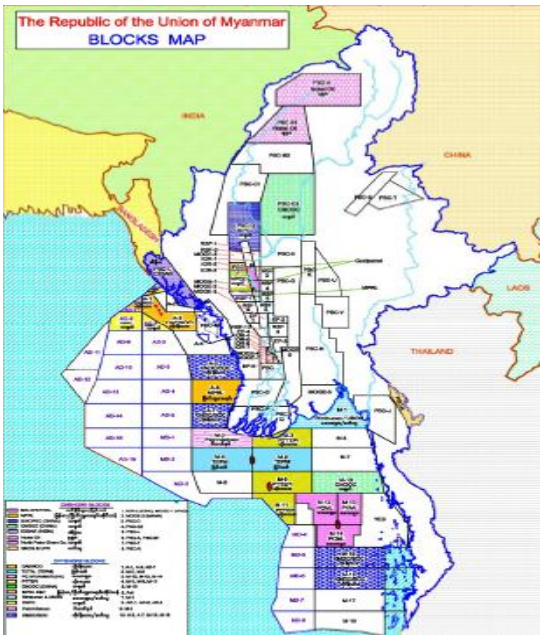
4. Cooperation Between Korea and Myanmar

1) Cooperation in the Development of Shipyard



Myanmar Shipyard (MS)

- ◆ Offshore Support Function
- ◆ Ship Repairing
- ◆ Steel Fabrication
- ◆ MS is capable of building vessels to highest Lloyds and ABS Class Rules
- ◆ MS has experience to build Pilot Vessel, Oil Barge, Tug Boat
- ◆ Rapid development of Offshore Plant ignite demand of OSV

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4. Cooperation Between Korea and Myanmar

1) Cooperation in the Development of Shipyard

Inland Water Transport (IWT)

- ◆ IWT includes four shipyards
- ◆ Fishing Boat
- ◆ Patrol Boat
- ◆ Inland Transportation
- ◆ IWT has provided 20 new vessels since 1988 to use inland transportation
- ◆ IWT has been highly relied on China
- ◆ Ships made in IWT is proper for China's Circumstance
- ◆ Optimization for Myanmar's condition

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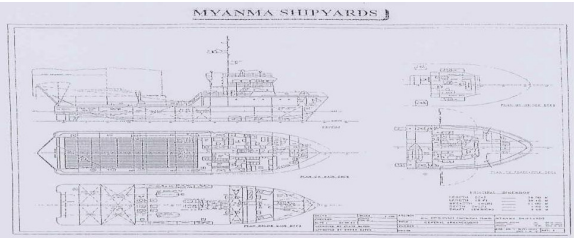
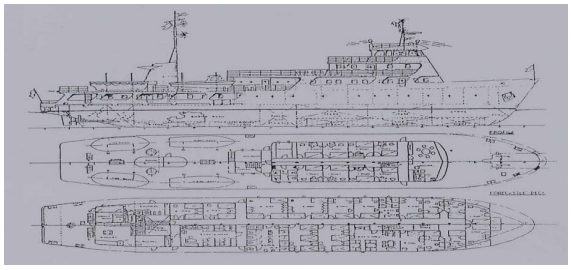
4. Cooperation Between Korea and Myanmar

2) Cooperation in the Development of Shipbuilding for Offshore

Oil Recovery Ship



Pilot Vessel



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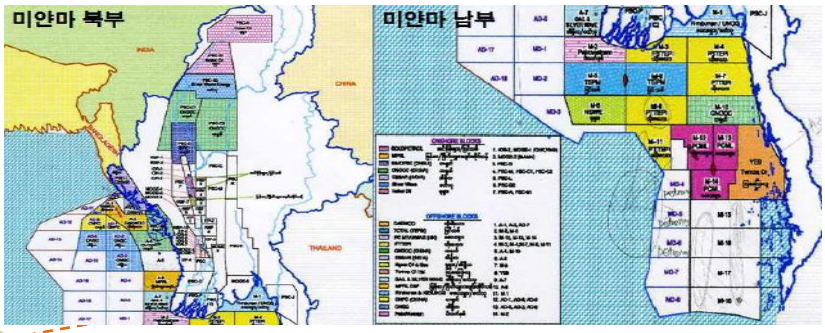
4. Cooperation Between Korea and Myanmar

3) Co-Operation Business in the Offshore Plant

MOE

M.O.G.E. Myanma Oil and Gas Enterprise

MINISTRY OF ENERGY



Joint development of offshore oil,
Co-Operation Offshore Plant

SK energy

DAEWOO INTERNATIONAL

한국석유공사

KOGAS

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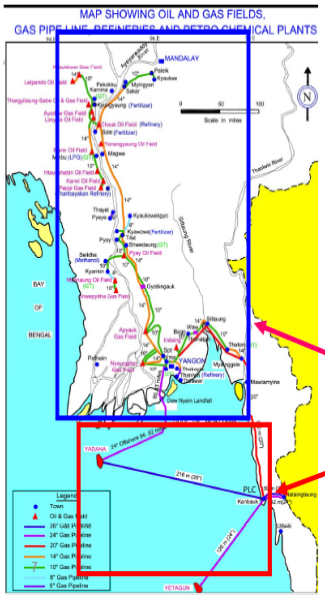
4. Cooperation Between Korea and Myanmar

4) Joint Supply business expansion on Pipe and Jetty



Existing Domestic Natural Gas pipeline

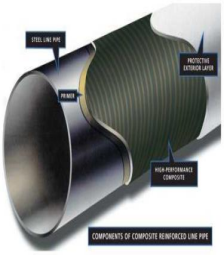
About 1979.91 miles of gas pipeline were constructed in onshore and 520.52 miles in offshore totaling 2500.43 miles

(Pipeline size varies from 6" to 20".)

- Daewoo Int'l , MOGE & CNUOC consortium to provide jetty for pipeline transmission of natural gas
- MPA is responsible to build the jetty within 2 years by BOT(Building, Operation & Transfer) system

Onshore Gas Pipeline

Offshore Gas Pipeline



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4. Cooperation Between Korea and Myanmar

5) Joint Education for Marine Human Resources

- ◆ Government Level
  - ➢ Joint operating a training ship
  - ➢ Joint practice program for offshore plant
- ◆ Private Level
  - ➢ Exchange program among MMU, MMMC, Korea Institute of Maritime & Fisheries Technology etc.
  - ➢ Joint Venture between Myanmar & Korea

	Name of the company	Number of seafarers on board the vessel
1	J.S.M INTERNATIONAL (LASCO)	1565
2	LIZSTAR ENTERPRISE CO; LTD	752
3	BAY POINT MARINE SERVICES	372
4	G.O.O(GOLDEN OCEAN OVERSEA) ENT ERPRISE	223
5	LEO SHIPPING	127

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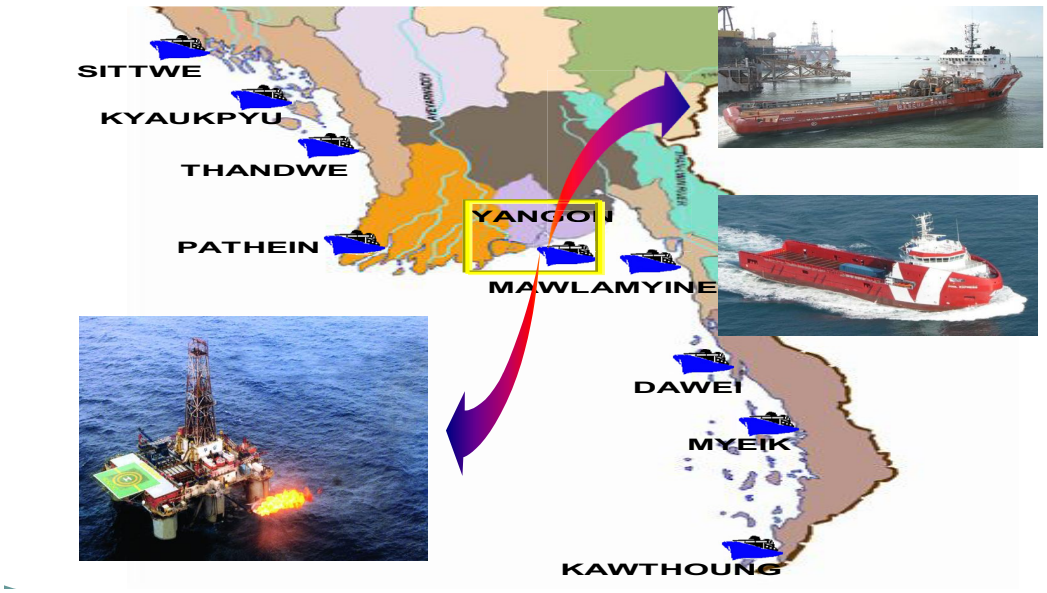
4. Cooperation Between Korea and Brazil

6) Cooperation of Port Development for Offshore Supply Base



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4. Cooperation Between Korea and Brazil

7) Cooperation among the Agencies related to the Marine Industries

	Korea	Myanmar
Exploration& Production	한국석유공사, KOGAS	MOE, Myanma Oil and Gas Enterprise
Education & Training	KOREA INSTITUTE OF MARITIME AND FISHERIES TECHNOLOGY	
R&D : Polices, Technologies	KMI KOREA MARITIME INSTITUTE, 한국조선해양기자재연구원 Korea Marine Equipment Research Institute	MYANMAR MARITIME UNIVERSITY

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Thank You!!

감사합니다 !!

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HTAY AUNG'S BRIEF PERSONAL RESUME

NAME : **HTAY AUNG**

NATIONALITY : **Myanmar**

ACADEMIC QUALIFICATIONS:

1. **M.Sc.** (*Maritime Affairs*, World Maritime University, Sweden)
2. **M.E.** (*Metallurgy*, Yangon Technological University, Myanmar)
3. **B.E.** (*Metallurgy*, Yangon Technological University, Myanmar)

Cert. in:-

1. Maritime English (Sweden)
2. ISPS Code & SOLAS – CSO, SSO, PFSO (Sweden)
3. Advanced Distributed Learning – Maritime Safety & Security (Germany)
4. Logistics in Maritime Dangerous Goods Transport (Sweden)
5. TOT, Training Course for Instructor – IMO Model Course 6.09
6. Managing Corrosion in Oil & Gas Industry (Total E&P Myanmar)
7. Integrated Coastal Management (China)
8. IMO-SMCP Professional Development Course

MEMBERSHIP OF PROFESSIONAL BODIES OR SOCIETIES:

Granted Membership, the Friends of WMU, the Nippon Foundation, Japan
Member, International Maritime Lecturers' Association
Member, Myanmar Engineering Society

CURRENT EMPLOYMENT (2011 July to Now):

Administrative Officer, Director General's Office, Department of Marine Administration, Ministry of Transport, Yangon, MYANMAR.

PREVIOUS EMPLOYMENT (2002 June to 2011 July):

Assistant Lecturer, Department of Naval Architecture & Ocean Engineering
Myanmar Maritime University, Thanlyin Township, Yangon, MYANMAR.

PROFESSIONAL DUTIES:

Drafting and Implementation of Maritime Education and Training in accordance with the National MET Scheme and the IMO-STCW requirements. Legislative and Legal Drafting. Technical co-operations between Training Institutes and the Administration. Syllabus & Curriculum Design and Development. Training Seafarers, Training the Trainers for Maritime Industrial needs. Writing technical and research papers.

BOOKS WRITTEN:

1. *Fundamentals of Ships & Naval Architecture*, March 2011, Department of Naval Architecture & Ocean Engineering, Myanmar Maritime University, Yangon: Myanmar.
2. *Train the Trainer: Training Fundamentals for Maritime Instructors,* May 2012, Published by the Department of Marine Administration, Ministry of Transport, Myanmar.

INTERNATIONAL PUBLICATIONS:

1. *Unconventional Iron- and Steelmaking Techniques Practicable To Myanmar Iron & Steel Industries,* 29th Conference of ASEAN Federation of Engineering Organisations 2011, Sustainable Urbanisation: Engineering Challenges & Opportunities, 27 – 30 November 2011, Bandar Seri Begawan, Brunei Darussalam
2. *Recent Development of Continuous Casting Process in Myanmar*, GMSARN International Conference on Sustainable Development: Challenges and Opportunities for GMS, November 12-14, 2008, China
3. *The art of materials selection in ship construction*, Scandinavian Shipping Gazette, Year Book of Maritime Technology 2007, September 28, 2007
4. *HSLA (High-Strength Low-Alloy) Steels Or Next Generation Shipbuilding Steels*, Alumni Journal 2007, World Maritime University, Sweden

SEMINAR & WORKSHOP PAPERS:

1. *Outlooks on Production Capacity & Consumption of Iron & Steel in Myanmar,* 15th September 2012, A special seminar to the foundation of Myanmar Iron & Steel Institute (Association), International Business Centre, Yangon, Myanmar
2. *Integrated Coastal Management for Developing Countries – Country Report.* Xiamen-Fujian Institute of Oceanography, 6 April to 4 May 2012, Ministry of Commerce, the Peoples' Republic of China.
3. *Workshop Skills Training* (A New Training Scheme for Marine Engineers in place of Dockyard Service), National Seminar on Research and Engineering, 13 – 15 January 2012, Myanmar Engineering Society, Yangon, Myanmar
4. *A Metal Forming Process – Rolling* (Special Seminar Programme of Metallurgical and Materials Engineering Development Committee), 30th April 2011, Myanmar Engineering Society, Yangon, Myanmar
5. *Make or Buy? – General Metallurgical Behaviours & Materials Selection of Certain Gas Turbine Components,* 12th – 13th January 2011, The National Workshop at Exhibition on Gas Turbine & Related Components for Electric Power Stations, Ministry of Electric Power (2), Ahlone Power Station, Yangon, Myanmar
6. *Unconventional Iron- and Steelmaking Techniques Practicable To Myanmar Iron & Steel Industries,* 6th Annual Seminar on Research and Engineering, 7th January 2011, Myanmar Engineering Society, Yangon, Myanmar
7. *The Roles of instructor in MET and Training & Assessment*, Seminar on Maritime Technology – 2010, Ministry of Transport, 5th August 2010, Myanmar Maritime University, Yangon, Myanmar
8. *Multimodal transport (Focus on Land & Inland Water Transport in Myanmar):* Current Status of ASEAN Transport Sector Performance, 23rd July 2010, The National Workshop for ASEAN Strategic Transport Plan - ASTP (2011-2015), Chatrium Hotel, Yangon, Myanmar
9. *Iron Making: Creating the Outsourcing Supply Chain*, 29th April 2010, A special seminar to Htoo Group of Companies, Summit Parkview Hotel, Yangon, Myanmar
10. *Structural Integrity of Hull Steels*, 5th Annual Seminar on Research and Engineering, 16th January 2010, Myanmar Engineering Society, Yangon, Myanmar
11. *Goal-based New Ship Construction Standards*, Maritime Education & Training Team: Workshop Forum (003/2009) 26th December 2009, Myanmar Overseas Seafarers Association, Yuzana Hotel, Yangon, Myanmar
12. *Introduction to Logistics in Maritime Dangerous Goods Transport*, Maritime Education & Training Team: Workshop Forum (001/2009) 10th October 2009, Myanmar Overseas Seafarers Association, Yuzana Hotel, Yangon, Myanmar
13. *Logistics and Supply Chain Management*, Logistics Interest Group: Workshop Forum (1/2009) 30th May 2009, STI Education, #377-Upper Shwebonthar Street, Pabedan Township, Yangon, Myanmar
14. *Estimating Welding Costs (Analysis of Ship Construction Costs)*, 4th Annual General Meeting and Seminar on Research and Engineering, January 8-9, 2009, Myanmar Engineering Society, Yangon, Myanmar
15. *Managing A Maritime University* (Human Resource Development), 20th December 2008, Myanmar Engineering Society, Yangon, Myanmar
16. *HSLA (High-Strength Low-Alloy) Steels Or Next Generation Shipbuilding Steels*, 3rd Annual Seminar on Research and Engineering, 22nd December 2007, Myanmar Engineering Society, Yangon, Myanmar

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MARINE RESOURCES DEVELOPMENT: FACTS ON OFFSHORE OIL & GAS EXPLORATION IN MYANMAR

by
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ABSTRACT

Earth's global ocean is the largest confirmed surface ocean on all observable planets, almost 72% of the planet's surface (~ 3.6 x 108 km^2), and is customarily divided into several principal oceans and smaller seas. It is habitat of 230,000 known species; however much of the ocean's depths remain unexplored. It is estimated that over two million marine species may exist. Generally, marine resources can be classified as physical, marine energy, biological and non-extractive resources. This paper is intended to introduce marine resources development from the aspect of physical resources and special focus on offshore oil & gas exploration in Myanmar. Furthermore, the national and international conventions like MARPOL 73/78 have considerably changed to protect marine pollution from ships and offshore industries. Consequently, DMA needs to ratify such amendments and new regulations under national legislation which is discussed briefly. Finally, the national oil spill contingency plan and response in Myanmar is introduced.

Keywords: Marine resources, Oil & Gas, Conventions, Marine pollution, Contingency plan

1 INTRODUCTION TO COUNTRY PROFILE

Myanmar lies between Latitudes 9˙ 32″ & 28˙ 31″ N and Longitudes 92˙ 10″ & 101˙11″ E. Its total length is 2,100 km in South to North and 925 km in East to West. Myanmar shares common borders with China in the north and the north-east, Laos in the east, Thailand in the south-east and India and Bangladesh in the west. In the south-west is the Indian Ocean and Myanmar's coastline extends southwards from where Myanmar and Bangladesh meet to the southern extremity where Myanmar and Thailand meet - making a very long coastline of 2,832 km with a continental shelf of 228,000 km^2 and territorial sea of 486,000 km^2 (EEZ). Approximately 37% of the population lives in coastal areas. It is the 24th most populous country in the world inhabited by a population of over 58 million people belonging to 135 national races. It has total land area of about 680,000 km^2 which is roughly equal to France and the United Kingdom combined. In addition, Myanmar is 40th largest country in the world and the 2nd largest country in the South-east Asia.

2 CLASSIFICATION OF MARINE RESOURCES & OBJECTIVE OF THE PAPER

Classification of Marine Resources

Marine Resources can be classified into:

1. *Physical Resources* - petroleum, natural gas, minerals, even fresh water from desalinization;
2. *Marine Energy Resources* – extraction of energy directly from the heat or motion of sea water;
3. *Biological Resources* – living animals and plants collected for human consumption and use; and
4. *Non-extractive Resources* – uses of the ocean in place, such as transportation and recreation.

Marine Resources can also be classified as: 1) *Renewable Resources* – naturally replaced by the growth of marine organisms or other natural processes. Examples are fish, kelp, sponges; and 2) *Non-renewable Resources* – deposited over millions of years and cannot be renewed in a human lifetime. Examples are natural gas, oil and solid mineral deposits.

Objective of the Paper

In addition to the information expressed in the abstract, the total volume of ocean is approximately 1.3 billion cubic kilometres (310 million cu mi) with an average depth of 3,682 metres (12,080 ft.). Approximately 32% of crude oil and 24% of natural gas is produced from offshore sources. The oil and gas normally occur in coastal zones – there is little oil or gas in deep ocean floors. Oil is a "soup" of organic molecules deposited into an anaerobic environment where bacterial action converted the original tissue into simpler hydrocarbons. "Slow cooking" under moderate ocean pressures and temperatures produced oil – in a several million year time while higher temperatures and pressures produce natural gas. This paper is intended to introduce the facts of the marine resources development from the aspect of physical resources and special focus on offshore oil & gas exploration in Myanmar with its laws and policies.

3 OFFSHORE OIL & GAS EXPLORATION IN MYANMAR

Oil & Gas Exploration in Myanmar

One bright spot for Myanmar is its significant gas deposits. Oil and gas exploration under the energy sector is contributed highest in the foreign investment of Myanmar. There is, therefore, a lot of potential can be seen in the establishment of downstream and related industries in this particular sector. About 35% of the total energy consumption depends on oil, natural gas, coal and hydropower in addition to traditional energy such as charcoal, fuel wood etc. for the period of 1999 and 2000. Increasing in production of commercial energy has to be prioritized to meet the requirement of industrial development in Myanmar with the aim of replacing traditional source of energy. Myanmar has very high potential in the development of oil & gas and hydro- energy sector. From 1989 to 1993 oil and gas exploitation and exploration was carried out by the Myanmar Government with the foreign companies as shown in *Table 1*.

Table 1 – Oil and Gas Exploitation and Exploration Companies in Myanmar

No	Onshore Workstation	Foreign Oil & Gas Company	Country
1	Block-F	Unocal	United States of America
2	Block-B	Amoco	United States of America
3	Block-G	Shell	The Netherlands
4	Block-E	Petro Canada	Canada
5	Block-H	BHP	Australasia
6	Block-I	Clyde	England
7	Block-D	Idemitsu	Japan
8	Block-C	Yukong	South Korea

(Source: The Mirror – Myanmar Daily News, 21-Jun-2012, p 6)

Contracted Oil & Gas Companies in Myanmar

Total offshore proved gas reserves are about 16 TCF and probable and possible reserves are estimated over 110 TCF. A new pipe line is now under construction and when completed total would be about 200 MCF per day. With future findings of new deposits, it will also be increased. Myanmar Oil and Gas Enterprise (MOGE) under the Ministry of Energy is responsible for onshore and offshore oil and gas production management. Between 1972 and 1987, MOGE as an operator had carried out seismic survey over the area of interest and 27 wells have been drilled including Yadana and Badamyar gas

field discoveries. Even larger exports to either Thailand or India are possible as the considerable offshore gas potential is defined and developed. New discovery of offshore gas fields developed by foreign investors are operating under the production sharing contracts. Estimates of annual net revenues in a five to ten year time frame will definitely be much higher than $1000 million, but the rate of growth will depend on the size, cost, and location of the fields.

Table 2 – Contracting Oil and Gas Companies in Myanmar

Onshore Workstation	Foreign Oil & Gas Company	Country	Myanmar Oil & Gas Company	Date of Contract
RSF-10	EPI Holdings Ltd.	Hong Kong	Aye Myint Khine	09-03-2012
RSF-9	Geopetro Int'l Holding Inc.	Switzerland	A-1Mining	11-03-2012
RSF-2	Petronas Carigail Myanmar Inc.	Malaysia	UNOG	04-04-2012
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PSC-1	Jubilant energy	India	Parami Energy	28-05-2012
PSC-G	PTTEP South Asia Ltd.	Thailand	Win Precious Resources	06-06-2012
EP-2	PTTEP South Asia Ltd.	Thailand	Win Precious Resources	06-06-2012
EP-5	Istech Energy	Indonesia	SMART	07-06-2012
PSC-E	CIS Nobel Oil Company	Russia	Alister	14-06-2012

(Source: The Mirror – Myanmar Daily News, 21-Jun-2012, p 6)

Very recently (9th March 2012 to 14th June 2012), 16 foreign companies and 7 Myanmar companies are operating in 17 blocks with 9 contracts which is described in *Table 2*. Previously, it was 14 foreign companies were operating in 28 blocks with 27 contracts starting from 1972. During 1970s four contractors conducted detail seismic surveys and 18 wells were drilled including one gas recovery. Since the promulgation of Myanmar Investment Law, starting from 1989, a lot of foreign companies signed mainly Production Sharing Contracts for Myanmar offshore areas with MOGE. In 1990s, 3 sedimentary basins in offshore area are identified. Out of three, 2 basins were thoroughly explored and 1 basin is explored to some extent and presently carrying on the exploration. Commercial gas accumulations are found in all 3 offshore basins.

Facts on Offshore Oil & Gas Pipelines in Myanmar

Oil and gas project and future exploration efforts are taking exploration an important role in Myanmar offshore sector. Currently offshore resources become very important assets for the country. At the moment, two companies are selling our offshore gas to Thailand and in the forthcoming other two companies will supply gas to China and Thailand, Myanmar-China gas and oil pipelines facts from Shwe gas field is described in *Table 3*.

Table 3 – Facts of Myanmar-China Pipelines (from Shwe Gas Field)

Parameters	Gas Pipeline	Oil Pipeline
Length of Pipeline	803 km	731 km
Pipeline diameter	40 inches	32 inches
Design pressure	1450 psi	1160-2175 psi
Transfer capacity of Gas	1st phase – 500 mmcfd 2nd phase – 1200 mmcfd	1st phase – 237,698.6 bbl/day 2nd phase – 435,780 bbl/day
Start of Transfer of gas	May, 2013	May, 2013
Off-take points in Myanmar	(1) Yenanchaung 50-70mmcfd N-02257538 E-00705330 (2) Taungthar 50-70 mmcfd N-02352402 E-00755419 (3) Mandalay 50-70 mmcfd N-02402225 E-00202418	(1) Saku offloading station (2) Nahtoegyi station

(Source: Ministry of Energy)

For domestic use small portion of offshore gas is now about 110 MCF per day. Development of Oil and Gas Pipelines and Terminal at Kyaukpyu Region are: in June, 2009, the Memorandum of Understanding (MOU) relating to the Development, Operation and Management of the Myanmar Crude Oil Pipeline Project was signed between the Ministry of Energy of the Republic of the Union of Myanmar and China National Petroleum Corporation of China.

Table 4 – Major Natural Gas Deposit, Partners and Revenue

Natural Gas Deposit	Partner	Country	Export to	Revenue per year (million $)
Yadana Project	TOTAL / Chevrons PTTEPI / MOGE	French / United States of America / Thailand /Myanmar	Thailand	480
Yetagun Project	Petronas / Nippon Oil / PTTEPI / MOGE	Malaysia / Japan / Thailand / Myanmar	Thailand	600 + 213

(Source: The Mirror – Myanmar Daily News, 21-Jun-2012, p 6)

The total investment amount of the project is estimated over US$ 2.0 billions. The construction works of the oil and gas terminal shall be completed by December, 2012. Construction of the Work-boat Wharf at the project area was completed in May 2011.

Table 5 – Gas Distribution Plan of Myanmar for the Local Services

1. Availability of Gas from Each Production Field:	A. Yadana Field B. Yetagun Field C. Shwe Field* D. Zawtika Field ** Shwe Gas will increase to 150-210 mmcfd in 2nd phase2014*	: 125 mmcfd : 135 mmcfd : 100-140 mmcfd, available from May 2013 : 60 mmcfd, available in late 2013
2. Gas distribution from Yadana + Yetagun Field (260 mmcfd)	A. Yangon Region B. Pyay Region C. Mawlamyaing Region	: 152.5 mmcfd : 52.50 mmcfd : 55.00 mmcfd
3. Gas distribution plan from Shwe Field (100 mmcfd) (For the 1st phase, gas available in May 2013)	A. Sakhar- Myingyan region B. Paliek region C. Kyaukse region D. Chauk- Sale Region E. Pyinnyaung Region F. Pinpet region G. Magwe-Pyawbwe-yeni region	: 14.5 mmcfd : 1.0 mmcfd : 16.5 mmcfd : 9.0 mmcfd : 18.3 mmcfd : 17.0 mmcfd : 23.7 mmcfd

The offshore Yadana field will begin sales to Thailand in mid-1998 and produce net revenue of about 480 million dollars each year. The Yetagun field with about half of the annual production of Yadana, was commenced production in 1999. Sales from Yetagun will also be to Thailand, with prices around $3 per million BTU, and indexed to rise with inflation. This could produce net revenues of nearly $600 million per year from selling natural gas and net revenues of almost $213 million per year from selling condensate (The Mirror), see *Table 4* whereas gas distribution plan of Myanmar for the local services in near future are shown in *Table 5*.

4 NATIONAL & INTERNATIONAL CONVENTIONS AND POLICIES IN MYANMAR

UN & IMO Conventions Adopted by Myanmar

Conventions of International Maritime Organization that already ratified and adopted by Myanmar are as follows:

1. UNCLOS 1982
2. IMO Conventions 48
3. IMO Amend-93
4. International Convention for the Safety of Life at Sea, 1974 (SOLAS 74)
5. Protocol for the International Convention for the Safety of Life at Sea, 1974 (SOLAS Protocol 78)
6. Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS 72)
7. International Convention on Load Lines, 1966 (LOAD LINE 66)
8. International Convention on Tonnage Measurement of Ships, 1969 (TONNAGE 69)
9. International Convention for the Prevention of Pollution from Ship, 1973/78 (MARPOL 73/78 Annex I & II)
10. International Convention on Standard of Training, Certification and Watchkeeping for Seafarers, 1978 as amended including 2010 Manila amendments (STCW 1978)
11. Convention for the Suppression of Unlawful Act against the Safety of Maritime Navigation, 1988 (SUA 1988)
12. Protocol for the Suppression of Unlawful Act against the Safety of fixed Platforms located on the Continental Shaft, 1988 (SUA Protocol 1988)

National Maritime Laws

Myanmar has a number of maritime legislations which dates as far back as 1841 based on British common law. These laws include the following:

1. Myanmar Merchant Shipping Act (1923)
2. Myanmar Registration of Ships Act (1841)
3. Inland Steam Vessel Act (1917)
4. Bill of Lading Act (1856)
5. Myanmar Carriage of Goods by Sea Act (1925)
6. Carrier Act (1865)

The primary laws that regulate shipping in Myanmar are the Merchant Shipping Act (MSA) 1923 and the Registration of Ships Act 1841. The MSA 1923 has been amended several times to incorporate the IMO requirements.

Myanmar Special Economic Zone Law

The ***"Territorial Sea and Maritime Zone Law"*** that clearly defined the Baselines has been enacted since 1977. Special Economic Zones are developing in accord with the respective SEZ Laws and there are a lot of potentials for the foreign investors coming to invest in Myanmar. Regarding that investment in the infrastructure development including ports

together with industrial zones and special economic zones are tremendous potential indeed. The new investment laws including SEZ laws will be encouraged not only the export oriented industries but for import substitution industries provided attractive incentives and privileges for the investors. Higher authorities have been taking into keen consideration to amend and/or promulgate SEZ Laws for such SEZs to be more attractive for the potential investors by providing comfortable privileges and enjoyable incentives. The unique objectives of Myanmar Special Economic Zone Law are:

- To base on the framework of the maintenance, protection and safeguarding the sovereignty of the State in allowing to operate foreign investment businesses;
- To develop the momentum of the economy of the State by establishing and operating the Special Economic Zones;
- To develop the industry and high technologies in the State;
- To improve the goods processing, trading and service business;
- To enable the citizens to train, learn and transfer the high technologies;
- To create more employment opportunities for the citizens; and
- To develop the infrastructures of the State.

Myanmar Fishery Laws

The Ministry of Livestock and Fisheries is responsible for the development of the livestock and fisheries sector. Myanmar Fishery Legislations are:

1. National Policy on Fishery
2. Law Relating to Fishing Rights of Foreign Fishing Vessels, 1989
3. Law relating to Aquaculture, 1989
4. Myanmar Marine Fisheries Law of 1990
5. The Freshwater Fisheries Law, 1991
6. Law Amending the Law Relating to Fishing Rights of Foreign Fishing Vessels, 1993
7. Law Amending the Myanmar Marine Fisheries Law of 1993
8. Master 30 year plan, long-term plan (2001-2031) target
9. National Sustainable Development Strategy (2009) Goal No. 1/(6)

The main salient features of these laws relating to environment are reduction and eradication of mortality caused by men apart from legal fishing; preservation of areas, habitats and fishing grounds; protection of specific stocks and species; exploitation of resources on rational sustainable basis; inhibition of environmental adverse effects on the industry and deterioration environment induced by the industry; and restriction of establishment of factories which use C.F.C as a refrigerant. In expanding and promoting our fishery industry, the Department of Fisheries exercises the above relevant fishery laws and procedures, making sure that there is neither depletion of resources nor environmental degradation. The policies relating to marine resources development in Myanmar are described in *Table 6*.

Table 6 – Policies Relating to Marine Resources Development in Myanmar

Marine Administration Policy	Myanmar Energy Policy	Myanmar Fishery Policy
▪ To conform national ships to safety standards, safe practices and standard of competence required of its marine personal. ▪ To promote development of human resources, man-power planning and optimum utilization of such man-power in the maritime sector. ▪ To improve the safety record of Myanmar registered vessels. ▪ To improve specific obligation save lives in distress at sea and protection of the marine increment.	▪ To maintain the status of energy independence, ▪ To employ hydroelectric power as one of the vital sources of energy sufficiency ▪ To generate and distribute more electricity for economic development ▪ To save non renewable energy for future energy sufficiency of the nation ▪ To promote efficient utilization of energy and impress on energy conservation ▪ To prevent deforestation caused by excess use of fuel wood and charcoal	▪ To promote all round development in the livestock and fisheries sector ▪ To increase meat and fish production for domestic consumption and share the surplus with neighboring countries ▪ To encourage the expansion of marine and freshwater aquaculture ▪ To upgrade the socio-economic status of livestock and fisheries communities.

Although there is no specific energy efficiency and conservation (EEC) policy at present, Myanmar is in awareness state and has to formulate specific EEC policy as increasing in energy consumption.

5 MARINE ENVIRONMENTAL PROTECTION

National Commission for Environmental Affairs, NCEA

The Government has established an appropriate coordinating mechanism (such as a high-level policy-planning body) for integrated coastal management and sustainable development of marine and coastal areas at both the local and national levels. The NCEA has been created in order to act as focal point, coordinating body for environmental affairs and promoting sustainable development since 1990. The main authority for the protection of the environment is the newly formed Ministry of Environmental Conservation and Forestry, Under the Ministry, a Union level Environmental Conservation Committee was termed, comprising members from other agencies including the Ministry of Transport. Myanmar also has a well stated environment policy covering environmental conservation and sustainable development.

Nevertheless, in many ways Department of Marine Administration, DMA is directly involved in the protection of the marine environment in particular the prevention of pollution from ships. DMA is responsible for the implementation of MARPOL, which currently, for Myanmar, covers only the mandatory Annexes I and II. It was observed that there is no specific unit in DMA that focuses on marine environment matters. However, Myanmar has established the National Oil Spill Contingency Plan, of which DMA has the central role and introduced in the following subsection.

National Oil Spill Contingency Plan in Myanmar

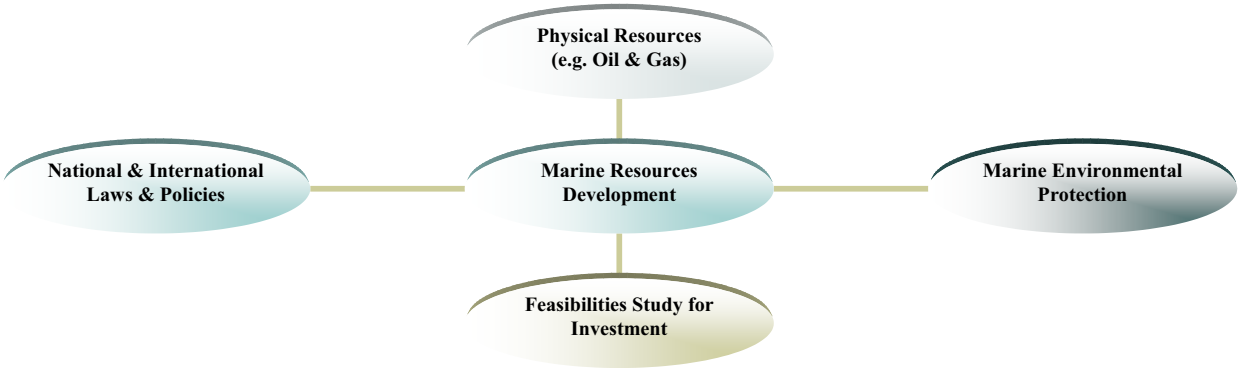
In view of the development of the deep water oil terminal at Kyaukpyu Port, it is imperative that the oil spill response capacity and capabilities are improved. At the same time, DMA already has plans to accede to the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) 1990, the International Convention on Civil Liability for Oil Pollution Damage as amended by the 1992 Protocol (CLC 1992) and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage as amended by the 1992 Protocol (Fund 1992) and MARPOL Annexes III, IV and V. Currently, Myanmar has established the National Oil Spill Contingency Plan in which the following committees and teams are comprised.

1. National Oil Spill Response Committee (*Vice-President of the Country as Chair*)
2. National Oil Spill Response Working Committee (*Union Minister of the Ministry of Transport as Chair*)
3. Regional Oil Spill Response Working Committees (*Respective Region Ministers of Transport as Chairs*)
4. Regional Working Team For Oil Spill Response
   - 4.1 Planning Team
   - 4.2 Operation Team
   - 4.3 Logistics Team
   - 4.4 Finance and Public Affair

The Notification of Myanmar Investment Commission

The Myanmar Investment Commission issued a Notification on 17th June 1994 that clearly underlines Myanmar's commitment for the protection of the environment The Notification states that:

1. All projects established with the permission shall be responsible for the preservation of the environment at and around the project site. The enterprises are entirely responsible that they shall be able to control pollution of air, water and land and other environmental degradation and that they can keep the project site environmental friendly.
2. All projects shall compulsorily install sewage treatment plant, industrial waste water treatment plant and other pollution control procedures soonest and abide with the sanitary and hygienic rules and regulations set by the authority concerned.
3. The proposals shall incorporate the provision in their contracts that they shall undertake proper sewage and industrial waste water treatment systems and other environmental control systems. The systems so used shall be on accordance with the rules and regulations specified by the respective development committees and local authorities.



In conclusion, as illustrated in the above diagram it is very important in every aspect for the implementing of the efficient and effective marine resources development. **Contemplate before venture!**

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MYANMAR MARITIME UNIVERSITY

KMI KOREA MARITIME INSTITUTE

Marine Resources Development

FACTS ON OFFSHORE OIL & GAS EXPLORATION IN MYANMAR

KMOF

07.11.2012
Park Royal Hotel

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2 • Marine Resources & Objective of the Paper

3 • Offshore Oil & Gas Exploration in Myanmar

4 • National & International Conventions and Policies in Myanmar

5 • Marine Environmental Protection

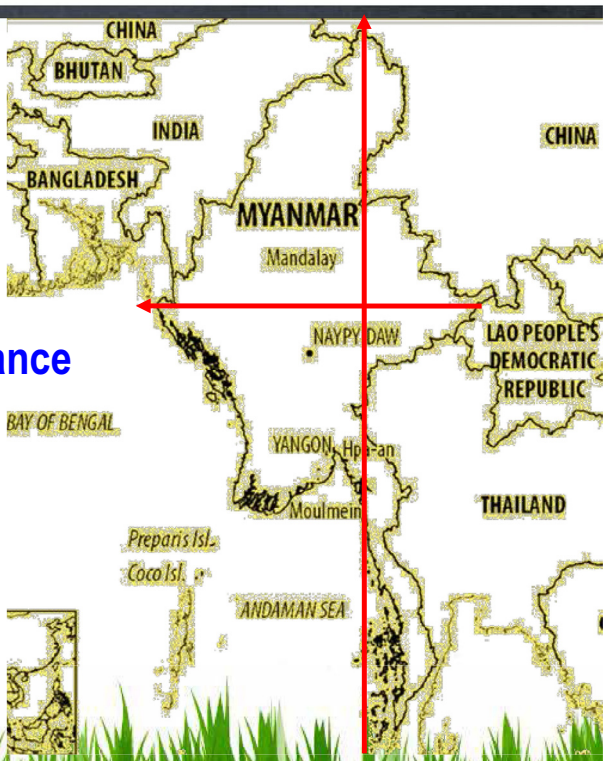
1 INTRODUCTION TO COUNTRY PROFILE

Location & Land Area

- Myanmar lies between
  Lat. 9˚ 32″ – 28˚ 31″ N
  Long. 92˚ 10″ – 101˚11″ E
- Total land area 680,000 km^2

Area of Myanmar **≈ UK + France**

- Total length
  (South to North) 2,100 km
  (East to West) 925 km

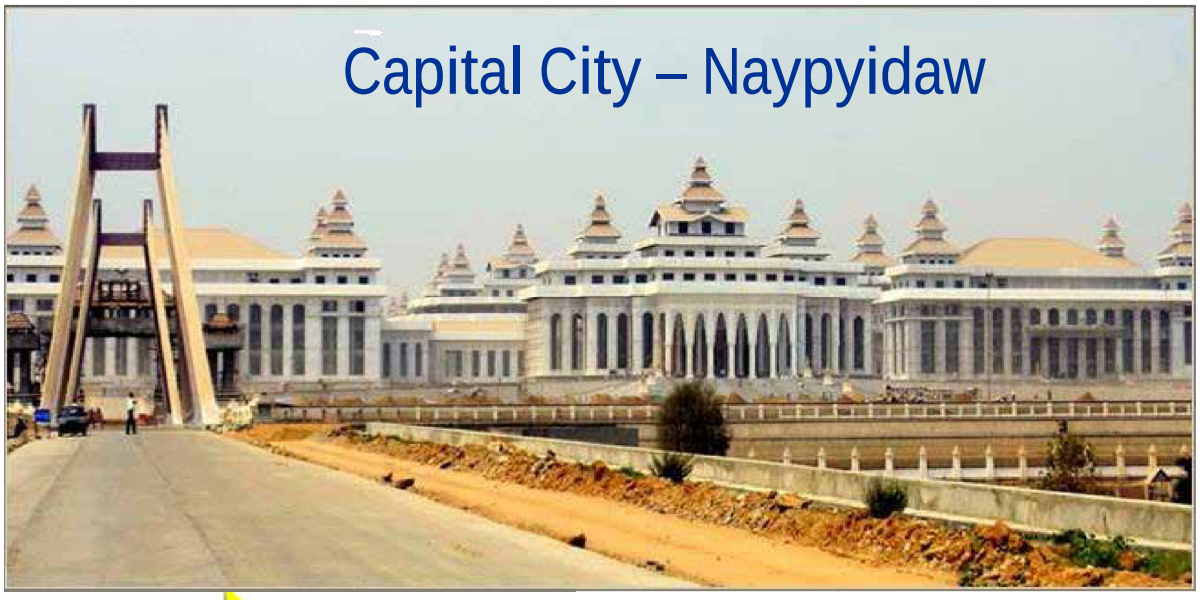


About 37% of the population lives in coastal areas.

Map

Emblem

- 58 millions people
- 135 national races
- Official language is Myanmar


Capital City – Naypyidaw

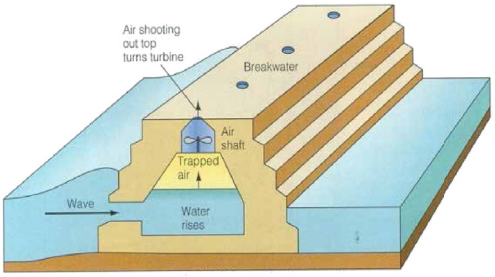
Business City – Yangon

2 MARINE RESOURCES & OBJECTIVE OF THE PAPER

Classification of Marine Resources

Marine Resources can be classified into:

1. Physical Resources
2. Marine Energy Resources
3. Biological Resources
4. Non-extractive Resources



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- About 32% of crude oil and 24% of natural gas is produced from offshore sources
- The oil and gas normally occur in coastal zones – there is little oil or gas in deep ocean floors
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- Special focus on offshore oil & gas exploration in Myanmar with its laws and policies.

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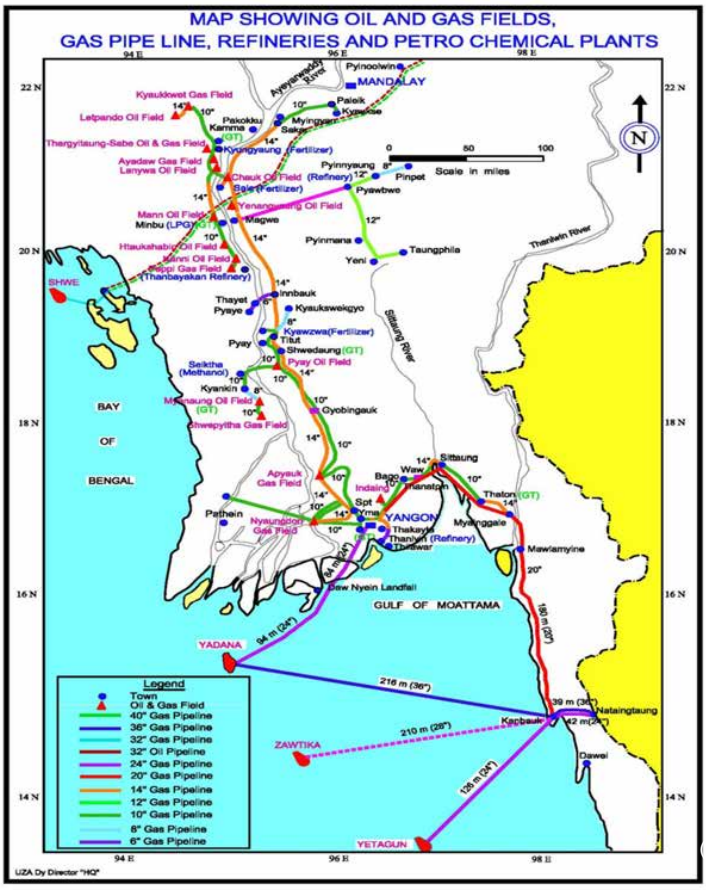

(Source: Ministry of Energy)

Oil & Gas Exploration in Myanmar

- Oil and gas exploration under the energy sector is contributed highest in the foreign investment of Myanmar.
- Myanmar has very high potential in the development of oil & gas and hydro-energy sector.
- New discovery of offshore gas fields developed by foreign investors are operating under the production sharing contracts.

Oil & Gas Exploration Companies in Myanmar

Onshore Workstation	Foreign Oil & Gas Company	Country
Block-F	Unocal	USA
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(Source: The Mirror – Myanmar Daily News, 21-Jun-2012, p 6)

4 NATIONAL & INTERNATIONAL CONVENTIONS AND POLICIES IN MYANMAR

UN & IMO Conventions Adopted by Myanmar

Treaty	Ratification type	Date of treaty entry into force	Date of entry into force in Myanmar
UNCLOS 82	Accession	1994-11-16	1996-05-21
IMO Conventions 48	Acceptance	1958-03-17	1951-07-06
IMO Amend-93	Acceptance	2002-11-07	2002-11-07
SOLAS 74	Accession	1980-05-25	1988-02-11
SOLAS Protocol 78	Accession	1981-05-01	1988-02-11
COLREG 72	Accession	1977-07-15	1987-11-11
LL 66	Accession	1968-07-21	1988-02-11
TONNAGE 69	Accession	1982-07-18	1988-08-04
MARPOL Annex I/II	Accession	1983-10-02	1988-08-04
STCW 78	Accession	1984-04-28	1988-08-04
SUA 88	Accession	1992-03-01	2003-12-18
SUA Protocol 88	Accession	1992-03-01	2003-12-18

National Maritime Laws

Myanmar has a number of maritime legislations which dates as far back as 1841 based on British common law. These laws include the following:

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Territorial Sea and Maritime Zone Law

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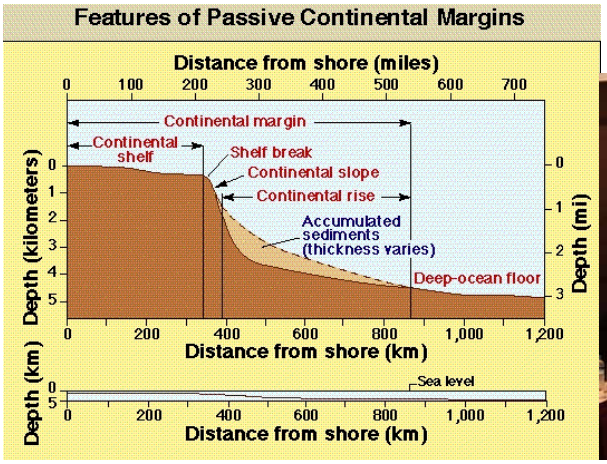

Myanmar Special Economic Zone Law

- To base on the framework of the maintenance, protection and safeguarding the sovereignty of the State in allowing to operate foreign investment businesses;
- To develop the momentum of the economy of the State by establishing and operating the Special Economic Zones;
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- To improve the safety record of Myanmar registered vessels.
- To improve specific obligation save lives in distress at sea and protection of the marine increment.

Myanmar Energy Policy

- To maintain the status of energy independence,
- To employ hydroelectric power as one of the vital sources of energy sufficiency
- To generate and distribute more electricity for economic development
- To save non renewable energy for future energy sufficiency of the nation
- To promote efficient utilization of energy and impress on energy conservation
- To prevent deforestation caused by excess use of fuel wood and charcoal

Myanmar Fishery Policy

- To promote all round development in the livestock and fisheries sector
- To increase meat and fish production for domestic consumption and share the surplus with neighboring countries
- To encourage the expansion of marine and freshwater aquaculture
- To upgrade the socio-economic status of livestock and fisheries communities.

5 MARINE ENVIRONMENTAL PROTECTION

National Commission for Environmental Affairs, NCEA

- The Government has established an appropriate coordinating mechanism
  - such as a high-level policy-planning body
- For ICM and sustainable development of marine and coastal areas
  - local level
  - national levels

- NCEA has been created in order to act as *focal point,*
  - *coordinating body for environmental affairs and*
  - *promoting sustainable development* since 1990.

National Oil Spill Contingency Plan in Myanmar

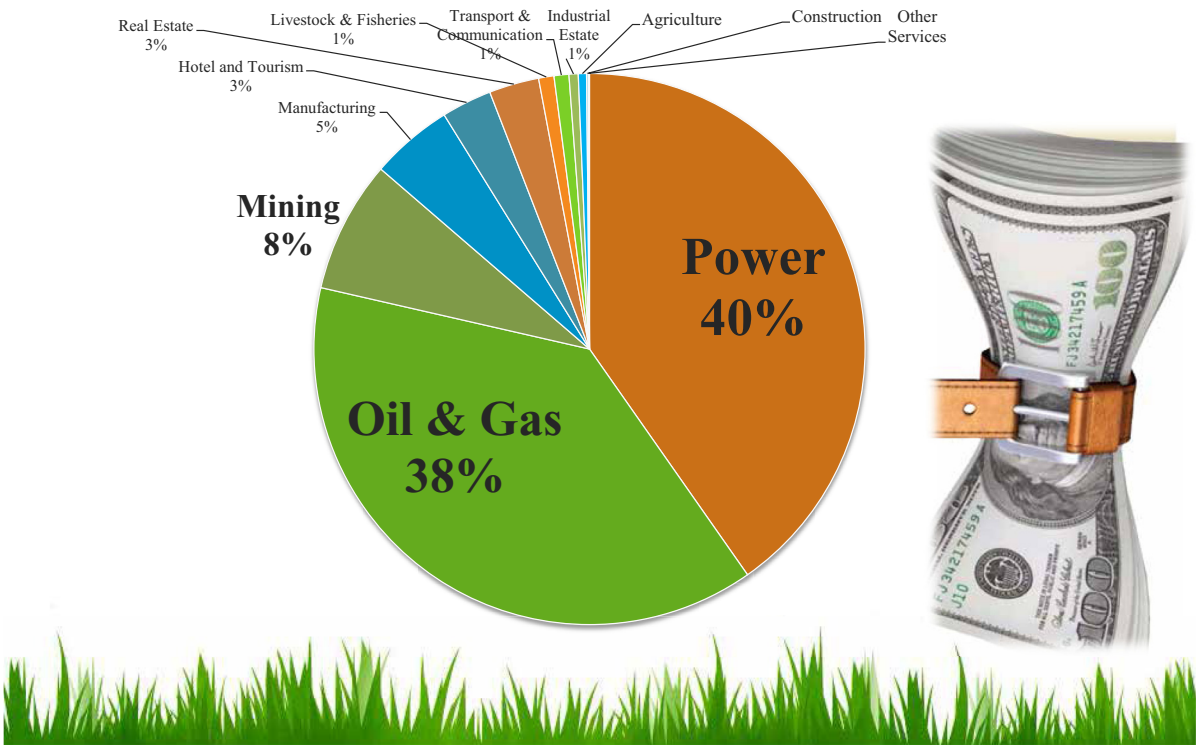
- National Oil Spill Response Committee
- National Oil Spill Response Working Committee
- Regional Oil Spill Response Working Committees
- Regional Working Team For Oil Spill Response
  - Planning Team
  - Operation Team
  - Logistics Team
  - Finance and Public Affair

Needs Global Cooperation

Myanmar is commencing MRD projects with -

- United Nations
- ASEAN Countries
- Some EU Countries
- USA
- China
- India
- Japan
- South Korea
- Bangladesh

Investments in Myanmar



Conclusion

Physical Resources (e.g. Oil & Gas)

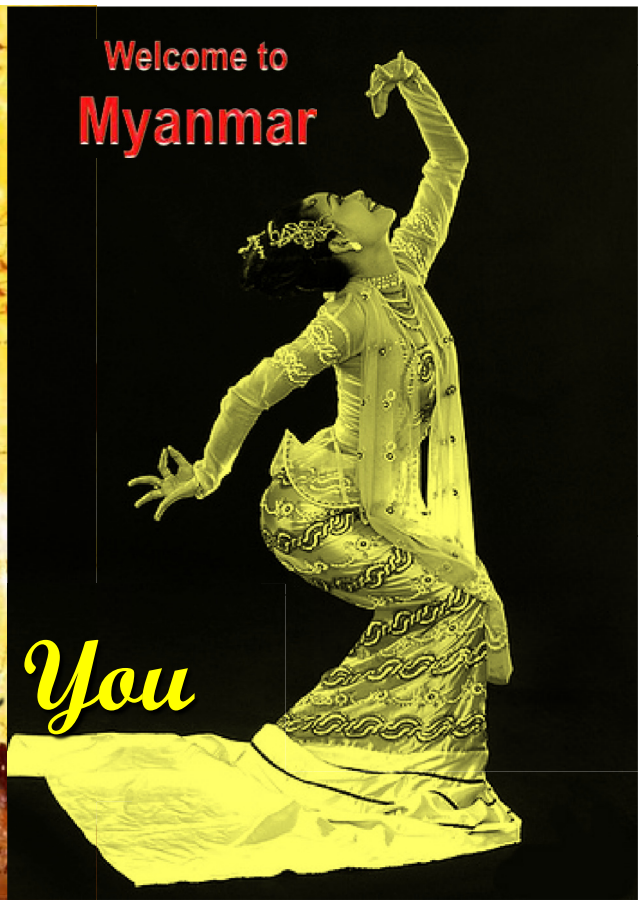
National & International Laws & Policies

Marine Resources Development

Marine Environmental Protection

Feasibilities Study for Investment

Contemplate before venture!



Session 2

General Discussion

Policy proposal for feasible plans of cooperative business

Chair: *Jae wan Lee*(President, KMBA)

Discussants

- **Korea** : *Sungchan Cho* (CEO), *Bay Moon* (Managing Director, KOREAP&I), *Mansik Shin*(Director, KOICA), *Hoon Kang* (Senior Reporter, ChosunIlbo), *Myungsang Jung*(Director General, KMI)

- **Myanmar** : *Htay Aung* (Rector, Mawlamyine University), *Ohn* (Chairman, FREDA), *Soe Win* (Managing Director, Win Ye Kyaw Services Co.Ltd.), *Tin Ohnmar Tun* (LocalP&ICorrespondent, Yangon), *Aung Htoo*(Deputy General Manger, Myanmar Five Star Line)