



**Dawei Deep Sea Port, Industrial Zone Development
and the Environmental Pollution
That should be CAUTIONED**



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“Dawei Deep Sea Port, Industrial Zone Development and the Environmental Pollution that should be CAUTIONED”

Environmental could be ruined by the process of environmental pollution caused by natural law or by human beings. Problems on environmental pollution started with natural disasters; eruption of volcanos and forest fire. After the industrial revolution, the smoke and disposed waste liquid from the developed factories impact was huge on the environmental pollution than caused by natural law. It was found in the history that pollution caused by human beings are worst than natural.

All the levels in the human society have one desire; to meet their basic needs and to have a peaceful environment. Fulfilling the desires to make the living standards high, by having plenty of goods, using full energy and easy transportation, could sway the beauty of the environmental at the same time.

Environmental preservation has become important due to the increase in population, cities being crowded and standard of living being high. Garbages problems increased as cities appear. Air pollution began since the usage of fuel. Experienced grieves because of the accident in the developed industrials. It is obvious to take heed in dealing with the chemicals which are very dangerous in mass production of commodities. Example – expanding the lands in Kalimantan island in Indonesia started the forest fire and due to the extremely pollution, affected the neighboring countries.

Economical development is directly connected with the development of technology of industries. The environmental quality declined as more technology is improved and more usage of natural resources. Since the process is linked, throughout the world there are weather changed for the worst, the forest are wiped out and thus faced environmental pollution. These incidents hinder the development of economic and technology.

Industrial is improved world wide and numerous types of factories appeared, and many gas from those factories, liquid or sediment one way or the other polluted the air, water and soil. Social needs are hit due to the bad consequences of environment, especially the danger of diseases that injured health.

Due to the growth of the industrial and industrial zones, the environment is damaged and totally destroyed, and it is highlighted to the public to be cautious.

- ✚ Because of human beings million tons of Carbondioxide gas is in the atmosphere and the world is getting hotter, new deserts coming up, melting of Ice Mountains and floods
- ✚ Less Oxygen in atmosphere
- ✚ The mass of water has mercury toxic as the water from the cities passed through the rivers, streams and ponds
- ✚ Due to the Nitrogenoxide; the Ozone layer which absorb the ultraviolet radiation are getting thinner.

The balanced natural law's circumference is being destroyed and the chemicals such as, Carabon dioxide, Oxygen, Mercury, Ozone and Nitrogen Oxide have the advantage in destroying the environment.

1. The locations and physical features of Dawei Deep Sea Port and the Zonal Industrial

In Myanmar, which is going to be the first and the biggest Dawei Deep Sea Port and Special Economic Zone is in Tanintharyi region, within Yebyu Township, which consists of (29) villages.

Dawei Deep Sea Port and industrial Zone is between North Latitude 14° 11' to 14° 19' and East Longitude 98° 01' to 98° 12'. It is adjacent with Yebyu Township in the north, Dawei River and Yebyu Township in the east, Launglon Township in the south and Andaman Sea. The area is (250) square kilometers (97 square miles).

Dawei Deep Sea Port and industrial Zone area is situated on the west of the Dawei River and on a big plain land between Dawei river valley and Tanintharyi coast line. This plain is lower than 100 feet above sea level. Within this zonal area there are high mountains Thit Net Mountain (230 feet), Taung Shan Mountain (321 feet) and Taung Ta Lin Mountain (371 feet).

Na Bu Le stream is one of the significant streams among the many streamlets in the zonal area. The length of Deep Sea Port coastline is (12) kilometers (7.45 miles) and the width is (213) meters (700) feet. The sea depth towards the shore is (30) feet and thus has the depth of water a ship draws for big container ships.

The sea is free from reef, rock mass in water and ridges. About (13.5) miles, north east of the seashore, there is Maungmagan archipelago in the sea protects naturally and reduces the storms and winds. There are enough of plain lands to construct the industrial zone and also if need to expand in future it is a good place. There is enough of fresh water for the year round.

Weather, fertile top-soil and natural vegetation of the industrial zonal area

Dawei Deep Sea Port and industrial zone area is close to the sea and therefore, the weather is balanced. It is in the tropic zone and the average highest temperature is 80.20 degree Fahrenheit (26.7) degree Centigrade and is the place that gets more than (200) inches of rainfall annually.

The fertile top-soil found in this industrial zone area is mostly coastal soil. In Zones A and B Sand Dune, in Zone C - Meadow Gluey Saline Soil, Zone D - Red Brown Forest Soil, Zones E and F - Yellow Brown Forest Soil are found. Beach and Dune Forest, Indaing Forest and Tidal Forest are found. The trees are Pyin Ka Doe and In-Bothit.

2. Environmental Assessment and norms of Zonal Industrial workplace

Comparing with other countries, it could be said that Myanmar is not that polluted yet. All the developed countries have to face environmental conservation. As Myanmar is heading towards developed country, the public those have concern should in unison work for the environmental conservation and sustainability. Have to find ways for the balance improvement of economical, technology and environmental and to fulfil the current needs and have to give special consideration for the next generations not to suffer.

Therefore, in 1994 UNEP has provided guidelines in (4) tables; Required Experiment and the level of acceptance for water pollution, Standard for Air Pollution caused by gas, Harmful Waste and Highest acceptable participation of liquid is shown in (4) tables respectively.

Table 1: Required Experiment and the level of acceptance for water pollution (Chapman, 2000)

Experiment	Highest acceptable participation	Highest permissible participation
<u>Physical Experiment</u> Color Muddy Smell Taste	5 Units 5 Units Not specified Not specified	50 Units 25 Units Not specified Not specified
<u>Chemical Experiment</u> PH Total deposit Calcium Magnesium Zinc Copper Iron Magnese Cadmium	7.0 – 8.5 500 mg/l 75 mg/l 30 mg/l 5.0 mg/l 0.05 mg/l 0.1 mg/l 0.05 mg/l 0.01 mg/l	6.5 – 9.2 1,500 mg/l 200 mg/l 150 mg/l 15 mg/l 1.5 mg/l 1.0 mg/l 0.5 mg/l 0.01 mg/l
Chloride Sulphate Nitrate	200 mg/l 200 mg/l 10 mg/l	600 mg/l 400 mg/l 10 mg/l
<u>Biochemical Experiment</u> E - coeli	Not more than 2 mpg / 100 ml liter	None

Table 2: Standard for Air Pollution caused by gas (Tietenberg, 1998)

Pollutants	Standards
Sulphur Dioxides	(a). 80 microgram/meter (0.03 ppm) annual (b). 365 microgram/ meter (0.14 ppm) within 24 hours
Dust and particles	(a). 50 microgram/meter (annual) (b). 150 microgram/meter (within 24 hours)
Carbon monoxide	(a). 10 microgram/meter (9 ppm) annual (b). 40 microgram/meter (35 ppm) within 24 hours
Ozone	235 microgram/meter (0.12 ppm) annual
Nitrogen dioxide	100 microgram/meter (0.05 ppm) annual
Lead	1.5 microgram/meter (quarterly)

Table 3: Harmful Waste (USEPA, 1987)

EPA of Harmful Waste	Pollutants	Highest acceptable participation (mg/l)
D 004	Arsenic	5.0
D 005	Barium	100.0
D 006	Cadmium	1.0
D 007	Chromium	5.0
D 008	Lead	5.0
D 009	Mercury	0.2
D 010	Selenium	1.0
D 011	Silver	5.0
D 012	Endrinelidane	0.02
D 013	Methoxychlo	0.4
D 014	2, 4-D	10.0
D 014	2, 4, 5 TP	0.5

Table 4: Highest acceptable participation in liquid (UNEP, 1994)

BOD (5 days, 20°)	Highest	20 – 60 ppm
Flotation sediment	Highest	30 ppm
Soluble sediment	Highest	2000 ppm
PH value	Highest	Between 5 – 9
Permanganate value	Highest	60 ppm
Sulphate	Highest	1 ppm
Cyanide	Highest	0.2 ppm
Tar	Absolutly no	-
Oil and grease	Highest	5 ppm
Formaldehyde	Highest	1 ppm
Phenol, Cresol	Highest	1 ppm
Free chlorine	Highest	1 ppm
Zinc	Highest	5 ppm
Chromium	Highest	0.5 ppm
Arbinic	Highest	0.25 ppm
Copper	Highest	1 ppm
Mercury	Highest	0.005 ppm
Cadmium	Highest	0.03 ppm
Barium	Highest	1 ppm
Selenium	Highest	0.02 ppm
Lead	Highest	0.2 ppm
Nickel	Highest	0.2 ppm
Pesticide	Absolutly no	-
Radioactive particles	Absolutly no	-
Temperature	highest	40° centigrade

- Mixture of color and smell can be in the water.

3. Grounds and evidence for environmental pollution

In Dawei special economic zone, big industries like charcoal power plant, chemical petrol industry, and fertilizer factory which are affecting the environment are included in the Dawei Industrial Zone project and Mat Ta Phut Area in Thailand, due to the industrial zones such as chemical petrol industry, health, environmental problems, proclaiming deserved rights and suing industries, happened in 2010.

There are about (30) chemical petrol industries in Mat Ta Phut industrial zone in Ya Yaung district, Thailand and are from PTT Plc and Siam Cement Group (SCG) Companies. It is found that in the long run, many people in the community suffered from respiratory diseases and cancers due to the environmental air and water pollution causes by those chemical petrol industries. Mat Ta Phut industrial zone is very much smaller than Dawei special economic zone project area.

Hundreds of people who had consumed mercury poisoned fish and sea creatures due to methane chemical wastages from industries into Bay of Menar Martha in Japan, suffered from diseases. In Italy, as a result of seveto chemical factory explotions, factory workers and community suffered from cancers due to poisonous dioxides.

In 1986, due to Charnobarl nuclear reactor incident, Ukraine citizens had suffered from throat cancer. We can see the evidences of liver disease to factory workers caused by using chlorofluro-hydrocarbon in metal purification factory and lead poison to battery workers.

Factory deposit can cause water pollution. Many evidences have been found that due to factory wastages and biochemical materials in polluted water, many water creatures died and harmed the community. People are poisoned by consuming sea food and it can cause neurological diseases and threaten the embryos and babies. It can cause skin disease as well.

All the fish and organisms living in the ponds situated in New York City, USA on the Adijulesdack Mountain range, over (2,000) feet high died due to the acid rains caused by the chemical wastes produced from the factories carried by air.

A chemical compound, Dioxin, which is present in the waste water from the factories treating chlorine and other chemical compounds and condenser a chemical used in electrical appliances were found in increased amount in the fat cells of human beings and animals. (E.g.Belgium foods) were discovered in the inspection done by World Health Organisation in 1997.

In early 20 century, factories emitting residuals into Thames River in Britain (England) caused low level of oxygen in the water and thus the salmon fish fade away. In 1973, Thames River had been found severely poisoned by mercury.

From 9 liquor factories in Shwe Pyi Thar industrial zone in Yangon, Myanmar, discarded polluted water into the drains and from there into the convergence of Ta Ru stream and Hlaing River. In 1997, Yangon Municipal and conservation of the environmental commission investigated and found that in the convergence Biochemical Oxygen Demand (BOD) is high and the water is polluted.

In the same way, polluted water from Mandalay industrial zone flowed into Taung Taman Inn and as a result of no outlet, Taung Taman Inn was polluted and its bad smell caused health problems. On account of those industries, environmental pollution can damage the wellbeing of human in some way especially diseases may occur and damage the health system. It is very important when finding a country's economy, technology and environmental development and fulfilling the needs of its people should not be harmful to the needs of next generations.

4. Instructions for industries in Dawei Special Economic Zone to prevent destructions and pollution

Major industries, middle industries, and small industries involved in Dawei special economic zone, would draw the precise production process and make record of its residuals quantity in each process. Then only the waste products coming out of factories such as fluid, sediments, dust and particles, gases and chemicals should be dealt according to the standards prescribed by UNEP "cleaner production mechanism, preventing environmental damaged and pollution in water and air control works can be priotised and implemented.

4.1. Instructions and control on water pollution by the waste products from factories

Waste liquids disposed from industries into the surrounding rivers, streams and ponds cause water pollution. Discarding exceeding acid, alkali wastages, and high temperature wastages, poisonous wastages (e.g., cyanide, arsenic, mercury, cadmium, lead, chromium, PCBs) directly into rivers, streams and ponds is forbidden. Myanma Industry allows

discarding wastages into rivers, streams and ponds only when it matches the contents in Table 3, Harmful wastages (USEPA, 1987) and Table 4, the highest acceptable participation in liquid.

In the case of direct discharge, it is allowed only after the period of necessity purification. The need to purify the liquid wastages before discarding, need to collect them in an earthen tank/pond first and let them evaporate and sink into the tank/pond. In doing this have to take into account not to effect the quality of the underground drinking water. Moreover, ways are created in order to use better quality of raw materials, substituting improved production techniques, reducing the waste and recycling.

Furthermore, the liquid wastages from factories such as, fertilizer, chemical, petrol chemical (e.g. hydrocarbon, alkali, phenol, chromium and chemical liquid and methane) sinking and flowing into the ponds, lakes, creeks, streams, rivers and the sea which are near the industrial zone are polluted. Drinking polluted water, exposing to chemicals and eating fishes from the sea and toxic vegetables had caused diseases to people.

For the disposed liquid wastages from the factories, Water hyacinth (*Eichornia crassipes*) is widely used for water purification; which is the natural way for protection. Water hyacinths (*Eichornia crassipes*) can easily suck up some of the chemical compounds in the water and science department in America use Water hyacinths (*Eichornia crassipes*) to cleanse the rivers and streams. In using Water hyacinths (*Eichornia crassipes*) to purify the liquid wastes, it reduces not only the pH value, but also BOD, COD, flotation sediment and the temperature.

4.2. Instruction and controlling air pollution due to gas emitted from industries

Air pollution occurs due to the long existence of unnecessary dirt, smoke and extremely emission of chemical substances into the air. Smoke emitted from industries such as carbon dioxide, carbon monoxide, nitrogen dioxide, sulfur dioxide, ammonia, hydro carbon gas, chlorofluorocarbon gas, dirt and cement are the causes of air pollution. Gas emitted into the air depends on the products and the usage of fuel. Smoke from charcoal causes air pollution more. Smoke from diesel can cause average air pollution and using natural gas causes the least air pollution.

Factories should record the usage of fuel and the measurement of smoke emitted into the air. To prevent the air pollution, industries should grow windbreak trees. Industries should implement continuous research to prevent air pollution in surrounded areas. Building tall chimney can reduce the air pollution by allowing the gas to flow in the up airstream. There are low chances of environmental damage if the low level emission of gas from industries that can cause air pollution.

4.3 Instruction and controlling soil pollution due to wastages discarded from Industries

Dawei special economic zone includes chemical industries, petrol chemical factories, paint factories, rubber factories, food industries and those industries use the large amount of chemical. Large amount of chemical wastages are emitted from those industries and it should be discarded systematically as it can pollute air, water and land in surrounded areas. Records are necessary according to the nature of the factory.

In collecting the wastes of Actinic gas from the gas factory, chemicals that are dangerous from the food products, the waste disposal from the chemical petroleum, sediments and

pulp, reactors and tar, need to be separated for recycling and rectifying. Need to make sure that the particles, bad smell and leakage of liquid in the containers do not pollute the air. Debris like the most harmful liquid and medical wastages must be kept in storage containers which cannot be reacted with them. Used waste liquid (oil, lubrication, drinks) must be kept separately. If it is spilled accidentally, cover it with sawdust which doesn't help in burning. Do not throw waste liquid, solid wastages and radioactive wastages into drains directly. Store and pack separately and then throw them. In disposing, need to abide International laws on methods of carrying and disposing the harmful wastages.

4.4 Controlling the poisonous waste products coming out from the factories

In order not to cause soil pollution and damage to the environment, the factories need to dispose, the waste products and solid wastages which cause the soil pollution, systematically as mentioned above then this may make development in productions and lessen the pollution to the environment throughout the working process.

Keep away poisonous and harmful wastages from the factories. Health of human beings from the developing countries which are going to change speedily into industrial countries can be ruined because of the wastages from the factories. Toxic chemical components in waste products of the factories and harmful wastages can affect the health of the people. Keeping those harmful wastages will be the main vital task of the factories.

If holding, packing, disposing and keeping those wastages from the factories are not systematic, it will be so easy to pollute the environment and the poisonous substances can cause human to suffer from cancer diseases, DNA damaging and can stop the plants from growing.

In Dawei special economic zone there are big plants which can damage the environment greatly such as charcoal power plant, chemical oil factory and cement factory. Like Mat Ta Phut Industrial Zone, which is situated in Ya Naung region, Thailand has environmental issues, health problems and taking that as a lesson learned, the government would state laws, rules and regulations for factories in Dawei Project Zone, in order to protect the Dawei natives from the possible dangers. Therefore, as a suggestion, the supervisors and managers should be careful when disposing the harmful wastages mentioned in Table 3.

5. Laws to control and protect from environmental pollution in relation with Dawei Special Economic Zone and Industrials

In Myanmar, there are implementing projects for national industrials to increase the productions for the economic development of the country. Since 1989, there are 19 industrial zones in Myanmar nationwide. In order to avoid pollutions from harmful waste products of the factories, in August 1995, Ministries of Industry (1) had declared the laws on environmental pollution conservation order (3).

According to the Myanmar special economic zone law number (8/2011), section (4), Dawei special economic zone has been recognized by the government. Advanced technology zones, information and communication technology zones, export goods production zones, port areas zones, support and transportation zones, science and research technology, developmental zones, services zones, transitional and trading zones and zones as required by the government.

The area of Dawei special economic zone is (97) square miles (250 square kilo meters) and the government had approved for (30) years the least by the section (33). Within the special economic zone, the physical features of the rental plot of land or agreement to use the plot

of land should not be changed without the approval which was stated in chapter (7) section (35) sub – section (8).

“Within the Dawei Special Economic Zone approved by the Central, the (19) villages and if there is a need to move houses, buildings, farms, gardens and orchards and cultivation; relocation and compensation would be provided. The cost for this would be borne by either the investment or by the investors” was stated chapter (7) section (34).

Moreover, according to the law number (17/2011) section (34), the (29) villages or within special economic zone, the basic needs of those who have to relocate must be taken care of, and their status should not be lower than before was stated with the intension and with special consideration of the community convenience.

Myanamr special economic zone, law number (8/2011) chapter (6) section (34) and according to Dawei special economic zone law, in section (31) it is stated that the investors are responsible for the environmental and air pollution related with their business, which shows great consideration for the environmental pollution.

For the environmental conservation in Dawei special economic zone, supervision, checking the systems of waste disposal from factories should be as the standards was declared in chapter (4) section (10) sub-section (Nya).

In Myanmar, regarding the environmental conservation, there is no firm law. For the industrial development, also laws related to it should be included. Myanmar investment Law number (2/94) chapter (3) section (10) sub-section (Sa) it is mentioned that “Environmental conservation” and in section (9) sub-section (Nga) a point that should be followed in constructing industries is found.

Myanmar minerals law section (3) sub-section (Sa), it is stated that “environmental conservation should not be damage” indicates that environmental pollution should be considered.

Myanmar environmental conservation, Myanmar Agenda 21 chapter (8) it is refered that environmental pollution because of the industries and for the development of industrial, related policies should be included.

Conservation of industrial environmental pollution relevant to factories in law (1951) section (14) it is indicated that effective plans should be done for the disposal of wastes from the factories and leakages and flow of the drains.

It is stated in notification number (10/99) para (25) to (34) “environmental conservation and rules on cleanliness” that the government would supervised, inspect the disposal wastes if it is according to the international acceptance standards in Dawei special economic zone.

Dawei Deep Sea Port and Industrial Zone that is going to be materialized, the length is 231 kilometers (143.2 miles) and width 200 meters upto Dawei and Thai (Kanchanapuri) (over 600 feet) with four lanes road, railway, natural gas pipe lines, electric power lines would be constructed and these roads will passed through Tanytharyi natural forest reserved, that was stated in 1994, Myanmar (“wild animals and natural plants protection and natural states conservation” law 1994”).

Tanytharyi natural forest reserved [656.37 square miles (or) 420,077 acreas] is the second place where the tigers graze and where valuable forests and trees grow. As mentioned above the roads and railways a (10) year project is going to pass through these forests and

definitely going to damage the environment, therefore, taking into account for the least damage it should be done systematically.

In addition, the construction site of the deep sea port and the docks areas which is (12) kilometers [43,344 kilometers] long is at the north of Tanytharyi coastal and there are beaches and lots of mangrove forest for recreation surrounding the deep sea port.

World wide it is found that the construction of deep sea port and industrial zones damages the coastlines and sea environment. There will be environmental lose for many reasons and to avoid this, those who wrote this project proposal and responsible persons should consider methods, ways and means of the forest law (1994) and coastal conservation and controlling and prevention of the sea pollution notification. Only then, the natives will be able to use the natural resources from the coastal and seas, thus the environmental conservation should follow and take into account.

Furthermore, the Thai authorities suggested that (Environment Impact Assessment - EIA) and (Health Impact Assessment-HIA) should be reflected for the Dawei Special Economic Zones and Industrial Zones.

Within these zones heavy constructions would be done within the first (10) year project and for the second (10) year project the factories would run. As this project is a very heavy one relatively it is going to effect the environmental.

Therefore would like to suggest that, from the time of construction of Dawei Deep Sea Port and Industrial Zones, environmental conservation and industrial impacts as mentioned above are seriously considered and follow the standards, laws, policies and notifications it could reduce the side effects of the environmental pollution

6. Evaluation and future prospects

As environmental related problems are increasing day by day throughout the world, there's improvement in collaboration in environmental conservation works.

Traditionally, the native people in Dawei do environmental conservative activities according to their beliefs in Buddhism such as planting trees, building bridges, digging wells, constructing wayside public resthouse which are the acts of merit. They also think these as the duties of the public.

In Dawei, since the time of Myanmar Kings, wild life sanctuaries, beaches were kept and maintained properly and systematically as environmental conservative measures. In a developing country like Myanmar, the first special economic zone project in Dawei will in some way improve the economic development of Myanmar. No doubt, we need economic development in our country, but it will also effect the lives and rights of the people who had lived in that area for many years. It will also effect their current basic economy.

Dawei Deep Sea Port and the Industrial Zone which would be materialized soon, like other industrial zones, as the economy improves have to be exchange with the environmental pollution and its side effects. Examples of such are found world wide. These examples are the best for Dawei Deep Sea Port and Industrial Zone project and the natives living around the project to consider and adjust the pros and cons.

Increased job opportunities for the nationals and salary could be high, but at the same time, physical development of the project are the strengths and the environmental pollution due to the waste from the factories and the lose of cultural heritage, decrease in psycho social values, lost of the original nature and quality of character, side effects and dangers on health

problems, social and moral problems caused by relationships and intermarriages with the benefactors, have to face weakness on the country's national characteristic and moral ethics.

However, since the economic development is most important for the country and its citizens, and if we can learn well of the pros and cons of some other countries, Dawei Deep Sea Port and Industrial Zone would improve the economy of Myanmar to a certain extent.

As we already and increasingly suffering from the effect of environmental damages, there should be laws on environmental conservation and prioritize conserving the forests.

As the industrial and economy will develop, there will be more damages to the environment. Therefore, laws related to environmental conservation should also be prescribed and enforced. In doing this the participation of the people and the civil society should also be advocated and seek technologies to improve the usage of restorative energy widely at low cost.

Laws regarding prevention of environmental damages and restoration should be amended as necessary. Only then as the industries increased and develop, we can prevent our future generation from the growing threats of environmental pollution and damages.





