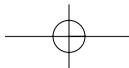


Greening development



Changing environmental policies and practices in East and South East Asia



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A major question for the Environmental Policy Group is how to stimulate more sustainable technologies such as this biogas station in Changdong.

Introduction

China started to construct small scale biogas stations in 1997, to promote green energy among farmers. Workers put rice husks, cornstalks or forestry biomass in the feeder and, after combustion, purification and storage, the gas is transported via underground pipes to individual families – 2.5 kilograms of biomass produces enough gas to cook meals for a whole day. By 2005, Shandong province had constructed biogas stations in 200 villages.

Unfortunately, most of these installations are no longer functioning. The equipment has jammed because of tar, the pipes have started to leak methane and carbon monoxide, or the steel parts have been damaged by the wet fuel that is used when no dry fuel is available. The station managers often do not know who to contact for assistance, or have no money to pay for the badly needed repairs; the municipal authorities set the price of the biogas at a very low level. The provincial officials are unaware of the problems, and they do not always know who is responsible for these demonstration projects. Worse still, some families tried to tap the biogas illegally, and many other families were not interested in participating as they did not have enough information about biogas.

The difficulties surrounding the introduction of these biogas stations in Shandong province, evaluated by researchers from the Environmental Policy Group at Wageningen University, are typical of many of the challenges East and South East Asian countries are facing at present. The economic growth of China, Vietnam, Malaysia, Thailand, Indonesia and other countries is placing a heavy burden on nature and the environment. Although national governments are in favour of implementing biogas installations, sewage systems, waste recycling practices and other technological solutions, political, economic, institutional and social factors hamper their introduction at the local level. Too often the emphasis is only on technological solutions, neglecting the social dimensions that form an integral part of their successful implementation.

A major question is how to stimulate more sustainable technologies such as biogas stations. What role can governments, industries, branch associations, international traders, local communities and non governmental organisations play in motivating producers and consumers to adopt more sustainable practices? What democratic space do members of the public have to campaign against polluting (state-owned) plants? What role can researchers from OECD countries play in facilitating more sustainable practices?

The Environmental Policy Group at Wageningen University has been investigating these kinds of questions since 1997, when the group started its Asia environmental research programme. Twelve East and South East Asian researchers have received their PhD degree from Wageningen University – all under the guidance of Arthur Mol. In 2008, ten Asian PhD students are still carrying out their doctoral research, while several others are at the start of their four-year PhD programme. All are investigating the complexities of environmental governance, and searching for solutions to the often identified governance failures. They all use and adapt theories and models which are in one way or the other related to the idea of Ecological Modernisation.

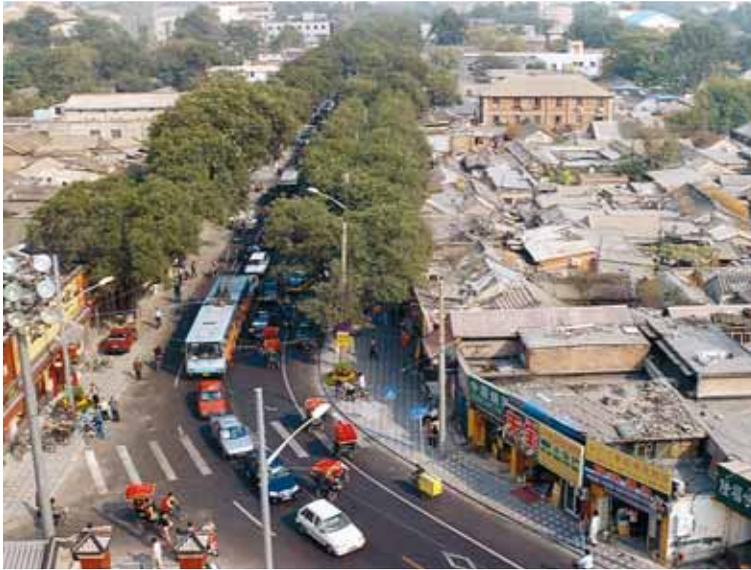
This publication reports on some major conclusions of this East and South East Asian programme, and is aimed at a broad scientific audience. In the first chapter, we report on the growing democratic space (i.e. opportunities for people to combat polluting practices) in China as a result of the worsening environmental crisis there. We also suggest that Chinese environmental NGOs only can succeed by continuously relying on a broad network of personal relationships.

The second chapter demonstrates that international standards such as Codex and ISO 14001 – in fact, translations of the concerns of Western consumers – are the main incentives for companies to clean up their production practices at present. A win-win situation may emerge, as governments and branch organisations can assist export businesses to achieve the new environmental standards, and hence improve both the environmental performance and the export position of the country.

The third chapter focuses on the growing number of dirty and noisy small and medium-sized enterprises (SMEs) in East and South East Asia. These companies produce for local communities, and are often among the ranks of the many ‘invisible’ suppliers of vast amounts of shoes, clothes and processed foods to the OECD countries. Such SMEs need an environmental policy that is tailored to their specific problems, which include limited resources such as a lack of time, education and money, as well as their overall lack of political power. Moreover, research institutes, banks, suppliers, insurance companies and tax-agencies could improve SMEs’ environmental performance by devising programmes specifically for them.

Another topical question is whether environmental technology developed in the OECD countries is also suitable for countries such as China, Malaysia, Thailand or Vietnam. In the fourth chapter, we show how system analysis and technology assessment can help when it comes to setting priorities for environmental policy.

Finally, in the fifth chapter, we reflect on the usefulness of the Ecological Modernisation ideas for East and South East Asia. The OECD countries have learned to eco-modernise their industrial production as a result of many changes in the fields of technology, economics, politics and civil movements, but will these Asian countries go through the same changes?



Traffic in Beijing. Mounting environmental problems have led some high officials to make pleas for more democracy.

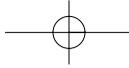
1 People's power on the increase

China's worsening environmental crisis has resulted in growing democratic space to combat unsustainable practices. The first successful actions against polluting mega-projects show that internet and independent NGOs, journalists and scientists can have a strong impact on the adoption of more sustainable practices.

In December 2007, the Chinese government scrapped its plans to build a dam at Tiger Leaping Gorge on the upper reaches of the Yangtze River. This enormous dam would deliver energy, but building it would also have destroyed temples and unique plants and animals, and displace some 100,000 minority residents. In the international press, the decision has been seen as a milestone for growing grassroots political movements in China. Local residents started protests against this dam with the help of NGOs and the media, resulting in a demonstration in March 2006. Until recently, critical members of the social elite were put under political pressure or detained, and protest movements were often crushed. This still happens, but the atmosphere is changing, according to many analysts in the field. Today, Chinese citizens have more opportunities to combat unsustainable practices, and this is also one of the most exciting and important conclusions of the Wageningen South East Asia programme.

Legitimacy challenged

Confronted with growing environmental unrest, the legitimacy of the Chinese Communist Party government is increasingly being challenged. In 2006 China's top environmental official, Zhou Shengxian, announced that citizens complain about water pollution, water shortage, poisoned air, spoiled crops and other environmental problems. Their complaints, expressed through government hotlines and letters to local officials, are increasing at a rate of 30 percent a year, and reached nearly half a million in 2007. But as few of these problems are resolved satisfactorily by local government, people throughout the country are increasingly taking to the streets. There were 51,000 pollution related street protests in the previous year, amounting to almost 1000 protests each week. Added to that, it is becoming increasingly difficult to ignore the problems. Even some high Chinese officials have admitted recently that the Three Gorges Dam, another



huge hydropower project in the Yangtze River, is spawning environmental problems like water pollution and potentially severe landslides.

The mounting problems have led some high officials from Beijing to make pleas for more democracy. As Pan Yue, deputy director of China's State Environmental Protection Administration (SEPA), said in his speech 'Green China and Young China' in July 2007: 'Environmental protection cannot be advanced by the SEPA alone. It requires action from the whole of society, and the establishment and implementation of democracy, and a mature legal system. (...) Environmental protection is the ideal field in which to experiment with democracy and law, because it is a fairly apolitical area and one on which it is reasonably easy to reach a consensus.'

The changed attitude of Beijing has resulted in a growth of grassroots organisations and other NGOs. Xie Lei, working at the University of Beijing, studied these civil organisations under supervision of the Environmental Policy Group. In the early 1990s, there were very few independent environmental NGOs; the mid 1990s saw an increase in their growth. Chinese environmentalists were particularly inspired by the Rio Declaration, following the United Nations Conference on Environment and Development in 1992. During the same period, multilateral banks, bilateral aid agencies and international NGOs poured into China. According to the (government supported) all-China Environmental Foundation (ACEF), there were approximately 2768 environmental NGOs in 2005. With only one environmental NGO per 400,000 inhabitants,

the density is still a fraction of that in Europe, India or Brazil. However, although the figures are not completely reliable, they do seem to indicate that civil society involvement in environmental NGOs in China is growing.

Environmental protection
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Petrochemical plant

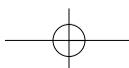
In March 2008, the mayor of the rich coastal city of Xiamen proposed relocating a controversial, newly planned 1.4 billion dollar petrochemical plant. The step

was hailed as another 'milestone' by the international press. The decision was in response to peaceful marches, organised by middleclass people including students and professors at Xiamen University. The activists are said to have sent out a million mobile-phone text messages urging citizens to take to the streets. Their actions were strengthened by a successful petition among Party members organised by a professor of chemistry in Beijing. The powerful National Academy of Science in Beijing wrote a critical report, and the resistance was overwhelming during the public hearing organised by the Xiamen city authorities in December 2007. The project will probably be realised in Zhangzhou, another city in the province, partly as a result of the campaign, but also because the plant would severely affect the prices of villas the city is planning to build on the coast.

Xie Lei also analysed the successful campaign against 13 large dams in the Nu River. After Yunnan province started constructing these dams in 2003, Green Environmental Volunteers (GEV), an NGO in Beijing, started a campaign resulting in critical press articles, TV and radio programmes, scientific reports, photo exhibitions, an interactive website and excursions to the Nu River. As a result of the widespread attention drawn to the negative aspects of the dams, the Chinese premier Wen Jiabao called a halt to construction in April 2004.

Chinese culture

Xie Lei's detailed analysis demonstrates how the lack of democratic institutions influences the way Chinese grassroots organisations have to work. Chinese NGOs are very different from Western NGOs: personal relationships are the most important weapon in their strategies to



combat unsustainable practices. In the anti-dam campaign, the informal network of Ms Wang, a journalist in Beijing, played a crucial role. She was the founder and leader of Green Environmental Volunteers (GEV) that started the campaign, and her broad network consisted of activists from the student movement in 1989, as well as journalists, scientists and the leaders of other NGOs. Many of them also participated in her radio programme 'Environmental Protection Focus'. Ms Wang made decisions herself, and then disseminated them by phone or email. Of major importance for the final outcome was her close connection with Mr Lu, an official at the State Environmental Protection Agency (SEPA), who provided Ms Wang with up-to-date information. SEPA itself had serious reservations about the 13 dams, but did not have enough authority to influence the proposal, so Mr Lu's connection with Ms Wang was silently approved of by a small group of people at the top of SEP.

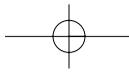
The campaign was only successful because Ms Wang's network in Beijing was not dependent on the local officials. There are many NGOs in Kunmin, the capital of Yunnan province, but neither government-funded NGOs nor well-funded international NGOs organised any form of objection or protest. Under pressure from the local government, they were prevented from expressing critical opinions about the building of the dam. The Centre for Biodiversity and Indigenous Knowledge, a government-organised group that is committed to promoting local participatory governance and biodiversity protection, attempted to produce an internal report directed at the provincial government. It did not succeed because of the political sensitivity of the issue. Only one, very poor, student organisation was active in Kunmin, and they turned to Ms Wang to strengthen their influence.

Personal networks

Chinese environmental organisations rely heavily on personal networks, Xie Lei concludes. In most of the NGOs she studied, it is one charismatic leader who collects the money, speaks to the journalists and ensures the members' loyalty to the NGO. Most NGOs owe their existence to one particular individual, often a woman. Only in Shanghai did Xie Lei find local NGOs with a degree of formal organisation; there, staff members were more or less replaceable. This is probably due to the relatively institutionalised formal culture in Shanghai, she thinks, and the fact that the NGOs there are supported by international umbrella organisations – many international NGOs have their Asian headquarters in nearby Bangkok, and for them Shanghai is an easy entry-point for China.

Personal relations with political authorities are the only way to acquire useful information at present. The availability of information, for example about emissions or new building plans, is very limited. Using personal networks is therefore a way of accessing this information. Added to that, personal relations are needed to obtain protection from officials. NGOs have to gain access to authority and protection by government agencies before they can create social leverage, Xie Lei writes.

However, the more dependent an NGO is on the local government, the less likely it is to write critical reports about this government's activities. The same has proven to be the case for journalists. The local journalists in Kunmin were put under pressure not to publish critical articles about the dam, so they remained silent. However, in other parts of China, many critical articles were published, influencing the prime minister's decision to halt the project. The same is true for scientists. At first, Yunnan Province came up with its own environmental assessment in favour of the dam. The State Environment Protection Agency (SEPA) in Beijing criticised this assessment for being subjective and one-sided, but the agency was not powerful enough at that point to be able to influence the assessment process. However, Ms Wang's informal network was then able to contact independent experts in Beijing and Kunmin, who were not afraid to publish critical reports which subsequently played a crucial role in the debate.



Public hearings

'Public hearings' also raise hopes for more democratic space in the environmental realm. Since 1996, government officials have been obliged to organise an environmental assessment and a public hearing before starting large projects such as a dam or a petrochemical plant. Public hearings have also become a compulsory step in the new process of water pricing. From the 1980s onwards, the government gradually started to charge for water services including wastewater treatment services. In the meantime, the government has allowed private companies to invest in this sector. Now, districts have to deal with transnational corporations (such as the French Veolia and SUEZ), Chinese investment developers, liberalised Chinese water companies and environmental engineering corporations. While the companies have to come up with a water tariff proposal, the city authorities make the final decision. But their decision has to be based on public hearings and independent price assessment reports. Since 2002, hundreds of public hearings have been organised.

Lijin Zhong, working at Tsinghua University, studied these public hearings under supervision of the Environmental Policy Group. She demonstrates that in most cases (over 90 % of 280 cases studied), the proposal for new tariffs was accepted at the public hearings. But in several cities, such as Qidong City in Jiangsu Province, Beijing and Luohe City in Henan Province, the public hearing actually influenced the plan. The water companies were obliged to submit a revised tariff plan for a new, second public hearing. And the new plans reflected the comments made at the earlier public hearing.

Public hearings raise hopes for more democratic space in the environmental area

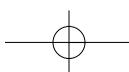
Chongqing Evening News

Lijin Zhong makes it clear that the democratic character of the public hearings depends on the local culture. She cites the example of Fengdu, a district of Chongqing that did not approve the water tariff plan during its 2005 public hearing. The local government increased the

water tariff anyway, ignoring the result of the public hearing. However, the omission was immediately made public by the Chongqing Evening News. 'Of course there will be other cities where media coverage is suppressed,' Lijin Zhong remarks.

In many cities these public hearings attract a lot of media attention, and a central question is how democratic these hearings are. One criterion for increased 'democracy' has become the increasing the number of delegates in the category 'individual consumers'. Since 2005 numbers do seem to have been increasing: in Maanshan City in 2004, only 5 of the 25 delegates fell under this category. At Shenzhen public hearing on wastewater treatment charges in March 2005 there were 10 individual consumers present – 45 % of the total 22 of delegates. And for the Changsha public hearing on water supply price and wastewater treatment in 2006, 15 individual consumers were selected from 109 applicants – 60 % of the total of 25 delegates. As Lijin Zhong concludes, 'Chinese urban citizens are not only concerned with access to information on the relevant costs for water, but also with the process of decision-making and the opportunities to let their voices be heard.'

In Xiamen, in December 2007, members of the public proved to be very creative in influencing the organisation of the public hearing about the controversial petrochemical plant, according to reports in the Dutch media. They published their marches on YouTube, and they published every step taken by the local officials on Internet. The result was unusually open elections. The authorities allowed 100 of the 200 delegates to be elected from members of the public. The draw for their names, done by a child, was directly broadcast on primetime local television in the presence of the most outspoken environmental critics of the city.



Protests in Thailand and Vietnam

Large demonstrations against the building of mega-dams have also taken place in Thailand, Malaysia and Vietnam. Added to that, several environmental reforms have been triggered by local community complaints. When a production site is situated close to a community, when the problems are felt to be insurmountable, and when local residents are not too dependent on the plant, the public does protest. And in many cases, local officials indeed are exercising more power. There are also cases where they have ordered factories to close.

But in general, citizen involvement is still very low. The Vietnamese and Thai researchers in this Wageningen programme came up with several policies to increase community action. First, the government can help to increase environmental awareness among citizens by including environmental issues in primary school curricula. Support for environmental programmes on television and radio, and in newspapers may also be an effective way to disseminate environmental information to the public. In order to facilitate community action, the state environmental authorities could provide specific guidelines so that citizens know how, where and to whom they should send their complaints.

Finally, governments can increase opportunities for independent NGOs. As Tran Thi My Dieu (Vietnam) writes, 'In the absence of NGOs, citizens in Vietnam lack a powerful source of support.' Le van Khoa (Vietnam) also stresses the importance of 'community-driven regulation'. He says communities and NGOs have the potential to become a very useful supplement to the state authorities in approaches to controlling industrial pollution. Vietnamese government officials are seeing this too, in the form of Ho Chi Minh's principle 'people know, people discuss, people execute and people supervise.' However, implementation of this principle still falls short.

2 Sustainable standards for shrimps

International standards such as HACCP and ISO 14001, combined with labelling, are the strongest incentive to implement environmental measures in East and South East Asia at the moment. Joint policy making between government institutions and industry may be the best way to cope with the new demands.

According to the researchers in the East and South East Asian programme and many other professionals in this field, the influence of the global market is remarkably strong at the moment, far outweighing that of local forces. During the last decade, export-oriented companies in Asia have implemented many more environmental measures than 'local' companies. The 'exporters' were often forced to do this by their foreign customers, including supermarkets. In this global process, two consumer concerns seem to dominate: food safety and the loss of natural forests including mangroves.

Frozen shrimps

One of the sectors that has deeply been influenced by the global market is the Thai frozen shrimp industry. In 2003, Thailand was the second largest shrimp exporter in the world, exporting 3000 tons of cultured shrimp annually to countries such as the USA, Japan and Canada (FAO figures). The industry generates several billion Baht export earnings each year, but since 1998 aquaculture has also been invading freshwater areas and paddy land. International NGOs, including the Mangrove Action Project (MAP), started to put pressure on the government to address the environmental consequences of this industry in 2001. Since then, Western supermarkets have also started to put pressure on the government. After several

Manufacturing practices have been deeply affected by the food safety inspections carried out for foreign customers

assessment studies, the Thai government passed a law prohibiting marine or brackish water shrimp farming in mangrove areas. According to Thanet Sriwichailamphan, an economist at the Chiang Mai University, (international) NGOs have played an important role in preventing further destruction of environmental resources. Thai shrimp farmers themselves also think they have been influenced by NGOs, he learned from interviews.

Manufacturing practices in the shrimp plants have been deeply affected by the food safety inspections carried out on behalf of foreign customers, Sriwichailamphan also concludes. He cites an example that occurred in early 2002, when EU countries detected chemical and antibiotic residues in Thai frozen shrimps, resulting in the rejection of some shipments. The Department of Fisheries (DOF) immediately implemented practices to ensure the safety of shrimp products from farm to fork. Now, all shrimp products for export must comply with importing countries' requirements and international standards, such as the FAO Codex Alimentarius and EU White Paper on Safety of Food for the entire production line. The DOF has developed a Code of Conduct to ensure that the whole shrimp production line meets international standards including the Codex and ISO 14001 for environmental management systems. At the factory level, processing plants and freezing operators certify their production mainly using the Hazard Analysis Critical Control Point (HACCP).

Global GAP

There is a lot of discussion about the standards for shrimp farming. And the leading approach in this shrimp debate is Global GAP (Good Agricultural Practices), an initiative of the large European



This fish manufacturing business in Ho Chi Minh City works according to strict HACCP standards.

supermarkets. This group draws up standards with the industry and NGOs in multi-stakeholder workshops. Wal-Mart – the largest importer of shrimps in the US – has already set its own standards. Under these, contaminants must be removed from the farm's discharge using filters, settling ponds and oxygen infusion. The quality of the discharge must be closely monitored. And there are other requirements too: farmers must replace any mangroves they clear for their ponds by planting new trees elsewhere; the shrimp must not be treated with antibiotics; and the farm workers must be paid the prevailing local wage.

Some consumers and NGOs fear that the control of these standards will not be stringent enough to protect the mangroves. Others worry about the many small shrimp farmers who are too poor to invest in these new requirements (see also chapter 5). The market will probably partly resolve the latter conflict. A stricter certification system for more expensive, extensively farmed 'organic' shrimps, has also been devised.

Customer inspections

The East and South East Asian researchers analysed the foreign influence on several sectors in different countries including canned pineapple and frozen chicken in Thailand, palm oil in Thailand and Malaysia, the textile industry in Malaysia and the sugar and candy industry in Vietnam. One outcome will probably be the same in the export side of all the sectors: certification according to international standards. For example, in the canned pineapple industry, importing countries have never detected 'forbidden' chemicals. This small sector has not experienced any 'scandals' or pressure from international NGOs. Nevertheless, the influence of the global market is comparatively strong at the level of manufacturers. Interviews and desk studies have shown that the exporting canned pineapple factories with foreign investment use more advanced and environmentally sound production methods than (smaller) companies producing only for the local market. Exporting companies may be visited by inspectors from the customers once or twice a year. Moreover, the production managers themselves regard the importing countries as the most compelling factor for environmental improvement, more compelling than their own government.

The marked influence of the global market has led to several recommendations. One is that the government and research institutes should assist companies in gaining certification. As Thanés Sriwichailamphan concludes: 'Especially for those companies that are in the process of

entering the global market, national regulations and state authorities seem relevant points of orientation.' Guidelines from importing countries including Codex, ISO 9000 and ISO 14001 represent a huge challenge for farmers and factory managers as they address many food safety standards. In the case of shrimps, a broad range of different items such as farm management, shrimp stock density, shrimp health, effluents, social responsibilities, farm grouping and data collection have to be checked before export certificates are issued. It is clear that assistance from government departments and extension and research institutes will help East and South East Asian companies conform to international standards.

Malaysian palm oil

The government may also involve private industry in drawing up environmental policy. An example of a public-private collaboration that has improved both environmental performance and the export position is the Malaysian palm-oil sector. Palm oil is a focus for international NGOs because the increasing cultivation of palm trees is threatening natural forests. As a result, the drive to implement environmental standards is stronger than in many other sectors.

The research of Er Ah Choy, at the Universiti Kebangsaan Malaysia (KMU), indicates that the Malaysian Palm Oil Council and the Malaysian Palm Oil Board have been effective in motivating the players in the chain to adopt Good Agricultural and Manufacturing Practices. These

**Branch organisations
may be an effective
institution to cope with
international demands**

government-related institutions with both state and private sector representatives have been established for the purpose of looking after the strategic interests of the industry. The participation of the industry in the policy formulation process has, according to Er Ah Choy, promulgated and yielded effective policies. The 'Task Force on the Environment and the general Promotion of Oils and Fats in the International Market', intended to improve the international position, was effective, and the 'Value Added Downstream policy' for poverty eradication

in the rural areas has also been successfully implemented.

Now, both the Malaysian Palm Oil Board as well as the Council are playing a crucial negotiation role in the Roundtable on Sustainable Palm Oil (RSPO), an international multi-stakeholders' organisation composed of palm-oil processors and traders, consumer goods manufacturers (including Unilever and DSM), retailers (including Sainsbury's), banks and investors, environmental and nature conservation organisations (including WWF) and social NGOs (including Oxfam and Solidaridad). In 2007, the Roundtable published its 'Certification protocol with recommendations for a complete scheme for certifying palm oil production against the RSPO Principles and Criteria for Sustainable Palm'.

But, if all sectors in a country are to address environmental problems, only relying on public-private institutions would be insufficient. A more effective institution to cope with the international demands may therefore be branch organisations. These can play an important role in the translation and advocacy of international standards, and in the development of (tailor-made) environmental technology. They normally have better access to knowledge and are further removed from short-term profit interests than individual enterprises, and their members trust them more than government agencies. Several East and South East Asian researchers have argued in favour of branch organisations, and they have done so at different levels. For example, an 'Industrial Zone Infrastructure Development Company' would be able to fulfil these roles in the Industrial Estates in Vietnam, as Phung Thuy Phuong put forward in her thesis.



The palm oil mills in Malaysia have to adopt Good Agricultural and Manufacturing Practices.

Joint development of environmental technology

The public-private collaboration in the Malaysian palm-oil sector has not yet achieved joint development and diffusion of environmental technology, according to Er Ah Choy. She was unable to trace successful projects that had resulted in the adoption of these technologies. One of the problems is that the existing tax incentives for technological programmes are not effective. The time-consuming bureaucratic processes and the high costs, Er Ah Choy discovered, hinder and deter the private sector from such collaborative efforts. But a learning process is underway.

The dissertations also make clear that it will not be easy for East and South East Asian industrial sectors and government agencies to undertake new forms of collaboration adapted to the global market fluctuations. The recent history of central planning and a command economy, the heritage of a culture of hierarchical behaviour and the lack of experience in negotiations and joint policy making do not favour a switch to more private participation in policy making, including research policy making. However, many East and South East Asian economists believe that new collaboration between research, government departments and private industry will be beneficial for the environmental performance of sectors. That is also the reason that Orathai Chalvaparit, associated professor at the Chulalongkorn University, has advised the Thai government to set up a new government unit (Palm Oil Research Institute of Thailand) supporting research and development capacity throughout the palm oil complex, similar to the Palm Oil Board in Malaysia.

3 Focus on small companies

Branch organisations, government agencies and research institutes can assist small and medium-sized enterprises (SMEs) in many different ways including the provision of education, specific lending facilities, technology and knowledge transfer, insurance and tax incentives. All these activities have to be adapted to the SMEs' general lack of time, money and knowledge.

If you live in the EU, the US or Japan, the chances are large that you own a pair of shoes made in Vietnam, now the world's fourth shoe exporter. It produced 300 million pairs in 2005 and annual production is growing steadily. This has resulted in a comparable growth of small chrome tanneries and slaughtering companies within densely populated residential areas. There, these often outdated and low-tech family companies dump both their toxic waste water and their solid waste, such as hair, trimmings, fleshing, splits, fat and shavings, untreated in the environment. European researchers estimate that only 25 % of the weight of the raw hide is processed into leather. The rest ends up as either waste or by-products – in the rivers or streets of Ho Chi Minh City or Hanoi.

Eco shoes

The Vietnamese tanneries and slaughtering companies have not yet been influenced by the global discussions described in the previous chapter: international negotiations to set up 'eco shoe' production have just started. The same is true for the tens of thousands of Asian SMEs in other polluting and rapidly growing sectors such as the tapioca, frozen seafood, rubber and sugar cane processing enterprises. A large part of the Wageningen research programme was specifically directed at small companies, examining the type of environmental policy that is suitable for them.

Slaughtering companies dump their untreated waste in the rivers of Ho Chi Minh City

Vietnam already had more than 160,000 private enterprises in 2005, with an average of 31 employees. Most of them do not experience pressure from the global market or the domestic market to improve their environmental performance. Local customers may even discourage eco-modernisation, as Pham Hong Nhat, working at the Vietnam Institute for Tropical Technology and Environmental Protection (VITTEP), found out in interviews with tannery managers. Most tannery managers are unwilling to change their production because the environmental measures might influence the quality of the leather. They are afraid that if a process goes wrong, the customer will go to another supplier, and the risk is therefore perceived as being too high.

What makes the implementation of environmental measures even more complicated is that most owners of these local companies are too poor to invest money, and it is difficult for them to get a loan. Moreover, most employees are low skilled. Pham Hong Nhat cites the figures from a report of the Department of Science and Technology of Ho Chi Minh City. In 2004, 78 % of the workers in SMEs had not completed secondary school and 48% of the entrepreneurs had no qualifications for a management position. Given that Ho Chi Minh City is the largest and the most advanced industrial centre in Vietnam, the situation in the rest of the country must be worse, he concludes.

In the last five years, East and South East Asian governments have been increasingly forced to deal with polluting production sites due to protest from residents – an issue we mentioned in the first chapter. However, residents tend not to complain about the small private companies in their neighbourhood: most protests are directed at the larger companies owned by the state or by foreign investors. Several East and South East Asian researchers describe the reasons for this. The



Relocation to industrial areas is already planned for the tanneries in Ho Chi Minh City.

lives of local residents are closely interwoven with these companies: too many families are dependent on them for their income. And the 'co-existing compromising strategy' may also play a role: every polluter is happy to live alongside neighbours who are also polluters of a different nature. The companies try to maintain good social relationships with the immediate communities, by selling them good products at a low price, or giving them presents, for example at New Year or important holidays. These 'family like' relationships help them to operate peacefully within the communities.

Relocation and clustering

Without an immediate incentive, global or local, it is understandable that government agencies either do nothing, or only half-heartedly implement the national environmental policy. It is also understandable that they often restrict their policy to the easiest actions: closure or forcing companies to install end-of-pipe technology, sometimes in combination with relocation and clustering outside the residential areas in industrial parks. This has also been the main strategy in Western Europe for the last forty years. According to Le Van Khoa, who evaluated the environmental policies for SMEs in Vietnam, clustering and end-of-pipe strategies may succeed. One of the most successful examples is Dalian City in China, an important industrial, trade and tourist city, with 5.43 million inhabitants. In the 1980s, the City Authority identified the most heavily polluting industries: metallurgy, chemicals, petrochemicals and cement. By 2001, 105 of the 121 listed polluting companies had been relocated or closed down. Now, the air pollution in the city has been drastically reduced; total waste-water discharge has decreased by 4 million tons and waste-oil discharge by 2700 tons.

However, successful environmental policy implementation for small companies is proving much more difficult, as several of the South East Asian PhD researchers have indicated. Relocation towards industrial areas combined with forced installation of end-of-pipe technology has already been planned for the most problematic small private companies in Ho Chi Minh City – the tanneries have also been put on the list. Le Van Khoa concludes that some of the SMEs in Vietnam have indeed reduced pollution levels by installing a chimney or a waste-water treatment system. These successes have mainly been due to strong commitment of city leaders and/or public pressure from the media and the public. But the current environmental policies,

regulations, support programmes and incentives (including financial ones) do not seem to reach the large majority of SME's. Le Van Khoa, who works at the Environmental Management Division of the Department of Science, Technology and Environment (DOSTE), interviewed 50 managers from polluting companies in Vietnam. Many of them were passively awaiting government enforcement and technical or financial assistance. Other companies had implemented control measures, such as air washing stacks or absorbers, but these have proved to be inadequate and insufficient. For example, some SMEs had only increased the height of their chimneys so that the maximum emission concentration at ground level is now below the legal standards.

The same conclusion can be drawn for northern Thailand. The Thai government has developed an active policy of relocating the growing number of animal and meat processing, and fruit and vegetable-processing companies out of urban areas. But no cases of relocation of these SMEs to industrial parks were found in northern Thailand during the period Ajachara Wattanapinyo studied the region (2003/2004), and other official regulations in Thailand are only haphazardly implemented.

Insurance companies

One of the main causes is the limited attention paid to SMEs by all types of institution: ministries of industry, departments of environmental affairs, local agencies that are responsible for monitoring and controlling air and water quality, insurance companies, suppliers, banks, research institutes and other relevant institutions. There are hardly any special programmes for SMEs. Most manpower and money is still directed at the large (state-owned) companies and exporting companies (partly) owned by foreign investors. And when special programmes, demonstration projects or financial instruments are formulated, they often are only partly effective, due to lack of money, experience, knowledge and manpower.

Support policies have to be combined with a sound system of checks and balances that holds local officials accountable

Indeed, the best entrepreneurs prove to be very innovative even without government help, when they are confronted with immediate pressure. In his article 'Greening small and medium-sized food processing enterprises in northern Thailand', Peter Oosterveer cites the example of a middle-sized pork-processing factory, with 20 workers, that was obliged to move out of town, because the animal fat had blocked the public drains. There were no possibilities for technical assistance, so the owner imported the machinery he needed to treat his waste water directly from Germany and he supervised the construction process himself. In a dried and pickled fruit factory with 40 permanent labourers, the owner himself took the lead, without even a tax reduction, to import the equipment. But not all entrepreneurs have the skills, network and self-confidence to undertake such risky activities.

Broad pallet

A major conclusion of the Wageningen programme is that SMEs need their own policies, adapted to their general lack of money, knowledge and time. The researchers have come up with a broad pallet of support policies such as demonstration projects, participatory research programmes, tax incentives and lending and insurance facilities. An organised exchange of information could be initiated either privately or officially. In both cases, networks including firms, supply chains and branch organisations can play an important role.

In this technology and information exchange, the East and South East Asian researchers, like their governments, prefer to promote Cleaner Production (CP) and Industrial Ecology (IE) because end-of-pipe technology only costs money, while companies may actually earn money by



Most small-scale entrepreneurs, including this fish seller in Hanoi, sell their products on the local market.

following the CP strategies (see also the next chapter). At the moment, a number of traditional waste exchange practices can still be found in East and South East Asia, but these practices are carried out on an ad hoc basis: most contacts are informal and direct. Organisations or companies that systematically link waste producers and waste buyers would help sustain and augment these practices.

All these support policies have to be combined with a sound system of checks and balances that can hold local officials accountable and make sure violators receive their due punishment: a clear system of regulations, monitoring and fines. In addition, an effective pricing and control system for (water) waste treatment, and for resources such as (ground)water and energy would stimulate recycling. It is indeed very unlikely that, in the near future, the East and South East Asian authorities will have built up sufficient capacities to monitor the implementation of such environmental regulations consistently. To solve this dilemma, governments need to be more selective in developing and implementing environmental measures. And, when they do, they should take the monitoring capacity into account. Moreover, agencies could augment their effectiveness by collaborating with each other. For example: when an official visits an SME to check its water quality, the visit could also be used to help the company obtain a subsidy or a loan.

A simultaneous change of focus in departments, institutions and companies on all levels could really improve the environmental performance of SMEs. The stakes are too high for a conservative approach to be adopted, some researchers believe. Because they are likely to grow in number and scale, a specific 'SME policy' will be even more important in the future. In addition, we can expect that global and local developments will ultimately affect the sectors that have not yet been influenced by external pressure. When a certification system for 'green shoes' does emerge, the eco-modernised tanneries and slaughterers in Ho Chi Minh City will probably command the best price for their leather.

4 Improving priority setting

System analysis and technology assessment can help policy makers and plant managers to set priorities for environmental management. Adaptation of these methods clearly demonstrates that waste prevention using relatively cheap and locally available technology may be much more cost-effective than using advanced end-of-pipe technologies.

In summertime, Lake Tai in eastern China often looks as though it has been dyed green. Unfortunately, this beautiful lake is among the country's most polluted lakes. The expanding population and industrialisation have resulted in a massive increase in water emissions of phosphorus, nitrogen and other nutrients. The sad result is eutrophication of the lake's water with foul-smelling algae. In the summer of 2007, the lake suffered an algae bloom that forced five million residents of Wuxi city to drink and bath with bottled water for three days – prices skyrocketed from \$1 to \$6.50 for a two-gallon bottle. Fish and shrimps died, and paint peeled off the boats in the lake.

Lake Tai is typical of water pollution problems in China. Cao Lake in Anhui Province and Dianchi Lake in Yunnan Province are also threatened by algae blooms. The Chinese government is trying to clean up the lakes, but it's difficult to know where to start when there are so many sources of pollution. The Wageningen East and South East Asian programme has demonstrated that system analysis combined with technology assessment can help when it comes to setting priorities for environmental management.

Many local governments do not have sufficient capacity to control the sewage installations

Add-on technology

Policy makers and plant managers often start with end-of-pipe technology, or add-on technologies to reduce water pollution, the most common being waste-water

treatment installations. In Lake Tai, officials were also using boats equipped with pumps to filter the lake water in an attempt to get rid of the algae bloom. However, the effects of these end-of-pipe technologies are often disappointing. Several East and South East Asian researchers in this Wageningen program have described the disadvantages: reliable treatments are often so expensive that neither companies nor city governments in these regions of Asia can afford them. And where filtration or treatment equipment has been installed, many local governments do not have sufficient capacity or knowledge to control the quality. The lack of sound inspection creates little incentive for polluters to adopt well-functioning end-of-pipe technologies. In addition, these technologies cost money, in contrast to structural measures that can also save or even generate money.

Liu Yi, an environmental scientist at Tsinghua University in Beijing, has studied the sewage systems built to prevent leakage of phosphorus and other compounds from household waste in China. Unfortunately, in its current state, China's urban wastewater infrastructure is not capable of stemming the continuing deterioration in quality of the surface water, Liu Yi concluded. Most towns and small cities do not even have sewage systems, and in the larger cities their operation is very poor. According to a national environmental enforcement action survey held in 2004, only half of the waste-water treatment plants in 232 cities were in operation, and only irregularly. And even if a treatment plant is operational, the phosphorus is just transferred elsewhere. As Liu Yi concludes: 'The centralised control of the effluent just removes 'pollutants' to the sludge, rather than promoting their recovery and recycling.'



The sad result of the industrialisation is eutrophication of the Dianchi lake's water with foul-smelling algae.

Cleaner Production

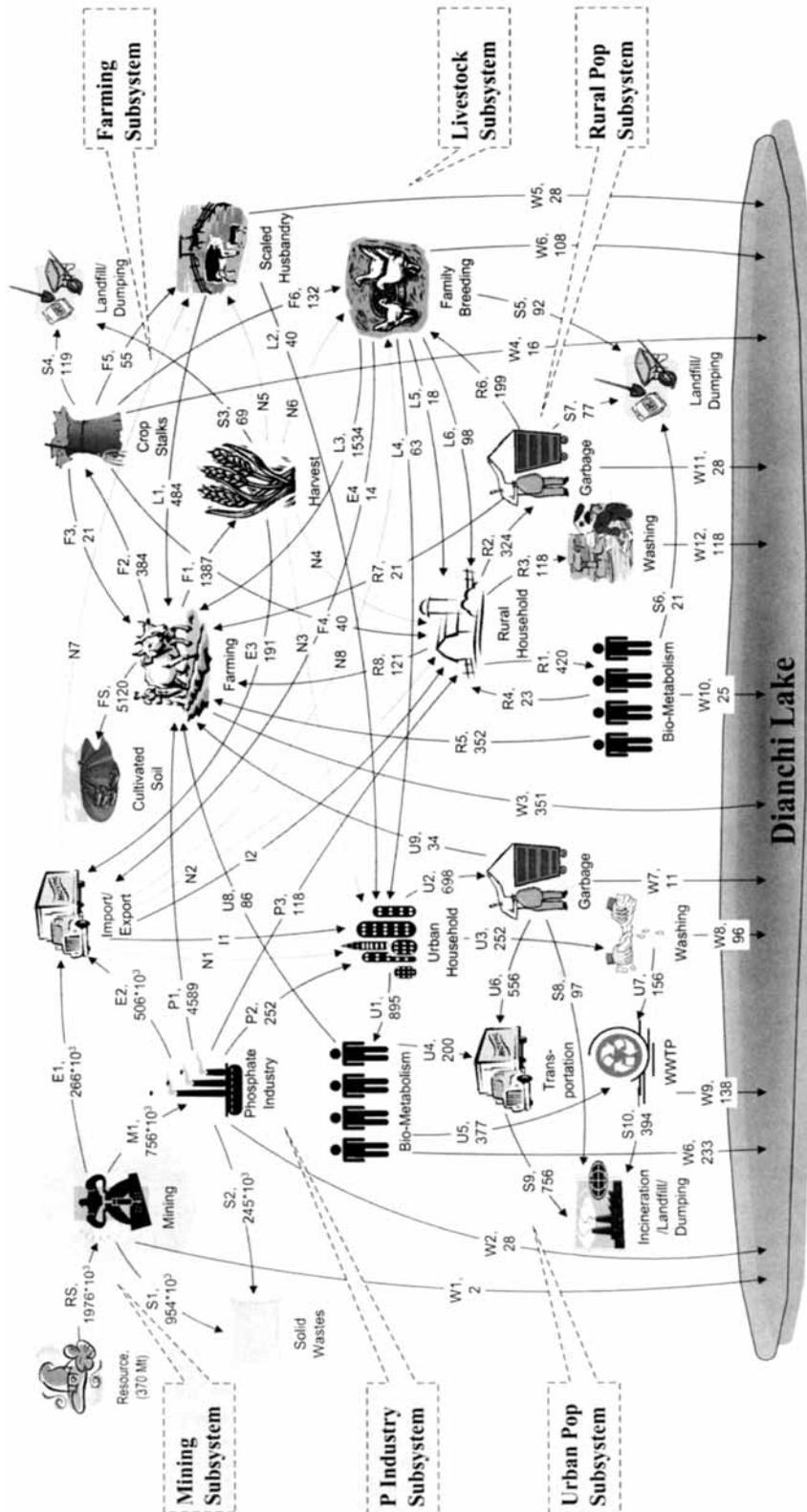
The disadvantages of end-of-pipe technology are generally known among policy makers, which is why prevention of waste – also referred to as Pollution Prevention (PP) or Cleaner Production (CP) – is the official policy in many countries. Pollution Prevention policies emerged in OECD countries around 1970, and were adopted later in developing countries. This key principle for environmental protection was proposed in China as early as 1983, and officially adopted in 1992, in its national 'Ten policies for Environment and Development'. The current plans to restore Dianchi Lake are partly based on the principle of prevention, but it is proving to be very difficult to translate this generally accepted principle into concrete measures and technologies that fit in with local circumstances. Several PhD students have assisted these efforts with system analysis and technology assessment.

System analysis and technology assessment are proven methods of facilitating priority setting in Western countries, but they are new for South East Asia. Liu Yi has adapted these methods for Dianchi Lake, and other PhD researchers have adapted them for environmental problems in Thailand, Vietnam and Malaysia. Their results can help policy makers to gain insight into possible preventive measures that take local conditions into account. The models may inspire and motivate the adoption of structural measures because they clearly demonstrate that these are not only better for the environment, but also for the economy.

Modelling flows

To restore the ecological balance in Dianchi Lake, Liu Yi combined a 'substance flow analysis' (SFA) with an evaluation of environmental measures. Liu Yi's model makes visible not only the phosphorus (P) emissions from different sources, but also the production and recycling of phosphorus. It highlights many human activities related to this flow – mining, phosphate industry, urban activities, farming, livestock and rural activities (see illustration, page 20). The P amounts (in tons) are based on secondary data such as statistical yearbooks and government plans for the economy, industry, agriculture and urban construction, and on primary data obtained from field surveys, face-to-face interviews and questionnaires.

Liu Yi was able to demonstrate that structural measures are more effective than end-of-pipe technologies alone. Fertilizer reduction in the intensive livestock sector, more effective urban



This 'substance flow analysis' of Dianchi Watershed makes visible the emissions, production and recycling of phosphorus.



The waste-water treatment installation of a Thai chicken manufacturer, who exports meat to OECD countries.

sewage systems and affordable alternatives for P-detergents are the appropriate candidates for environmental policy changes in the Dianchi Lake region. The data back up his suggestions: most phosphorus comes from P-detergents (400 tons), garbage (410 tons), centralised urban sewage (150 tons) and livestock (392 tons). As the illustration shows, a massive amount of phosphorus from the local mining activities ultimately makes its way into phosphorus detergents (718 tons in 2000) and fertilizer (4049 tons). As long as no reduction or recycling of these phosphorus products takes place, Liu concludes, Dianchi Lake will continue to suffer from eutrophication.

Local solutions

Analyses that focus on one problematic compound can help policymakers to identify trouble-makers, especially when the sources of emissions are diffuse and unclear. These might be phosphorus, which causes eutrophication, but may equally be sulphur dioxide, which causes acidification, or soot, which causes smog.

But how does one go about achieving local goals, such as reducing the waste-water of a specific detergent industry, a palm-oil mill, or a livestock farm? Five PhD researchers applied system analysis according to the principle of 'Industrial Ecology' at the level of plants and industrial areas. Industrial Ecology goes a step a further than Cleaner Production. Under the latter principle, a plant tries to prevent as many waste flows as possible, but where this is not possible, the waste is emitted. The goal of Industrial Ecology is 'zero-waste'. Waste does not even enter the equation, as we think in terms of 'by products'. The production process is designed in such a way that all emissions and solid waste can be recycled and/or sold to other companies. Experts therefore have to analyse all emissions and waste flows, not only the most problematic ones. The system boundaries are broad, because destinations for the waste can be found in other industries or agriculture, in nearby 'eco-industrial parks', or – if this is not possible – further away.

It is possible to analyse all waste and emissions from one factory, but also from an entire industrial park or a village. Tran Thi My Dieu, working at the Polytechnic University of Ho Chi Minh City, has done this for several areas where food processing factories are located in Vietnam. According to her, 'almost zero-waste industrial ecosystems' are possible for the polluting Vietnamese agro-food processing industry. With supervision from the Environmental Policy

Group, she developed 'material flow networks' for a number of industrial areas including the Bien Hoa 1 Industrial Zone, an area of 550 hectares, about 6 km outside from the centre of Bien Hoa City (25 km north-east of Ho Chi Minh City). She analysed all waste from six food processing enterprises in the industrial zone, including a sugar company, coffee factory, fruit processing plant and a powder milk factory. In addition, she analysed the possibilities for collaboration in terms of energy production, waste-water treatment and composting organic waste. She came up with many solutions. For example, the coffee grounds (348 tons a year) can be used for fuel (onsite or offsite), the molasses from the sugar (500 tons/year) and the fruit waste (180 tons a year) as fertilizer for sugarcane, and all broken wrapping materials can be sold: waste paper to the nearby paper company, plastic bags to the plastic company and aluminium to the aluminium company.

Zero waste

The East and South East Asian PhD researchers applied system analysis and technology assessment to several sectors including the palm-oil industry and Kraft pulp industry in Thailand (see box) and animal slaughtering and food processing in Vietnam. They all conclude that 'almost zero waste' is possible for the plants they have studied. Moreover, the technical solutions are neither difficult nor expensive to implement – many of them fall under the category low-tech and cheap. However, an 'almost zero-waste material cycle' in a plant or industrial park has yet to be

It is possible to analyse all waste and emissions from an entire industrial park or a village

realised in East and South East Asia. Even in the rich OECD countries, there are hardly any industrial parks or companies already operating according to this principle. Eco-modernised plants like this are still very difficult to create because of the many new and delicate social interactions and contracts that need to evolve.

Companies have to collaborate with other companies: they have to sell their by-products (sometimes they are new), and they may have to collaborate for energy production or water treatment. They have to take risks,

invest in new technologies and train their personnel. But it's not just down to the private sector: government organisations have to change their policies – an issue we elaborated in the previous chapter.

With this in mind, the Industrial Ecology model appears to be more suitable for new plants and industrial areas than for existing plants, at least in the short term. But for some existing industries – even small ones – industrial ecology is a feasible option, according to Pham Hong Nhat, who works at the Vietnam Institute for Tropical Technology and Environmental Protection (VITTEP) in Ho Chi Minh City. He has designed almost closed material cycles for three SME sectors in Ho Chi Minh City: leather tannery, seafood processing and animal slaughtering. His eco-modernised designs are quite simple to implement and economically viable. For example, the waste-water flows from the seafood processors can be reorganised without expensive technology. At the moment, all small and medium-sized seafood processors in the city discharge their untreated wastewater into the river or sewer. In Pham Hong Nhat's eco-modernised design, they first divide their waste-water into high and low-organic content water. After the high-organic-content water has received anaerobic treatment, both flows go into a constructed wetland planted with cattail, which can be sold to farmers as fodder. Next, the water goes to a water-hyacinth pond – the water-hyacinth can be sold to pig farmers – after which the water is clean enough to be used. The investment costs to the companies are about USD 4450 for installations, stiff brushes, the constructed wetland and piping systems. But once they have this set up, entrepreneurs will pay less for tap water use, ground water use, labour for cleaning and pollution loads. In addition, they can sell the cattail hay. Investments will be recovered within

three years, Pham Hong Nhat calculated, after which there will not only be no more waste water, but the company will also earn more money. A real win-win solution.

So, more detailed analysis of plants and livestock according to the principle of Industrial Ecology might be one of the next steps in the Lake Tai and the Dianchi Lake regions. The Chinese government has already initiated projects to promote organic agriculture and ecological parks around the lakes, although the plans have not yet been realised.

Kraft pulp industry in Thailand

Thailand had no eucalyptus trees until 1952, when the first seedlings from Australia were tested at the Doi Suthep Experimental Station in Chiang Mai. Now, 55 years later, at least 400,000 hectares of natural forest (one tenth of the area of the Netherlands) have been turned into eucalyptus plantations. These drought tolerant, fast-growing trees provide fibrous raw material for the Thai Kraft pulp and paper industry. And more of these plantations are planned, as the Kraft paper industry is growing at around 4 percent a year.

Like many booming East and South East Asian industries, this pulp sector is important for revenues and employment. But the pressure on the environment has become a problem: the loss of natural forest and the displacement of local populations have been challenged, while planting and transport of eucalyptus trees requires fuel, fertilizers and biocides. In addition, the pulp production generates dirty waste water and emissions of pollutants such as carbon dioxide and noxious sulphur-containing gases. It is therefore not surprising that a planned 1 billion US dollar joint venture between the Chinese government and Thailand's largest pulp and paper company, Advance Agro, is still being delayed by strong public opposition. Examples of resistance like this are forcing production chains to improve their environmental (as well as social) performance.

One way of addressing this kind of problem is a system analysis, which can focus on all emissions from a single production chain in a country. Warit Jawjit, a lecturer in the Faculty of Science and Technology at Rajamangala University of Technology Srivijaya, has analysed the pulp-production chain in Thailand under supervision of the Environmental Systems Analysis group. He examined the whole chain, from the breeding of the eucalyptus trees to the transport of the pulp to the customers. He first identified the worst emissions for the different environmental problems: global warming, acidification, smog, toxicity and eutrophication. The next step was technology assessment – systematic analysis of the options for reducing the most problematic emissions.

His analysis clearly demonstrates that structural changes, such as improving pulp washing, increasing the dry solid content of black liquor and spillage control, are more cost-effective than the typical end-of-pipe technologies such as activated sludge and scrubbers. Some solutions even seem to be paying options: the annual savings from reducing emissions were greater than the annual costs. Paying options include applying optimum doses of fertilizers, extended delignification, enzyme delignification, improving pulp washing and solar heating solutions, and finding alternatives for P detergents. System analysis may inspire or at least help convince policy makers or plant managers to take structural measures.

5 Greening industry in an Asian way

How can scholars from OECD countries help East and South East Asia to become sustainable? East and South East Asian countries differ from OECD countries in crucial ways. Informal relations are much more important than formal relations, and communities that have been marginalised by the global economy cannot fall back on a social insurance system.

In many OECD countries, people can happily breathe clean air and don't have to worry about their drinking water or the safety of our food. They are able to walk in nearby parks, go hiking in forests, or swim in the rivers. However, this state of affairs did not arise spontaneously. Until fifty or forty years ago, environmental problems in these countries were comparable to those facing East and South East Asian countries today. Smog was only one of the problems, others being acid rain, noise, poisoning of rivers and soil, and foul-smelling industrial plants. OECD countries still face environmental problems, including loss of biodiversity and loss of darkness at night, but many institutions are on the way to solving these problems. In general, many citizens are satisfied with their surroundings. How did these countries manage this? And what can industrialising countries learn from these experiences? In this Wageningen environmental research programme, Ecological Modernisation theory has been used to answer these questions.

Ecological Modernisation Theory

Ecological Modernisation Theory (EMT) was developed to analyse the social and institutional changes that developed countries have to go through in making their industrial production more ecologically sustainable. The Environmental Policy Group in Wageningen was among the first to elaborate this theory in the early nineties. Since then, many scholars including the East and South East Asian researchers in this programme, have used the

EMT framework to analyse their own environmental problems. Recently, the concept of Ecological Modernisation has been formally introduced in China (see box).

According to this theory, the improvements in environmental performance of Western countries was at first due to modernisation of technology, such as the invention and diffusion of waste-water treatment systems, and solid waste collection and treatment systems. The change from costly end-of-pipe technology in the seventies, to the more cost-effective Clean Production and Industrial Ecology practices in the nineties, is one of the transitions that the OECD countries have undergone in the domain of environmental technology.

Second, environmental interests are increasingly included in the economy. Market mechanisms such as certification systems, eco-labelling and eco-taxes have proved to be effective incentives. In addition, economic actors such as firms, consumers, and insurance companies became major advocates for environmental improvement.

Third, political modernisation – the modernisation of environmental politics – has played a role in improving environmental performance. Strict environmental legislation, together with government support for environmental research and innovative technologies, has proven to be a way of driving the innovation process and therefore also the industrial competitiveness of new technologies. But the state has also developed another strategy. To solve complex problems, government agencies have had to move from a top-down, command-and-control style of governance to more decentralised, flexible and consensual styles. Hence, other, non-state actors, were allowed to become co-governors of environmental policies.

Finally, the changing strategies of civil society movements have contributed to eco-moderni-



Until fifty years ago, environmental problems in the OECD countries were comparable to those facing Hanoi today

sation. While in the 1970s the environmental movement was part of a broader movement for social change, the environmental NGOs that emerged in the subsequent decades can be regarded as one-issue organisations. And rather than acting simply as external commentators, they participate in direct negotiations with state representatives and economic agents, and take responsibility for the development of concrete proposals for environmental reform.

Resemblances

Ecological Modernisation Theory has made it easier to trace similarities in development between the East and South East Asian countries and the OECD countries, especially in the current era of globalisation. For example, by analysing the economic actors and market incentives in the shrimp industry in Thailand, the researchers were able to make clear that international standards like Codex and ISO 14001 have become important incentives to make the exporting production chains greener.

With this analytical framework, the researchers were also able to trace what they call 'sprouts of political modernisation', or 'sprouts of civil activism'. They point to the public hearings in China and the successful Cleaner Production demonstration projects in Ho Chi Minh City – financed and assisted by foreign (academic) institutions. The stakeholders in these initiatives were indeed trying to follow an innovative and flexible governance style, beyond the bureaucratic state.

Where developments resemble each other, or are global, countries can learn from each other. The Roundtable on Sustainable Palm Oil (RSPO), established in Malaysia, is a modern, multi-stakeholder partnership that can function as a worldwide example. Many stakeholders (now over 200) are involved in this difficult process of making palm-oil production sustainable: palm-oil processors and traders, consumer goods manufacturers, retailers, banks and investors, environmental, nature conservation and social NGOs. Here, the Malaysian government is not only a regulator and enforcer, but also the mediator and promoter of agreed standards. And the role of the Malaysian and international NGOs is modern too, as they are engaged in constructive thinking about solutions in collaboration with representatives of industry and government agencies.

Framework

Ecological Modernisation Theory also functions as a normative framework: many

recommendations made by the East and South East Asian researchers have been shown to have an influence on environmental performance in the developed countries – so they are part of the theory – but they have not yet been proved to work in East and South East Asian countries. And not all recommendations have been shown to work in the OECD countries: some have only proved effective in a number of ‘best cases’ in the Netherlands, Sweden or Germany, or they are only assumed to work. Even in the OECD countries, there are few industrial parks already organised according to the principles of Industrial Ecology, although several cities are now trying to realise these. And even in European research institutes, little attention is paid to small and medium-sized companies, although government agencies are trying to improve this.

One major recommendation of the East and South East Asian researchers is to stimulate branch organisations. However, most sectors in East and South East Asia do not even have a branch organisation, or the branch organisations pay no attention to environmental issues. As a result, the effectiveness of branches organisations has barely been proven in East and South East Asia. But the researchers expect that branch organisations will work in their countries, as Er Ah Choy postulates. Another major recommendation is a flexible and participatory style of governance. That this ideal style has proved to work in Western Europe and the US, has been a reason for the East and South East Asian researchers to recommend this for their countries. They regard the principles of Ecological Modernisation, based on the experiences and debates in

western Europe and the US, as natural steps in eco-modernising the production processes.

Informal networks can result in corruption and bribery, but may also have a positive impact on environmental policies

If this is the case, East and South East Asian countries will follow the developed countries. All eco-modernised states would be organised according to the same principles: Industrial Ecology (or the even more modern: ‘Cradle-to-Cradle’), the use of market incentives, joint policy making, decentralisation, environmental education, independent environmental (monitoring) institutes, independent media and NGOs. This does not

imply that the industrialising countries will continue to lag behind the OECD countries. They may take ‘short cuts’ and go beyond their western counterparts in realising some principles.

Time and place dependent

However, several East and South East Asian researchers also conclude that the Ecological Modernisation Theory needs to be adapted for their region. They do not expect that the final outcome will be exactly the same as in the OECD countries. Lijin Zhong proposes a ‘Chinese-style Ecological Modernisation Theory’. Le Van Khoa warns ‘not just to copy the western models or theories of ecological and political modernisation to Viet Nam.’ And Ajchara Wattanapinyo stresses that ‘Thailand is in some major economic, political and cultural dimensions very different from Europe. Comparisons with other Asian countries are perhaps more realistic and useful.’ In their article ‘The interpretation of Ecological Modernisation in China’ in *Environmental Politics* (2007). Zhang Lei and Arthur Mol conclude that in both the Chinese and Western reports and literature they have analysed, there is one common conclusion: ecological modernisation is very much time and place dependent (see box).

One major difference may lie in the broad use of advanced technology in the OECD countries: many of these solutions will be too expensive for most East and South East Asian companies in the short run. Tran Thi My Dieu (Vietnam) proposes an adaptation of the theory on this point: ecological modernisation in Vietnam will have to rely on relatively simple measures. And researchers will also have to look for favourable local conditions, such as the advanced system of industrial estates with their industrial infrastructure and development companies. Another one is



One research question is how farmers, fishermen and local traders can be supported in their strategies to cope with the new global demands.

the large number of reuse and recycling practices that already exist – motivated by economic considerations.

From the Wageningen East and South East Asian programme, we can conclude that realising the principle of Industrial Ecology is economically feasible, also for small companies. But we can also conclude that, in East and South East Asia, this principle will often be more effectively realised with locally available technology and (existing) recycling practices than with expensive technology imported from Western countries.

Personal relations

A very pronounced difference is the dominance of informal relations – or *guanxi* – in East and South East Asia. *Guanxi* is a Chinese term referring to all interpersonal connections and cultural factors which structure and affect social life. Xie Lei has demonstrated the crucial role of *guanxi* in a non-democratic society (see chapter 1). She has described the power of and the need for a broad personal network in civil movements. Ms Wang needed her many personal relations to acquire crucial information about the dams in the Nu River, and to be sure of protection against attack from the government when mobilising people against the building of the dams.

Ajchara Wattanapinyo, assistant professor at Chiang Mai University, stresses also the importance of informal relationships. She has studied these in the Thai agro-food processing industry. Business networks in Asia are mainly constructed through personal relations, rather than formal contacts. As Wattanapinyo explains in her thesis, personal contacts with government officials present a way to get round rules and regulations, obtain special treatment, or put moral pressure on small enterprises to implement environmental regulations. Informal business-to-business relations may facilitate off-site recycling, help implement product requirements and standards, facilitate information exchange, or create solidarity – all potentially affecting environmental performance. ‘*Guanxi* principles and informal/family networks can result in corruption and bribery,’ she writes, ‘but may also have a positive impact on civil society and on the implementation of environmental policies.’

Informal relationships have proved to contribute substantially to the environmental performance of some of the companies studied. A relationship between a manager and a researcher belonging to the same political party, or between a manager and a processor belonging

to the same extended family, could be crucial for a company. According to Wattanapinyo, informal relationships could be activated as a channel to motivate companies to green their production. In rural areas, these networks might even work better than the formal policy and economic networks, she concludes. Ecological Modernisation Theory could be adapted for East and South East Asia by taking into account informal relationships.

Poverty trap

The most relevant informal networks to analyse at the moment are the networks of the many local producers and traders who together supply the raw 'materials' for processing plants and exporters – shrimps, fruit, fish or leather. These local farmers, fishermen, slaughterers and small-scale traders are confronted with new demands. But what do global certification schemes mean for them? This will be an important research subject for the Environmental Policy Group in coming years. Ecological Modernisation cannot be sustainable if communities end up in a poverty trap due to the demands of environmentally aware consumers in rich countries. More insight into the workings of these supplier networks, and their formal and informal relations with industry, NGOs and government agencies, may help prevent such negative side-effects.

Simon Bush and Peter Oosterveer make a case for analysing these networks in their article 'The Missing Link' in *Sociologia Ruralis* (October 2007). They use the example of Thai shrimp farmers (see also chapter 2), who now have to comply with the national Code of Conduct for sustainable shrimp farming, or quality assurance schemes of supermarkets such as Wal-Mart.

Ecological Modernisation cannot be sustainable if communities end up in a poverty trap due to the demands of environmentally aware consumers

The new certification schemes have already proved to have downsides for the local coast communities. Processing plants have introduced contracts with trusted suppliers to increase traceability and transparency throughout the shrimp supply chain. But many Thai shrimp farms – most of them small operations run by

families living on-site – either lack the resources to make necessary upgrades or balk at the certification fees as costs they are unlikely to recover. That could widen the gap between the haves and have-nots, providing a greater advantage to large, well-capitalised suppliers. And remarkably: so far the shrimp farmers themselves have not been involved in the certification schemes. They have simply been confronted with the strict quality requirements from the processing plants.

A study of the shrimp farm community in Hiep Thanh commune in the Mekong Delta (Vietnam), performed by Simon Bush, already indicates that the farmers and traders miss crucial information to cope with the new demands. Technical information is often not suitable to the needs of the farmers, because, as more than one shrimp farmer pointed out, the state extension services only provide intensive aquaculture techniques while these farmers are limited to extensive shrimp farming due the high costs of intensive aquaculture techniques. Added to that, these farmers cannot be sure of commanding a higher price in return for their efforts to save the mangroves. For price information, they rely on inaccurate radio and newspaper sources and their daily consultations with passing small-scale traders on motor-bikes.

Yet another research question therefore is how farmers, fishermen and local traders – at the level of individuals, households and communities – can be supported in their strategies to cope with the new global demands. Answers to these questions can also enrich Ecological Modernisation Theory for industrialising countries. Unlike the OECD countries in the 1960s, these countries do not yet have a social insurance system for the households that have been marginalised by the global economy. The current and new East and South East Asian PhD students will address these and other questions.



Local farmers, fishermen and small-scale traders are faced with new demands, for example from rich consumers in Shanghai.

'Idealistic' European model versus 'realistic' Chinese model

The concept of Ecological Modernisation and scholarly literature on the subject was formally introduced in China in 2007, when the China Centre for Modernisation Research in Beijing released its *China Modernisation Report 2007: Study on Ecological Modernisation*. Zhang Lei and Arthur Mol analysed the interpretation of the concept in *Environmental Politics* (August 2007).

According to this progressive Chinese report, depending on the modernisation stage a country is in, the pathways towards ecological modernisation can be different. The Chinese distinguish three pathways: pathway 1 applies to the 'highly developed knowledge societies' where ecological modernisation takes place through dematerialisation, decoupling and ecological rationalities. Pathway 2 applies to 'developmental countries' that take a short cut towards an eco-modernised society: they focus on accelerated green industrialisation and 'ecologising' the economy towards a knowledge society – China wants to belong to these countries. Pathway 3 is relevant for 'developing countries'. Emerging from an agricultural society, they are not proceeding directly towards a knowledge society in the way the 'developmental countries' want to, but they are trying to green their industry and industrialisation process. And interestingly: For the highly developed knowledge societies, the Chinese make a distinction between the 'idealist' European model, the 'pragmatic North American model' and the 'realistic model' in the newly industrialised countries. Thus China obviously distinguishes itself from the idealist European model. According to the Wageningen researchers, this appears to be a more refined differentiation than found in the Western literature to date.

However, a primarily economic-technological approach to ecological modernisation prevails in this 2007 report, with an emphasis on China's major production sectors. Political modernisation, sub-politics, and the reinvention of environmental governance are not referred to, although this does not mean that there will be no changes in these domains, the Wageningen researchers also conclude. 'Contemporary China is witnessing various experiments with new forms of environmental governance. And sprouts of civil society activism can be witnessed in China today,' they write.

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