Economy and Environment Program
for Southeast Asia
Tanglin PO Box 101
Singapore 912404

Phone: (65) 6831-6854
Fax: (65) 6235-1849
E-mail: dglover@idrc.org.sg
Web site: www.eepsea.org

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 10 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Sri Lanka, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

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Industrial Estates and the Environment : A Study of Water Pollution in Vietnam

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In Vietnam, as in many other rapidly-developing countries in Southeast Asia, industrial estates have sprung up to provide the infrastructure that factories need. Such estates can reduce the environmental impact of the industries they support, by providing central wastewater pollution control facilities. Since there are economies of scale in wastewater treatment, sharing common facilities should reduce costs. Unfortunately, wastewater treatment is often not practised and Vietnam is currently experiencing a lot of water pollution from the factories in its industrial zones.→

A summary of EEPSEA Research Report 2004-RR1, *Incentives for Wastewater Management in Industrial Estates in Vietnam* by Le Quang Thong and Nguyen Anh Ngoc, Faculty of Economics, Nong Lam University, Thu Duc, Ho Chi Minh City, Vietnam. (Contact : lqtsta@hcm.vnn.vn)

Water pollution has become

Now a new report has highlighted why many industrial estates in Vietnam have not invested in wastewater treatment plants and why many companies still fall far short of the necessary compliance. It finds that fines for polluters are ineffective and that factors such as a lack of investment capital, and a perception that the fees charged for waste treatment are unfair, are stopping many firms from investing in wastewater treatment. It makes a number of recommendations on how this situation can be improved. These include tightening pollution monitoring and assessment and imposing stricter legislative controls and stiffer penalties to deter polluters.

Investigating the Estates

The study, by Le Quang Thong and Nguyen Anh Ngoc from the Faculty of Economics at Nong Lam University, Ho Chi Minh City, looked at 32 industrial estates in four areas: Ho Chi Minh City (HCMC), Binh Duong Province, Dong Nai Province and Ba Ria-Vung Tau Province. These areas were chosen because they have the highest levels of industrialisation – and the highest number of industrial zones – in Vietnam.

In HCMC, ten industrial zones operate, including two for export processing. Binh Duong Province has seven industrial zones; Dong Nai has ten, with another nine to be established in the next ten years. Ba Ria-Vung Tau has only five operational zones. However, it has the highest amount of invested capital in the country and so looks set for a rapid expansion in the size and number of industrial estates it contains. Together, the sites in the areas surveyed comprised almost 50% of the industrial estates in the country.

The study team conducted surveys and meetings with industrial zone managers, infrastructure construction companies and investors to gather primary and secondary data. In each of the 32 industrial estates, two or three of the most polluting factories were visited. Interviews also helped the researchers identify the factors that affected the decisions companies

Factories and Common Treatment Plants in Ho Chi Minh City

Name of industrial estate	Number of factories and wastewater treatment requirements			Number of factories not connected to common WWT plant		Number of factories connected to common WWT plant	
	Required	Not required	Total	With treatment	Without treatment	With pre-treatment	Without pre-treatment
Le Minh Xuan	97	22	119	21	26	52	20
Tan Tao	65	15	80	12	8	46	14
Vinh Loc	25	17	42	15	27	0	0
Tay Bac Cu Chi	16	12	28	16	12	0	0
Tan Binh	36	13	49	30	19	0	0
Linh Trung 1 EPZ	31	14	45	0	10	27	8
Linh Trung 2	8	4	12	0	4	8	0
Binh Chieu	5	9	14	5	9	0	0
Tan Thoi Hiep	13	9	22	13	9	0	0
Tan Thuan EPZ	72	33	105	6	27	55	17
Total	**368**	**148**	**516**	**118**	**151**	**188**	**59**

a serious issue for all industrial estates

made on environmental compliance. In addition to this fieldwork, the Vietnamese Department of Science, Technology and Environment (DOSTE) helped gather information on water pollution control.

Rivers are Suffering

The researchers found that water pollution has become a serious issue for all the industrial estates in all four regions. Overall, they found that a lack of wastewater treatment (WWT) facilities in these estates (especially common WWT plants), together with inappropriate monitoring procedures, had led to large amounts of untreated wastewater being discharged into rivers. For example, none of the industrial zones in Ba Ria-Vung Tee had common WWT plants. Serious water pollution was observed in Dong Nai River (Dong Nai), Sai Gon River (HCMC), and Thi Vai River (Ba Ria-Vung Tau).

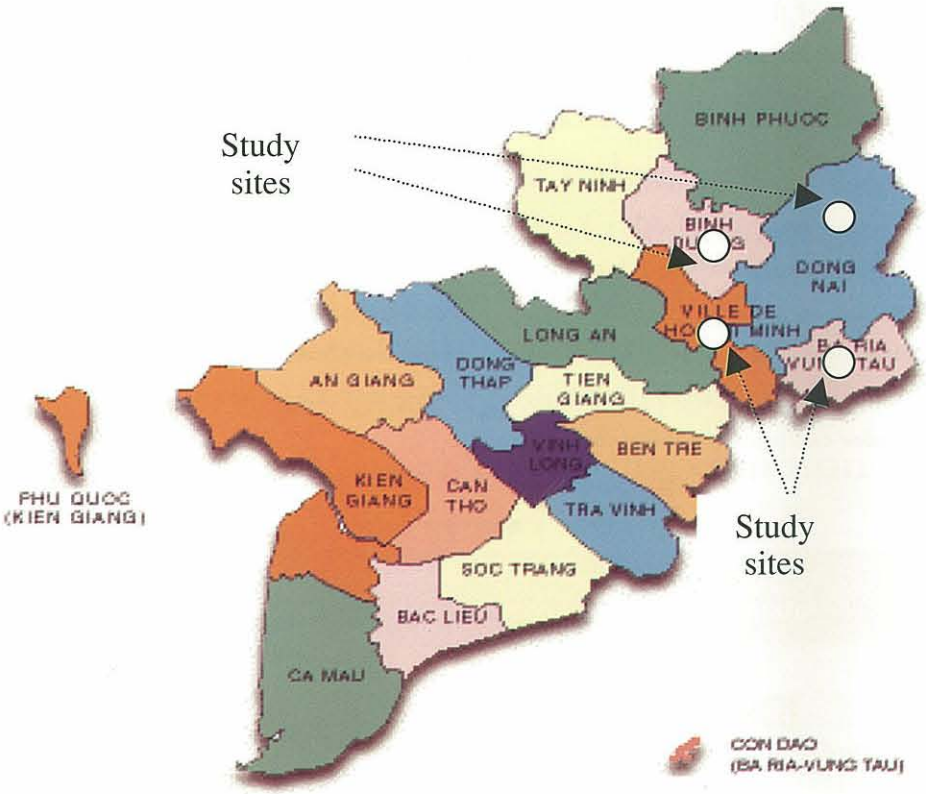
The type of industries in the industrial zones had a significant impact on the effectiveness of pollution control measures. For example, pollution in the Le Minh Xuan industrial zone is worse than in other industrial zones because Le Minh Xuan has several highly-polluting industries.

Cleanup Costs Deter Action

When the researchers investigated why companies in the industrial estates did not clean up their waste water properly, small and medium-sized enterprises generally said they could not afford to invest in and operate their own treatment systems. These companies also considered that participating in common WWT plants – although a more cost-effective option – were still too expensive.

In comparison, well-resourced and supported organisations – for example multinational corporations – were found to comply more effectively with environmental laws than those with less capital.

Except for a few industrial estates with strong capital injections (for example, the Vietnam-Singapore Industrial Park in Binh Duong Province), most prioritized



investment in other infrastructure systems such as roads, and electricity supplies, rather than in common WWT plants. Limited land area was also found to be another major factor halting the construction of common WWT plants.

Cleanup Charges Provide the Wrong Incentives

When they looked at why companies were not using common WWT plants, the researchers found that the fee structure for wastewater treatment was often considered unfair. In general, companies were charged according to the amount of incoming water used by the factories, rather than the amount of water or effluent discharged; the quantity or consistency of the wastewater they produced was not considered. Such a system provide no incentive to reduce pollution loads.

Nor were the penalties imposed for non-compliance with environmental standards high enough to act as an effective deterrent. Fines were generally set at a maximum of USD 200. Only under exceptional conditions was a higher penalty imposed. Given the high cost of construction of wastewater treatment facilities, it is not surprising that companies prefer to breach the law and pay a penalty rather than invest in clean up technology.

Weak Enforcement Compounds Pollution Problem

This was compounded by the fact that officials conduct only infrequent checks on whether companies were meeting pollution control regulations. Because of this, some common WWT plants stopped operating between visits from environmental enforcement officers and freely discharging untreated water into rivers.

Carrots and Sticks

In light of the pollution problems they found, the researchers emphasize the need for waste water treatment, especially in Dong Nai and Ba Ria-Vung Tau. The industrial estates may need government support to make the necessary investment in plant. They suggested that credit facilities and support programs should be provided.

Along with these "carrots", however, must go some "sticks". The government, with the industrial estates management boards, need to implement better pollution monitoring procedures. Penalties for non-compliance need to be increased, and the fee structure for wastewater treatment should be revised to provide incentives for pollution prevention.

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