

Chapter 4

Results and Analysis

4.1 Introduction

This topic shows the results and data analysis which used methods mentioned in Chapter 3 based on the conditions and policies that addressed in Chapter 2. Differences between China and Malaysia were very obvious after conducted survey and pay visits to respected government offices and departments.

Every country has its own environmental land policies. In order to fulfill the purpose of this study, further investigations on both countries' policies were carried out. Primary focus is comparison the implementation and limitation on environmental land policies.

4.2 A Comparison between China and Malaysia's Environmental Policy on land caused by Agricultural Activities

4.2.1 China's Environmental Policy on Land caused by Agricultural Activities

The main culprit of agricultural land pollution is unreasonably amount of pesticides usage. As a county with large amount of pesticides production (1.9million tons per year) and usage in the world, China's pesticides management is lagging far behind as to compare to other developed countries. It is because there is no laws and regulation on pesticides management until 1980's. The Regulation on Pesticide Management (RPM) was enacted by National Council in 1997, which represented a new transformation for pesticide management in China (Chinese Statistical Department, 2008).

In 1997, China constructed an integrated pesticide management and technical standard based on Guideline of Pesticide Residue Test (Ministry of Agriculture, 1978); Guideline of Pesticide Environmental Assessment Test (State Environmental Protection Administration, 1985); Guideline of Pesticide Safety Toxicological Assessment (Ministry of Health and Ministry of Agriculture, 1991) and many more.

In ensuring people's health and food are in good shape and safety level, China government has set a guideline for usage on various kinds of pesticides in different types of crops. It is name as the maximum residue limit.

The biggest problem that China encountered is the large scale of livestock enterprises (especially pigs and cows) using concentrated feeds for their farm animals to consume. Later, they will discharge the animal waste directly into water bodies. Another problem could arise is the damages of soil ecological process. It is because there is no specific limitation or guideline that the entrepreneurs should follow when applying fertilizers to farm land. Therefore, this is another add on entree to land pollution.

Due to poor planning of existing waste disposal or treatment facilities and lack of legal requirements for environmental impact assessment prior to expansion livestock enterprises has led to current situation where 90% of animal farm in China are equipped with no or inadequate discard facilities. Moreover, lack of integration between live stocks and crop productions, there is no awareness of recycling program on livestock waste especially in the sub urban area whereby these entire mega animal farms are developed. Consequently, the animal wastes are directly discharged into the environment instead of being used as a resource to be processed into organic fertilizers. Statistic from recycling rations of the waste of beef cattle is 44%, pig is 43%, chicken is 10% and dairy cow is 3% (Chinese Agricultural Department, 2008).

Most human foods are originated from soil despite some of us are meat eaters. But animals are only depending on plants to live. If there were no plants, there will be no animals. No animals meaning human won't have meat to consume. Therefore, safety of soil is very crucial as plants, animals and human are inter-related. For further illustration, most pesticides that applied to plants will finally remain in the soil matrix. As a result, soil becomes a storage pool or distribution center for pesticides that existed in the environment.

Pesticides pollution on soil is determined by the physical and chemical contents of pesticides that have been use to spray to natural surrounding as well as duration period to live since its application. We have to take note that each type of pesticides has its own degradation rate to soil. Generally, the slower pesticides degradation, the longer it will resides in soil and easily it will affect the soil fertility rate. Natural conditions does affect too whereby quantity of soil microbe, solar radiation, precipitation, cultivation and many more is concerned. In addition, historic usage of pesticides can determine the seriousness of pesticides pollution in that particular area.

In the 1950's, China were using an inorganic pesticides which contain arsenical lead that resulted pollution of heavy metal in soil and crops. So, this pesticide is banned in during 1970's. Organ chlorine pesticides (OCPs) were used in 1950's too. It is estimated that total amount of HCH and DDT was about 4,900,000 tons and 400,000 tons respectively in China between 1950s to 1983. As a result of excessive usage of organ

chlorine pesticides, the areas of cultivated land polluted reached 14 million hectare, which is about 1/7 of the total cultivated areas. The first survey conducted in 1980's shows that the remaining of HCH and DDT in cultivation layer were about 0.742 mg.kg⁻¹ and 0.419 mg.kg⁻¹ respectively. Ever since the usage of OCP is banned in 1983, the content of organic chloride pesticides in soil started to decline. In 1985, decreasing numbers of HCH and DFT are 0.181-0.254 mg.kg⁻¹ and 0.222-0.273 mg.kg⁻¹ respectively was recorded (Chinese Agricultural Department).

According to result of soil sampling and monitoring conducted by the Ministry of Agriculture in 1989, the residue of HCH and DDT in most part of China have declined from mg.kg⁻¹ (ppm) to µg.kg⁻¹ (ppb). As conclusion, overall soil pollution caused by organic chloride pesticides became less serious. However in some areas, this kind of pollution got worsens. For example, in Fujian province, the content of HCH and DDT in soil is 0.891 mg.kg⁻¹ and 1.04 mg.kg⁻¹ respectively. In Beijing, the maximum content of HCH has reached 1.01 mg.kg⁻¹ meanwhile in Henan province the maximum content of DDT is 1.50 mg.kg⁻¹ is recorded (Chinese Agricultural Department).

From above, although China has a sense of achievement in the control of pollution of pesticides on the land, it still needs to vigorously strengthen the policy binding in terms of the partial. Ensure that the reduction of hazardous substances on land pollution.

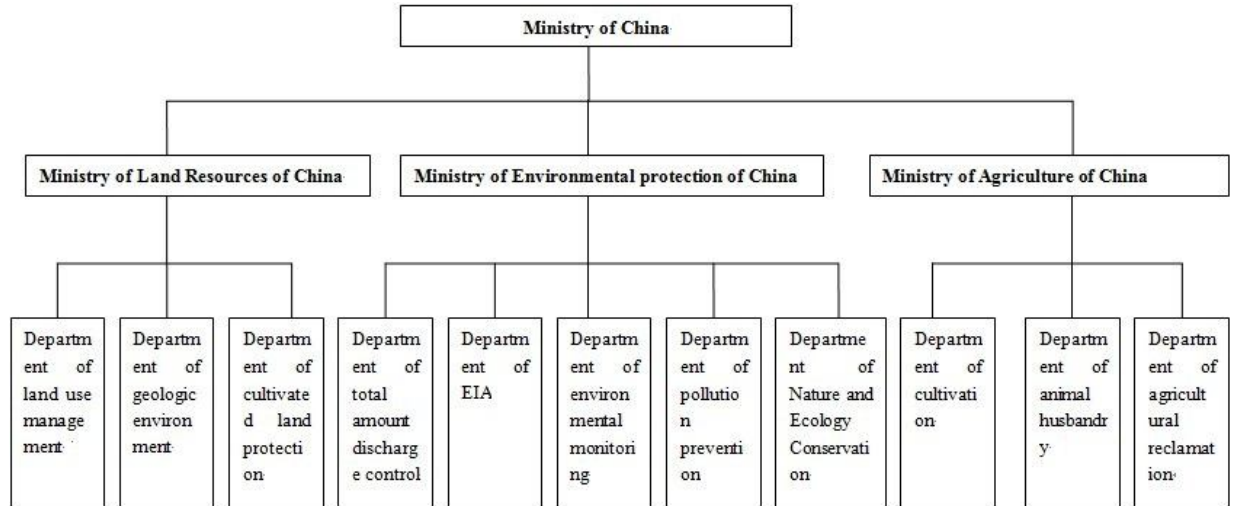
In 1992, a survey on organic chloride pesticides' residue was carried out and shows that the maximum content of DDT in cotton field in Jiangsu province has reached 1.23 mg.kg⁻¹. The recent survey showed that the chlorine pesticides especially HCH attained more than 90% of sampling (An et al., 2004). Therefore, although the tool chlorine pesticides were prohibited for 20 years, the pollution from organic chloride pesticides will last longer due to its persistence characteristics.

After 1983, the substitutes for chlorine pesticides, such as phosphorus pesticides, carbamate, organic nitride pesticides and sulfonylurea herbicides, were used widely in China. These pesticides are easily degraded and exist rarely in soils.

The treatment of land pollution was implemented under the supervision of Chinese Government. Governmental multi-sectoral Cooperation ensure the smooth implementation of regulatory and supervision. In China, normally there are three ministries which are responsible for the environmental protection on land issue. Those are Ministry of Land Resources of China, Ministry of Environmental protection of China and Ministry of Agriculture of China. While, in Ministry of Land Resources, there are three departments which are department of land use management, department of geologic environment and department of cultivated land protection. These departments are responsible for the issues of land property, usage, and planning. These are almost the same as UDA (Urban Development Authority) in Malaysia. In Ministry of Environmental protection of China, there are five departments that are department of

total amount discharge control, department of EIA, department of environmental monitoring, department of pollution prevention and department of nature and ecology conservation. These departments are responsible to establish and perfect the basic system of environmental protection, and develop and implement state environmental protection policy, planning, draft laws and regulations. Finally, in Ministry of Agriculture of China, there are three departments which are department of cultivation, department of animal husbandry and department of agricultural reclamation. These are responsible to organize the zoning of agricultural resources, ecological agriculture and sustainable agricultural development; to guide the exploitation of agricultural land, fishery waters, grasslands, shoals and swamps suitable for agricultural purposes and the exploitation of rural regenerative energy as well as the protection and management of resources of biological species of agriculture. In addition, there is also an authoritative supervision on management of pesticides. The Table 4.1 of the roles of stakeholders related to environmental protection on land in China below:

Table 4.1: The Roles of Stakeholders related to Environmental Protection on Land in China



4.2.2 Malaysia’s Environmental Policy on Land caused by Agricultural Activities

Agriculture sector still plays a very important role in the Malaysia’s development and lots of prominence has been placed on it.

Cameron Highlands, one of the famous tourism places in Pahang, where vegetables and tea were planted. But all these plantations have posed a danger to the fragile environment. Large scale farming has caused thousands of acres forest land to be ploughed up and indirectly it has destroyed the habitat of thousands or even millions of wildlife. Due to this, wildlife starts migrating in order to escape the dangers of human

activities. Without realization, they caused an imbalance in their ecosystem whereby some areas are too densely populated with predators and do not have enough of food to go around the chain.

Malaysia is well endowed with natural resources in areas such as agriculture, forestry and minerals. In terms of agriculture, Malaysia is one of the top exporters of natural rubber and palm oil, which, together with sawn logs and sawn timber, cocoa, pepper, pineapples and tobacco, dominate the growth of the sector. Palm oil is also a major generator of foreign exchange. In Malaysia, palm oil activities are managed by few public and private organizations such as FELDA and Sime Darby

At the same time, FELDA (The Federal Land Development Authority) is the world's largest plantation operator, with 811,140 hectares (2,004,400 acres) of oil palms, mainly across Peninsular Malaysia, Sarawak and Sabah in Malaysia. It also operates plantations and oil mills in Indonesia. Although FELDA is mainly pre-occupied with alleviating rural poverty through resettlement, it reportedly holds a minority stake in some major Malaysian banks.

In addition, Sime Darby is Malaysia's leading multinational conglomerate involved in five core sectors: plantations, property, industrial, motors and energy & utilities, with a growing presence in healthcare. Plantation is Sime Darby largest revenue generator. In 2009, about 70% of the conglomerate profits come from this segment. The company

operates palm oil and rubber plantations in Malaysia and Indonesian islands of Sumatera, Kalimantan and Sulawesi, with a land bank of over 633,000 hectares, including 300,000 hectares in Indonesia (Majalah, 2009). It is one of the largest plantation companies in the world. It is one of the largest plantation companies in the world.

As the world's largest palm oil producer and exporter, Malaysia is now looked upon as the pioneer palm biofuel producer. Malaysia has embarked on a comprehensive palm biofuel programme since 1982 and has successfully established the use of palm methyl esters and the blend of processed palm oil (5%) with petroleum diesel (95%) as a suitable fuel for the transport and industrial sectors.

Palm oil is mainly used as renewable biofuel. This usage will help reduce the use of fossil fuel and indirectly reduce the emissions of greenhouse gases such as carbon dioxide to the atmosphere.

On the issue of rubber, rubber was the dominant crop of the Malaysian Plantation Industry for more than eight decades up to 1989 when the total area of oil palm (1,591,536 ha.) exceeded that of rubber (1,551,000 ha.). By 2005, rubber area represented only 23.45% (1.250 million ha.) of the plantation industry's total area of 5,305,765 ha, of which the area under oil palm was 4 million hectares (75.50%).

Related to this issue, RISDA (Rubber Industry Smallholders Development Authority) was established by the Government of Malaysia as the Government sees the importance of a new policy and strategy for the development of the smallholder sector. With the establishment of RISDA, an organization which specifically guides the smallholder sector towards progress and social and economic development has been created. RISDA will also determine that the nation's natural rubber industry becomes stronger and more stable. RISDA Cooperated with other agencies responsible in research, expansion, agricultural loans, processing and marketing of rubber to speed up the modernization process of the smallholder sector.

Therefore, it is clear that the elements of modernization must be the fundamental basis of RISDA's concept in enabling all our smallholders to utilize modern practices to increase the rubber production quality as well as to earn higher returns.

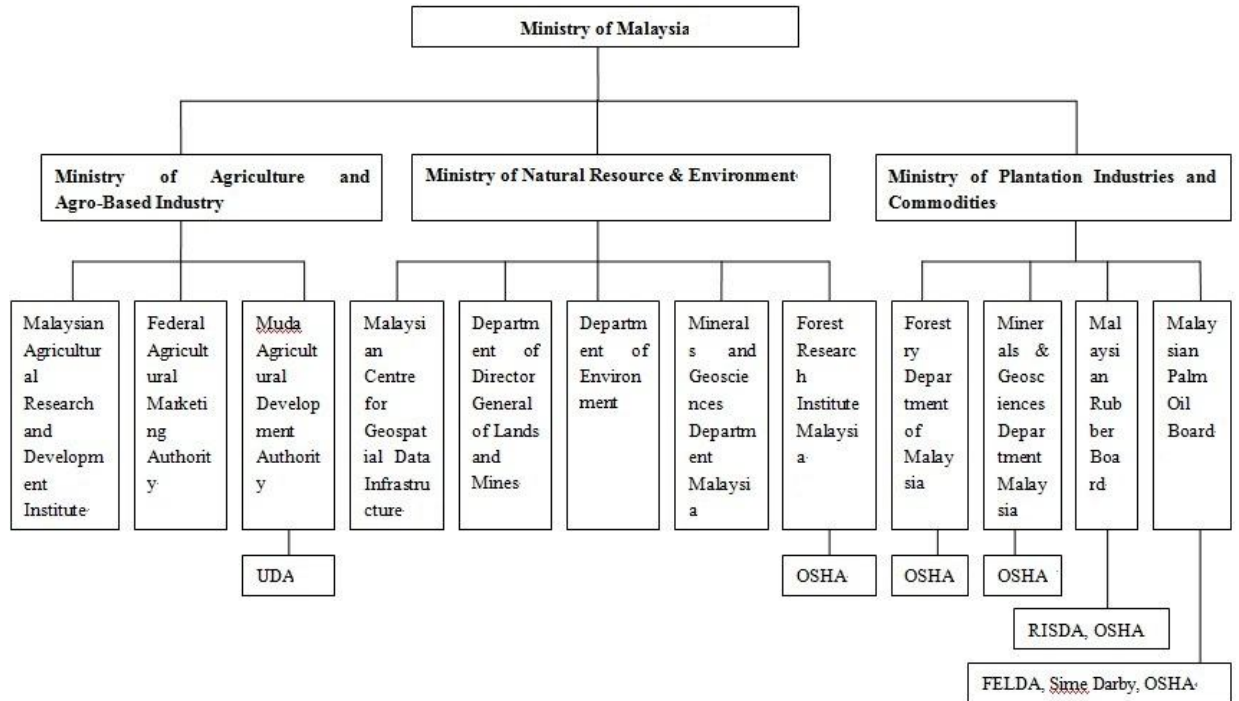
In addition, substantial areas are being silviculturally treated and reforestation of degraded forestland is being carried out. The Malaysian government provides plans for the enrichment of some 312.30 square kilometers (120.5 sq mi) of land with rattan under natural forest conditions and in rubber plantations as an inter crop. To further enrich forest resources, fast-growing timber species such as *meranti tembaga*, *merawan* and *sesenduk* are also being planted. At the same time, the cultivation of high-value trees like teak and other trees for pulp and paper is also encouraged. Rubber, once the mainstay of the Malaysian economy, has been largely replaced by oil palm as Malaysia's

leading agricultural export.

The control of land pollution was implemented under the supervision of Malaysian Government. Departments Cooperation ensure the smooth implementation of regulatory and supervision. In Malaysia, normally there are three ministries which are responsible for the environmental protection on land issue. Those are Ministry of Agriculture and Agro-Based Industry, Ministry of Natural Resource & Environment and Ministry of Plantation Industries and Commodities. In Ministry of Agriculture and Agro-Based Industry, there are three departments which are Malaysian Agricultural Research and Development Institute, Federal Agricultural Marketing Authority and Muda Agricultural Development Authority. The UDA (Urban Development Authority) is managed by this ministry. The mission of these departments is to transform the agriculture and agro-based industry into a modern, dynamic and competitive sector, to position Malaysia as a major world food exporter and to develop the agriculture sector as the country's engine of growth. In Ministry of Natural Resource & Environment, there are five departments that are Malaysian Centre for Geospatial Data Infrastructure, Department of Director General of Lands and Mines, Department of Environment, Minerals and Geosciences Department Malaysia and Forest Research Institute Malaysia. These departments are responsible to ensure well balanced management of natural resources and environment in achieving sustainable development, to ensure efficient and effective service delivery system of natural resources and environment management, to establish training and research and development (R&D) as an innovative exploration

catalyst in natural resources management and environmental conservation and to ensure a clean, safe, healthy, productive and unpolluted environment. Finally, in Ministry of Plantation Industries and Commodities, there are four departments which are forestry department of Malaysia, Minerals & geosciences department, Malaysian rubber board and Malaysian palm oil board. RISDA is a rubber plantation section which managed by Malaysian rubber board. In addition, the mainly works of Sime Darby and FELDA are supervised under Malaysian palm oil board as palm plantation. These are responsible to ensure Malaysia's international competitiveness in the commodity-based industries and their contribution towards national development, to maximize the contribution of the commodity-based industries to national income including GDP and foreign exchange earnings, to make Malaysia a centre of excellence in R&D, technology and services in commodity-based industries and to increase the efficiency, productivity, quality and sustainability of primary industries. (Table 4.2)

Table 4.2: The roles of Stakeholders related to Environmental Protection on Land in Malaysia



Pesticides usages in agriculture play a main role in the degradation of environment. Most of these pesticides contained non biological ingredients which can cause abnormal changes to any wildlife that comes across it. The chemicals carry on the transmission through the form of food chain. Pesticides primary aim is insects but once animals consume these affected insects as their food, the last “victim” is human bodies as we will endeavor the animal.

The cons of pesticides usage is natural minerals in soil will be slipped away or contaminated. It made the piece of land to become useless and poisonous. Hence, the land will be unproductive for years before it is able to recover to its normal pH level and

nutrients. Pesticides also flowed into rivers, streams and sea, causing pollution. Situation will get worsen if its' continue to stream down the seaward journey.

A minimal amount of pesticides usages are harmless and eventually help to increase the production rate of agriculture by eliminating unwanted pests. However, pests will start to build up a defense system in their bodies to overcome it and probably will be immune to the chemical effects. By this time, farmers will get trouble to get rid off it and have no choice except to increase the amount of pesticides or using much 'stronger' pesticides. The consequences of this action are hard to be imagined.

For example, Felda Agricultural Services Sdn Bhd has also collaborated with Malaysian Palm Oil Board (MPOB) to develop a technology to mass produce a bio-pesticide product, *Metarhizium anisopliae*. This widely distributed soil-inhabiting fungus kills a major oil palm pest, the Rhinoceros Beetle *Oryctes rhinoceros*. The collaboration culminated in the setting up of *Metarhizium* Technology Centre (METEC) at Tun Razak Agricultural Services Centre (PPPTR) in 2005. The centre produces a powdered *Metarhizium* formulation called ORY-X used to control Rhinoceros Beetles in oil palm replanting areas.

The oil palm industry follows a long life cycle of 25-30 years, which means that the land needs to be cleared once only during this period. In contrast, intensive agriculture undertaken for annual oilseed crops leads to detrimental consequences for the

environment, including soil erosion and land degradation, due to pesticides and nutrients from greater use of fertilizers.

In Malaysia, some organizations and the companies are also responsible for the environmental issues on land. Some of them obey the environmental policy on land or Pesticide Act 1974. The following table 4.3 shows the organizations and the companies taking place the environmental policy on land and environmental system issues.

Table 4.3: Organizations and the Companies taking place the Environmental Policy on Land and Environmental System Issues

Implementation	FELDA	Sime Darby	RISDA	UDA
Policy on Land	Yes	Yes	Yes	Yes
The usage of Pesticide	Yes	Yes	Yes	No
Environmental system issues	the use of pesticides to plant palm in accordance with <i>Pesticide Act,1974 & OSHA,1994</i> .	the use of pesticides to plant palm in accordance with <i>Pesticide Act,1974 & OSHA,1994</i>	the use of pesticides to plant rubber in accordance with <i>Pesticide Act,1974 & OSHA,1994</i>	UDA is a governmental agency in Malaysia. It serves to launch and oversee urban development projects related to business, industry, and housing. It is also tasked with developing urban infrastructure.

Legal or illegal logging has made its mark in the degradation of nature. Malaysia has become a dumping site to millions of tons waste that were thrown every week from household due to the increments of human population.

This critical situation has attained Malaysian government's highest attention whereby curbing approaches was formulated in accordance with environmental land policies.

4.3 A Comparison between China and Malaysia's Environmental Policy on Land pollution caused by Industrial Activities

4.3.1 China's Environmental Policy on Land pollution caused by Industrial Pollution

Currently, China is in a rapid growth of industrialization development. Hence, exploitation on natural resources has increased tremendously. It leads to a greater pressure in improving the quality of land. In an article published by *China's Environmental Year Report of 2008*, it reported that although China's industrial pollution is in a serious condition, statistic on land contamination has not increased which govern by the same relevant policies. At present, industrial pollution comes from enterprises have achieved the discharge standards, which create a favorable external environment to improve land management policies.

Currently, a further approach in prevention, control and measures of industrial pollution policies has been taken. When doing the Environmental Impact Assessment on "3 Simultaneous systems", sewage permits system, deadline management system, centralized control on pollution and pollution levy system; the results are more rigorous

and consistent. This proves that these policies are practical.

However, China shouldn't just stop the present success rate. It is because everyday more and more waste will be disposed due to human's lifestyle and also limited space for waste landfill. Moreover science and technology always changes and develops. So, from time to time, these pollution policies should be revised accordingly to the condition at that time.

4.3.1.1 Three Stages of China's Pollution Prevention and Control

In the application of land management, China has categorized prevention and controlling methodology for industrial pollution into three stages. Firstly, stage of waste management. Secondly is stage of integrated prevention and treatment and lastly stage of restructuring. These three stages showed three types of different eras and modules that China's took to overcome this matter. The modules are end-of-pipe treatment, integrated control and structural adjustment.

The model of end-of-pipe treatment started from 1973-1981. It focuses on organizing and comprehensive utilization of waste management during this period which was limited by the central planning system and awareness level on land issues. Failure to control industrial pollution is because of the responsibility of various departments and local businesses. The crises that lead to this failure are:

1. Controlling power is not clear. It is because there are many protocols in Government's office that need to be referred when dealing an issue. For example, cases reported in district should be referred back to district office and not the city council.
2. Management systems are relatively weak. Despite protocols to be followed, there are some departments whom practice ping pong system. It means transferring the hassles from one party to another party.
3. Standard of regulations and policies are not complete. As we know China is governed by Central rules. However, these central rules can't be practice 100% at other district or province.
4. Investment of management are basically comes from the national budget. It is because it needs a huge sum of money to be invested and the profit return is not guarantee. Therefore, not many private entrepreneurs' are willing to take this risk.
5. Long term history problems. If looked back to history, land pollution has occurred many years ago and still can't be solved due to advancement of science and technology and also quality of human life.

All these crises lead land issues to be in more critical condition.

The integration control stage is from 1982 to 1995. During this period, China's industrial pollution policy has gone through many changes and new standards in order to create awareness of land problems. In 1982, the first national's experience sharing session on pollution prevention and control of industrial system was held. At the end of the session, there are five basic policies that were concluded. They are:

1. to adjust the unreasonable distribution of industrialization land
2. to transform industrial pollution combined with technologies
3. to integrate utilize the industrial waste
4. to improve the level of waste emissions
5. to enhance the dealing with land management

These five policies are the primary tool for China to prevail pollution problem. Land management has positioned at highest level in strategic awareness of the textile industry pollution. It is because the demand for fabrics from around the world has increased tremendously. Hence, to ensure the demand is meeting, effective land management is necessary.

In October 1993, *Second National Industrial Pollution Control Conference* was organized by Chinese Government. This meeting has summarized China's industrial pollution prevention and control work on the application of land management in the past decade. Hence, new planning and strategy of National Industrial Pollution Control

especially land application on 1990's has been lay out. It can be said that this is an important milestone mission for China in battling industrial problem.

Industry restructuring stage was introduced on 1996 and is been practiced till today. China started to control the pollution caused by large-scale industries during the Ninety-Five Year planning. At this time, economic restructuring was emphasized. Companies that "contributed" to the seriousness of pollution were forced to closed down or suspend its operation. Some companies were merged with others or change its current product production to another type due to excess productivity. Furthermore, outdated technologies, equipments of small enterprises and things that lead to pollution emissions were banned. Quality of land is improved and it manages to support the capacity of industrialization. At the same time, five main industries (chemical industry, light industry, electric power, machinery and building materials) were appointed as cleaner production pilot for 10 cities (Beijing, Shanghai, Chongqing, Tianjin, Taiyuan, Ma'anshan, etc.) (Ministry of Chinese Environmental Protection, 2008). The purpose is to improve the carrying capacity of land and to reduce emissions of industrial pollutants in the main line of the structural adjustment period (from 1994 until now). This mission will be continuing for decades.

In order to achieve cleaner production objectives, the Government put forward a method called positive and negative grades of industrial assessment. If a factory was defined as negative grades by the expert panel according to *China's production safety policy, 2002*,

it will be enforced to stop producing. Such recognition, in another way will force the respective entrepreneurs to use better technology in order to upgrade or improve their ratings in the next round of assessment (Sammalisto and Brorson, 2008).

To enriched more effectiveness in controlling pollution, maybe in future China can proposes Cleanliness and Eco-Friendly awards or rating to entrepreneurs that fulfill its requirements. In another words, this awards is an express ticket for that entrepreneur to market its services or products to other nations or international level. It is like Government's accreditation for that entrepreneur's services or products quality control. In Canada, the outstanding enterprises of cleaner production will receive government funding awards (Kim, 2000). In Germany, both the government and companies actively support corporate environmental responsibility through Cleaner Production. Cleaner Production Germany (CPG) is an Internet portal or gateway, which provides in-depth and comprehensive information about the performance of German environmental technologies and environmental services. Moreover, CPG also provides information about national and international support and promotion tools and contacts in the field of technology transfer are available (Damian, 2002).

4.3.1.2 The Implementation of Control on Industrial Pollution

The Environmental Impact Assessment and the “3-Simultaneous system” are the key elements in conjunction with "prevention first" principle of land protection. Furthermore, environmental management system is the important legal system of China’s land protection. In recent years, the management of contaminated land is via technology transform, process reform and elimination of obsolete facilities and products. If the whole process is in control, the implementation of cleaner production and minimization of waste and other new approaches can be applied. Of course, this will enriched the new contents into system. In the mission of reducing industrial pollution on land, China actually encouraged and support actions of clean production, reducing the amount of pollutants been generated, the rational use of natural resources, prevention of land pollution and ecological damage. Currently, *Cleaner Production Promotion Law* is being formulated in China.

Throughout the progress of development in prevention and control of industrial pollution, it is proven that:

- Economic restructuring is the fundamental approach to control the industrial pollution and to improve land management.
- Publicity of industrial pollution control is focus on pollution control in the affected areas. The improvement of land is start from the local.

- to strengthen the land management system is the main step of industrial pollution prevention and control on land.
- to strengthen the law enforcement team is an assurance in combating industrial pollution on land protection.

4.3.2 Malaysia's Environmental Policy on Industrial Pollution

In 1996, three sectors were stressed cleaner production on sewage discharge, textiles and metal finishing. Violations happened because of inadequate affluent treatment, increase in production without commensurate in boosting treatment plant capacity and slow response to plant upset. There are 4 palm oil mills and 4 rubber factories licenses were temporarily suspended and withdrawn due to repeated violations of licensing conditions (Hashim, 2000).

As for non-prescribed premises, under the Environmental Quality (Sewage and Industrial Effluents) Regulations 1979, metal finishing and leather industries have yet to comply with the requirements of these regulations. In addition, prescribing of draft regulations for specific control is still under vetting by the Attorney General's Chambers. Occasionally, non-compliance regulations were reported for other industries, in respect to Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended solids (SHEAR STRENGTH), and Oil and Grease.

The overall industrial compliance with the Environmental Quality (Clean Air) Regulations 1978 was generally in satisfactory level, although smell and fugitive emissions remained problematic. To banish smell in the air in 100% successful rate is a mission impossible (Azorín, et al., 2008).

Smell can come from various sources. For example, gas or smoke emission from industrials, carbon monoxide generated by busses or cars and many more. The relationship between industrial activities and land pollution is the stinky smell which comes from waste that been thrown by factories. Despite stinky, it may generate poisonous gas to the air. If weather is too hot, open air fire may occur. This is an unpleasant or danger environment for any living things to stay.

4.4 A Comparison between China and Malaysia's Environmental Policy on Domestic Activities

4.4.1 China's Environmental Policy on Land caused by Domestic Pollution

The policy of *Pharmaceutical pollution prevention technique policy of domestic waste disposal* is suitable for overall management and application of waste technology from collection to transport and to dispatch waste at landfill. It can be used as a guideline in planning, set up, design, construction, running and management of waste treatment facilities. It can also lead the development of related industry products.

As stated in the policy, professional planning related to waste disposal and overall arrangement and scale of waste treatment facilities should be stipulated under the guidance of master plan of the city and environmental protection plans. In the conditional area, planning of waste regional facilities and centralized treatment are encouraged.

The policy also stressed that overall management on waste production should be strengthened accordingly to the reduction, recycle treatment and to reduce the production of waste from source. The innocuous treatment and waste recycling should be implemented in prevention of environmental pollution.

Moreover, there are co-related service condition for the technology and machinery of landfill hygiene, burn, compost and recycling. Among all, one of it will be chosen as a tool to fit into local conditions, feasible technology, reliable gadgets, appropriate scale and utilization. At the landfill field of possessing and suitability natural conditions, landfill hygiene is considered as the basic requirement of waste disposal. In a city that lack of hygiene landfill resource due to economic condition and waste calorific in terms of possessing, treatment technology of incineration can be developed. Any suitable biological treatment technology should be developed actively and encourage adoption for such ample treatment. Overloaded and uncontrolled piling up of waste is forbidden.

This policy also stated that the construction of waste treatment facilities should be aligned with the basic construction process and environmental impact assessments. In the waste treatment facilities operation course, any confirmation and supervision of disposal pollutants should be toughen and punished whoever failed to obey the policy.

Diversification of investment on construction facilities is encouraged. Fields that they can look into are garbage disposal, marketing, standardization of machinery and automation of controlling. It also encourages society of all levels to participate actively in waste reduction, categorized collection and recycle.

Under this policy, it is made known that development of technology in waste disposal must base on scientific and technology progression. The new technology should be positive in research and new skill should be adapted. In order to improve technical equipment of garbage disposal, selection on new machinery and materials for use and strengthen technology integration are necessary.

4.4.2 Malaysia's Environmental Policy on Land caused by Domestic Pollution

Department of Environment (DOE) has adopted a three-pronged strategy in handling environment problems especially land management. It can be categorized as short, medium and long term measurements. Short term strategy is focusing on

implementation of existing legislation whereby it control discharges and emission pollution from the main sources. Medium term strategy is emphasized on incorporation of an environmental component into development planning process. And long term strategy is to ensure development involving both physical environment and quality of life is in extensive running or planning.

DOE is the main environmental controller in regard with environmental issues. It practiced problem solving approaches. However, recently, DOE has taken a step further from its current approaches to a more systematic and holistic approaches which encompassed monitoring enforcement, development and planning. Monitoring is done on a regular basis as six months in order to collect and compile environmental data which required for the assessment of the state of the environment. This assessment is basically acting as prerequisite to enforce any actions. Only areas that are critically affected will be given priority to have retreatment actions specifically towards the major contributor of pollutions.

Currently, Kuala Lumpur produces 3,500 tonnes of domestic and industrial waste per day. This could fill up the Petronas Twin Towers up to a height of 11m. Meanwhile, waste generated by an average household is approximately 0.8kg to 1.3kg per day (Sooria, 2009). If to compute all the quantity of wastes that have been thrown by these three parties (domestic, industry and household), it would be able to fill up both towers in 40 days. To add on, these wastes will be rotting in landfills and producing a toxic

poisonous called leachate which will contaminate our rivers and seas. The gas emission of nitric oxide and methane into the greenhouse will be 21 times more potent than carbon dioxide.

In order to solve this misery scenario, the government has come out with a solution which is called vermicomposting. It means, using worms to compose the waste and produce a richer end product call vermicompost fertilizer. This vermicompost fertilizer offers an effective stand alone protection against plant diseases. Hence, this can lessens the usage of pesticides on crops. It also helps to expand the landfill's lifespan, eco-friendly and back to nature practice. At present, Kuala Lumpur was chosen to be the first test runner on this new approach due to high traffic of population (Sooria, 2009).

If vermicomposting practice in Kuala Lumpur is a success result proven, therefore the DOE or Government should proposed this plan to national level whereby the whole nations will be practice it either in residential areas, school, business complexes, hotels, factories and hypermarkets.

4.5 Government's Interview

4.5.1 Interview Information from National Ministry of Land Resources in China (NMLR)

The officer that been interviewed gave a very dim view of China's current situation on land pollution control. It is because China does not have sufficient land policies and laws.

Nowadays, land pollution does not only a major problem that Asia is facing but it is even to the world. In order to curb it, environmental policy on land is the main tool. Developed and upcoming developing countries should study and practice each other's experience in tackling this problem.

4.5.2 Interview from Department of Environment in Malaysia

During the interview session with the officers from Department of Environment (DOE), they have presented some situations and suggestions in improving Malaysia's environmental policy on land. It short, DOE is responsible for EIA environmental management and protection. Malaysia is well known for its outstanding achievement in water and air management. Presently, any problems regarding to environmental policy on land is comparatively concerned by Government's work. Therefore, it is necessary to

have relevant policies and laws on the land protection. It will involve environmental protection on the contents of land protective policy from nowadays onward. It also studies lessons from the policies and regulations from water and air to manage the land.

Moreover, research on field land management is carried out. The areas that included are land pollution control, land-use planning, land protection and ownership. Most of this mentioned areas are guided by relevant policies and laws. But some are like “an innocent infant”. Relationship between land ownership and land protection is very close related.

The land ownership includes trading, usage and planning is the main element to control land pollution. By doing comparison, we will have a better outcomes. China is having the same land pollution problem as Malaysia. So, both countries should study each other’s pros and cons in handling this issue and try to improve each other’s conditions.

4.6 The History of Acts in Malaysia

Everything in existence is reasonable, so do the Act. When people cannot solve new problems, corresponding law will be promulgated. In 1920, rivers and sea of Malaysia were polluted seriously, and Malaysian people were not health because of the bad drinking water. Thus Malaysian *Water Act 1920* was first published. This law formulates on water protection, controlling of rivers and streams, and some areas related to water,

such as river bank, agriculture, and land. While before 1952, some of Malaysian were killed by the poison. At the same time, *Poison Act* came out. It was making provisions for the sale of non-medicinal poisons and pesticide. In order to protect farm land, *Pesticide Act* was published in 1974. This Act is more complete in detail than *Poison Act*. At the same time; it could be the base for future environmental policy on land. Water and food are the key elements to human life, thus Malaysian *Food Act* was published in 1983. This act can be ensure healthy food. Before 1994, lots of workers were dangerous in their work because of some poison or structure around them. As this, *OSHA 1994* was published. This act can protect plantation workers or builders. Around 1998 and 2002, Malaysian environment and Biodiversity were damaged seriously. At the same year, *National Biodiversity Policy* and *National Policy on the Environment* were published. These two acts can protect bio-ecosystem and the habitats of plants and animals. Because this, environmental policies on land in Malaysia were more comprehensive. The following Table 4.4 was shown below:

Table 4.4 Time-frame of the History of Act in Malaysia

Publish Year	Policy or Law	Description
1920	Water Act	An Act to provide for the control of rivers and streams.
1952	Poison Act	An Act of the Parliament of Malaysia making provisions for the sale of non-medicinal poisons and pesticide, and the involvement of local authorities and Malaysian Government in their regulation.
1974	Pesticide Act	Under the Pesticides (Pest Control Operator) Rules 2004, a person carrying out any of the following activities or engage in the business of applying pesticide to the property of another for hire must at any time possess the relevant license issued by The Pesticides Board of Malaysia,
1983	Food Act	To address food safety, there are, according to food safety, some issues with its effectiveness. Many facilities, such as farms, restaurants, and nonprofit food establishments in which food is prepared for or served directly to the consumer are exempt from the requirements of the bill.
1994	OSHA	The principle of the Act is "To make further provision for securing that safety, health and welfare of persons at work, for protecting others against risks to safety or health in connection with the activities of persons at work, to establish the National Council for Occupational Safety and Health and for matters connected therewith".
1998	National Biodiversity Policy	The principal aim of the National Forest Policy, 1998 is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant.
2002	National Policy on the Environment	To achieve a clean, safe, healthy and productive environment for present and future generations, and sustainable lifestyle and patterns of consumption and production.