



IN INDUSTRIAL PARKS IN EASTERN SOUTH: FACT AND SUGGESTIONS

by MEcon. NGUYỄN QUỐC NGHĨ*

In Vietnam, the development of industrial park (IP) is indispensable to the industrialization and modernization. Nonetheless, the race to build IPs in Eastern South provinces has produced a lot of problems, especially environmental pollution which has been menacing the sustainable development of local IPs. Therefore, this paper is to shed light on the causes of pollution and recommend some solutions to the problem.

Keywords: IP, pollution, sustainable development

1. Industrial parks in the Eastern South

Industrial parks, in fact, have played a vital role in changes in the structure of industry, economic growth, job creation, improvement in personal income, and transfer of technologies. Therefore, Vietnam's government thus far has tried its best to beef up the process of industrialization and modernization. Counting to May 2011, there have been totally 260 IPs, export processing zones (EPZs), and high-tech parks which occupy 71,394 hectares and are located in 57 provinces and cities. Of them, around 173 IPs with a total area of 43,718 hectares have been put into operation; the remainder are being basically constructed.

The Eastern South Vietnam houses the largest number of IPs and is also a key economic zone, leading the country in export turnovers, foreign investments, gross output and many other social factors. This zone comprises five provinces (i.e. Bà Rịa – Vũng Tàu, Bình Dương, Bình Phước, Đồng Nai, and Tây Ninh) and a city (HCMC). Counting to May 2011, there are 104 IPs in the zone and this number is on the onward trend. In 2010 alone, foreign investment in Eastern South reached US\$2,896.3 million as compared to the US\$5,276.86 million of foreign capital flowing to Vietnam. Provinces of the zone always go into the top ten in terms of foreign investments attraction.

Table 1: IPs and export processing zones in the Eastern South, up to May 2011

No.	Provinces/city	Quantity
1	Bà Rịa – Vũng Tàu	12
2	Bình Dương	24
3	Bình Phước	18
4	Đồng Nai	30
5	Tây Ninh	5
6	HCMC	15
	Total	104

Source: Eastern South Industrial Parks and Export Processing Zones Management Board

Đồng Nai Province is leading the country with 30 IPs, accounting for 28.8% of IPs in the zone and 11.5% of Vietnam's IPs. Until late 2010, IPs in the province have welcomed 817 FDI projects capitalized at US\$12,376 billion, and 306 domestic ones accounting for VND31,176 billion.

Ranked second in the country, Bình Dương Province has 24 IPs in operation occupying 8,751 hectares and being 2.7 times as much as that in 2005, and attracting more than 1,200 enterprises; the occupancy rate reaches 60%. In the past years, 613 FDI projects capitalized at US\$3,483bn and 225 domestic ones with total investment of VND2,656bn have come into operation.

HCMC, with the expansion and development of IPs, has substantially contributed to the economic transition. As rendered by the HCMC

Industrial Parks and Export Processing Zones Management Board, the city houses three export processing zones and twelve IPs which occupy 3,521.37 hectares. In which, 14 EPZs and IPs that has been operational have 1,185.34 hectares out of 1,763.41 hectares of commercial land leased to investors, pushing the occupancy rate up to 67%. Besides, seven new IPs which are going to be established will occupy an area of 1,569 hectares, and four IPs to be expanded to hold 894 hectares more. In sum, by 2020, there will have been 22 IPs and EPZs with the area of 5,939.61 hectares in HCMC. They are accordingly supposed to attract investments in key industries such as electricity, electronics, chemicals, engineering, and food processing with a view to facilitating the industrialization process of the city. In terms of investment attraction, the gross investments in IPs and EPZs, counting to May 2011, have reached US\$7.7bn. Of legally-valid projects, there are 733 domestic ones and 483 FDI ones.

Bình Phước Province, thanks to attractive investment policies, has had 18 IPs with the planned area of over 5,211 hectares which are mainly located in key economic areas along main arteries. Up till now, there have been over 80 FDI projects which represent the total registered capital of over US\$600 million.

In Bà Rịa Vũng Tàu Province, as from the



emergence of the first IP (Đông Xuyên IP), there have been 14 IPs with the area of 8,801 hectares. The province has attracted 228 projects whose registered capital amounted to US\$14,399 million representing 51% of the total investment within the whole Eastern South. These IPs have generated jobs for 32,500 workers whose average monthly income is around VND3.5 million.

Tây Ninh Province, at present, has five IPs. Of them, there are three new-built ones (i.e. Bourbon An Hòa, Phước Đông – Bời Lời, and Chà Lã). The two IPs of Trảng Bàng and Linh Trung III have completed infrastructural constructions as approved, reaching the occupancy rate of 80%. The three new-built IPs have step by step constructed infrastructural facilities and attracted investments as per the industrial-urban-service complex with a view to attaining the sustainable development. Counting to late 2010, there have been 169 legally-valid projects (i.e. 128 FDI ones and 41 domestic ones); the gross investment capital is equivalent to US\$646.6 million.

It is possible to state that IPs play a vital role in FDI attraction. Annual contribution of IPs to the national total export turnover reaches around 20%. A hectare of industrial land for lease can bring in an export value of US\$700,000 on average and create jobs for some 70 direct workers. Up till now, the urbanization rate of the Eastern South is about 50%. Its IPs have contributed a lot to the development of the rural area and provided jobs for millions of people. Together with the development of IPs, local infrastructural facilities such as ports, traffic networks, power and water supply systems, and communication networks, etc. are also evolved. Stats figure out that majority of workers in IPs are young and can quickly take in state-of-the-art technologies and production methods. The development of IPs has trained a dynamic and disciplinary workforce. By working for foreign-run enterprises, skills and management capacity of local workers are also improved.

In spite of numerous contributions to the socioeconomic development, IPs, in their operation, have generated a lot of social issues to

be concerned. Contraction of agricultural lands has sharply affected the life of agriculture-dependent households. Spontaneous migrations of workers have produced various problems in terms of social order, housing, cultural life, and especially environmental pollution. The development of IPs has put a great pressure on environment, causing adverse impacts on the life of workers and local communities, and the sustainable development of the country.

2. Pollution in Eastern South Industrial parks

Pollution is a serious matter of concern to peoples around the world. It directly threatens the sustainable socioeconomic development and the human life at present and in the future. Pollution includes three main types, viz. land pollution, water pollution, and air pollution. In which, air pollution in urban areas and IPs are the most severe.

a. Water pollution due to effluent from Industrial parks:

In recent years, the amount of effluent from IPs has ever arisen tremendously and is much higher than that from other sources. The quality of liquid waste depends heavily on whether it is treated or not. At present, just around 43% IPs are equipped with effluent treatment systems. The dumping of effluent at lakes, canals, rivers, and seas, etc. has made water sources severely polluted and unusable.

Effluent from IPs in the Eastern South is the largest, accounting for 49% of the total amount of effluent from all IPs.

Table 2: Effluent from IPs in Eastern South

Provinces/City	Effluent volume (m ³ /day)
Bà Rịa – Vũng Tàu	93,550
Bình Dương	45,900
Bình Phước	100
Đồng Nai	179,066
Tây Ninh	11,700
HCMC	57,700
Total	388,016

Source: Environmental Technology Center (ENTEC), 2009

The daily volume of effluent from Đồng Nai Province is the largest in the Eastern South (with 179,066m³ representing 46.15% of the effluent from the zone). According to the stat by the Đồng Nai Department of Natural Resources and Environment, some rivers near Biên Hòa are contaminated with coliform which exceeds the permitted threshold from 186 to 920 times, or even 1,860 times in some places. This is due to the fact that effluent is not treated before draining into rivers. The Đồng Nai river and its tributaries is seriously polluted, causing dead rivers such as Thị Vải River where a 10-km long

is such a manifest example for bacterial pollution. The micro-organic content of 100% water samples is 137 times as much as the allowed limit at the high water, and 10,859 times as much as the allowed limit at the low water.

b. Air pollution due to industrial emissions:

Housing a lot of IPs, the Eastern South has to suffer serious air pollution. At present, air pollution is mostly originated from old factories that have employed obsolete production lines and machines or have not been installed with an exhaust emissions treatment system.

Table 3: Air pollutants in Eastern South (kg/day)

No.	Provinces/city	Dust	NO ₂	CO	SO ₂
1	Bà Rịa – Vũng Tàu	13,378	25,109	3,873	240,049
2	Bình Dương	6,564	12,320	1,900	117,779
3	Bình Phước	14	27	4	257
4	Đồng Nai	25,606	48,061	7,413	459,483
5	Tây Ninh	1,673	3,140	484	30,022
6	HCMC	8,251	15,487	2,389	148,058
	Total	55,486	104,144	16,064	995,649

Source: ENTEC (2009)

river segment has become lethal to many creatures. The mercury content of river water around Vedan Port, Mỹ Xuân exceeds the permitted limit around 1.5 to 4 times, zinc from 3 to 5 times, etc.

In HCMC, surface water pollution is becoming extremely serious. As per calculations, around 1,740,000 m³ of industrial effluent from IPs and 195 major factories outside IPs is drained into Sài Gòn – Đồng Nai river system daily. In which, there are 671 tonnes of floating solid matters, 1,130 tonnes of BOD5 (which reduces the biochemical oxygen demand), 1,789 tonnes of COD (which reduces the chemical oxygen demand), 104 tonnes of nitrogen, 15 tonnes of phosphorus and heavy metals. These substances have polluted water of rivers which are supposed to supply water to vast residential areas, causing adverse impacts on the ecosystem and micro-organisms which play a vital role in cleaning up rivers. Tham Lương – Vàm Thuận canal system

Air pollution in Đồng Nai, Bình Dương and HCMC is the highest in the country. HCMC alone is one out of ten most polluted cities in the world. A recent survey by the Ministry of Industry and Trade has asserted that industrial production is to blame for around 40% of causes of environmental pollution, especially dust pollution which is the most popular in IPs. Given inspection results by Vietnam Environment Administration, the daily amount of emissions from IPs in Đồng Nai Province is 30% higher than the permitted limit. Every day, around 25,606 kilos of exhaust dust is dumped to air by IPs in Đồng Nai, and some 13,378 tonnes from Bà Rịa – Vũng Tàu. In HCMC alone, dust in the air is so dense that it causes smog covering the whole city. Records in air observation stations in HCMC show that 89% air samples do not meet the permitted limit and are extremely harmful to human health. The number of children who are

hospitalized for respiratory disease is getting high.

c. Pollution caused by solid waste from IPs:

The operation of IPs has produced a large amount of hazardous solid waste. The component and amount of solid waste in IPs depend on the type of business, scope of investments, and capacity of factories. The amount of solid waste has incessantly increased so far due to the emergence of new IPs. The amount of hazardous solid waste accounts for 20% of solid waste. Most of IPs have not had a separate waste dumping area and thus enterprises in the park must enter into a contract with environment companies to collect wastes. Many of recycling plants which are not equipped with state-of-the-art technologies to dispose of and recycle wastes have caused secondary pollution. Some enterprises even sneakily dump non-treated wastes at rivers.

The ratio of solid waste from IPs in the Eastern South is the highest, amounting to approximately 3,000 tonnes per day. The amount of hazardous waste in the Eastern South triples that in the North and is twenty times as much as that in the key economic zone of the Central Coast.

Table 4: Solid wastes from IPs in the Eastern South

Provinces/city	Industrial solid wastes (tonnes/day)	
	Non-hazardous	Hazardous
Bà Rịa – Vũng Tàu	288	72
Bình Dương	155	41
Bình Phước	45	11
Đồng Nai	329	55
Tây Ninh	5	1
HCMC	1,618	191
Total	2,440	371

Source: ENTEC (2009)

The daily amount of solid waste from IPs in HCMC is the highest in the Eastern South (around 1,809 tonnes of solid waste and making

up 64.53% that of the whole zone). In which, the monthly amount of sludge is above 200 million tonnes. A research by Vietnam Environment Administration has shown that only 20 out of 138 enterprises transfer sludge to competent authorities for disposal; the remainder keep it in stocks. Of 106 sludge samples taken for testing, around 60% samples contain hazardous waste.

Đồng Nai province is ranked second in terms of solid waste with 360 tonnes per day and accounting for 12.81% of solid waste in the whole zone. Of this volume, waste containing hazardous chemicals (which are flammable, poisonous, etc., or can combine with others to do harm to the environment and human health) represents 20%. The 2009 inspection by Vietnam Environment Administration shows that over 40% enterprises in the province do not observe provisions on garbage collection and classification.

Around 50% enterprises in Bà Rịa – Vũng Tàu do not comply with provisions on hazardous waste management. A lot of hazardous waste is mixed with municipal solid waste in landfills or even dumped messily in the factory, causing harm to the environment.

3. Explanations for the pollution in Eastern South

Firstly, the comprehensive zoning of IPs has not been implemented scientifically. Many IPs (such as Bình Chiểu and Tây Bắc Củ Chi IPs) are established within the city or in residential areas, causing adverse impacts on the environment. Meanwhile, protection of the environment in IPs has not been seriously taken into account by local authorities. The race for FDI projects in many provinces has got many low-quality projects (that do not satisfy stipulations on technologies and environmental protection) approved and licensed.

Secondly, many investors are not well aware of the environmental protection when constructing infrastructural facilities in IPs. The cost-effective problem in setting up waste treatment systems along with unsatisfactory

supports from the government have caused investors to tardily execute a common waste treatment system in the IP. Besides, the legal corridor for environmental protection in IP has not been perfect enough. To renew provisions on environmental inspection for projects in the IPs is rather tardy and penalties are not heavy enough.

Thirdly, the number of factories in IPs equipped with a state-of-the-art technology for waste treatment is still humble. Some effluent treatment systems are very obsolete and of small capacity with the result that wastewater overflows into canals and rivers making the environmental pollution more severe.

Fourthly, the army of environmental inspectors is small and their competence is not high enough, either. Sanctions are sometimes a purely formality, causing the repetition of violation; and if corrected, it is seemingly not done radically, exacerbating the environmental pollution in the Eastern South.

4. Consequences of environmental pollution in Eastern South

Overall, most IPs in the Eastern South have not met requirements of environmental protection as stipulated, getting the ecological environment severely polluted. Consequences of pollution in the zone are terribly serious and adversely impinge on the life of residents in the

vicinity of IPs. The dead segment of Thị Vải River has set the alarm bell ringing for every people. Both the surface water and air in this river segment are seriously polluted by industrial wastes; a lot of disease appears threatening the life of hundreds of households along this river. In addition, Nước Trong Stream, which plays a vital role in the life of residents in Long Thành District of Đồng Nai Province, is dying. The contaminated water of the stream is day and night drained into the Đồng Nai River which is supposed to provide water for agricultural production and millions of people in the Eastern South, including HCMC. Water pollution has got many wells contaminated and a lot of orchards to die.

At present, the groundwater in the Eastern South is almost contaminated with nitrate, a pollutant that is hard to treat. Nitrate contamination is also quite popular in many districts in HCMC. Besides, the polluted water is also the origin of infectious disease such as diarrhea and cholera, etc. At the same time, dust and exhaust emissions from IPs which are gone with the wind to residential areas have caused chronic respiratory diseases like acute respiratory infection, chronic pneumonia, or even lung cancer.

Records by Departments of Natural Resources and Environment in Eastern South provinces show that most rivers suffering industrial wastes



are seriously polluted and many micro-organisms are killed in many river segments. If shrimps used to be regarded as the primary source of income for many households, then a lot of shrimp farms are abandoned or changed to raise low-productivity fish. Besides, despite the knowledge of infected water, many local residents still utilizes it for daily life. Many shrimp farms, albeit located 20 to 30 km far from IPs, cannot avoid the high rate of dead shrimps.

5. Tackling pollution in IPs in Eastern South

As set forth in an evaluation by the Đồng Nai Department of Natural Resources and Environment, there have recently been some positive changes in the practice of environmental protection of IPs in the province. Counting to late 2010, 19 out of 21 IPs have been equipped with a common wastewater treatment system (equaling 90.5%, an increase by 52.5% as compared to the 2006 figure, much higher than the planned target of 70% and the national average of 56%). The collection of both hazardous and non-hazardous solid waste in the province is also much improved. Accordingly, around 797 enterprises register to administer hazardous solid wastes and this is such a rapid increase as compared to the 30 in 2001. At present, some 400 enterprises have registered to collect and transport solid waste and hazardous wastes. The ratio of

collecting ordinary solid waste reaches 95%, an increase by 25% as compared to 2006. The ratio of collecting and disposing hazardous waste in 2010 reached 61%, rising by 36% as compared to 2006.

In HCMC, 100% of IPs and EPZs are equipped with centralized wastewater treatment systems. Since 2006 till now, all remaining IPs have established their own wastewater treatment systems and put them into operation. The total capacity of all treatment systems reaches 53,000m³ per day. Up till now, most IPs have basically completed their sewer system. Some 200 out of over 1,000 enterprises produce dust during its operation. However, they have already installed air fresheners so as to dispose of emissions from gas boilers, galvanization, painting, leather production, etc. and dust from furniture production and polishing, etc. Solid waste from IPs and EPZs is divided into three types and treated as follows: industrial waste containing recyclable materials that can be reused; industrial and municipal solid waste that are collected and transported to landfills; hazardous solid waste that is collected and disposed of by competent authorities. Enterprises in IPs and EPZs have step by step established their procedures of collecting, storing, and transferring industrial wastes as provided by law.



Mỹ Xuân A2 IP is the only one in Bà Rịa – Vũng Tàu that is equipped with a provisional wastewater treatment plant whose capacity is 1,500m³ per day. Mỹ Xuân A IP is building its effluent treatment plant. Phú Mỹ I and Đông Xuyên IPs where infrastructure building is financed by the provincial budget are completing their plans. At present, the project of a non-hazardous solid waste landfill by Kbec Limited Company with a capacity of 500 to 700 tonnes of waste per day has been carried out. Besides, together with a 100-ha centralized waste treatment area in Tóc Tiên Commune, three other projects in Tân Thành District have also partially dealt with non-hazardous waste. A part of hazardous waste is transported to an industrial waste treatment factory in Phước Hòa Commune of Tân Thành District; the remainder are collected and transported to specialized companies in HCMC, Bình Dương and Đồng Nai for disposal.

Bình Dương Province houses 24 IPs which have come into operation and produced around 45,900m³ of wastewater daily. Up till now, around 96% of IPs are equipped with centralized wastewater treatment systems (which includes 17 complete treatment systems, four pilot operation systems, and two systems in the pipeline). However, these attempts are not sufficient due to the fact that the amount of wastewater from IPs, in practice, is five to ten times as much as the permitted limit; some IPs have not thoroughly collected wastewater from enterprises for treatment, or detached rain drains from wastewater drains, causing some enterprises to sneakily drain industrial wastewater into rain drains.

Apparently, pollution management has been the matter of concern for management boards of IPs in the Eastern South. However, to control the quality and effectiveness of waste treatment systems in IPs is not stringent enough.

6. Some suggestions

Via the above-mentioned analyses, some solutions to the environment protection and the

sustainable development of IPs in the Eastern South can be put forth as follows:

Firstly, the zoning of IPs must accompany with the master plan for socioeconomic development and environmental protection. The development of IPs must correspond to advantages of natural resources, socioeconomic characteristics, and trends in scientific and technological development, etc. Before approving an IP zoning plan, competent authorities must weigh up the pros and cons as well as raise instructions for timely amendments to approved projects. It is also necessary to spur the “strategy of green production in industry till 2020” which has been worked out by the government with a view to improving the environmental quality and orienting the eco-friendly development of enterprises. Particularly, it is encouraged to opt for investors who own high technologies and high competitive edges.

Secondly, the enhancement in perception of environmental protection must be at the fore. Legal provisions on environmental protection in IPs must be disseminated to enterprise managers and investors. Disclosures about environment criteria and environmental administration database should be set up and widely propagated in IPs. Enterprises violating laws on environmental protection must be declared in public and those without must be highly commended.

Thirdly, the legal corridor for environmental protection in IPs must be perfected. Law documents concerning environmental protection, inspection and delegation of environment-related duties should be revised, amended and modified. Policies that allow and encourage the establishment of internal provisions on environmental protection should be worked out. Besides, it is possible to impose stringent penalties on infrastructure investors who violate legal provisions on environmental protection, perfect directives relating to techniques in environmental protection in IPs, and work out provisions on labor safety and environmental protection.

Fourthly, it is necessary to perfect the centralized waste treatment systems in IPs; and make sure that each IP must be equipped with a standard wastewater treatment system which works effectively during its operation. For those without a centralized wastewater treatment system, each enterprise itself must treat its wastewater before draining into the environment. Solid waste must be collected and disposed of by certified treatment companies. Each enterprise must carefully establish a temporary container of hazardous waste.

Fifthly, the environmental administration in IPs must be improved. Centralized wastewater treatment system in IPs must be regularly inspected. Large projects that are supposed to have adverse impacts on the environment must be weighed up prior to approval. It is also encouraged to establish automatic and continuous observation stations in dumping areas of IPs. Management boards of IPs must collaborate with the local Department of Natural Resources and Environment in inspecting the environmental compliance of enterprises and stringently punishing any violation deeds. Decision on establishment of IPs must be thoroughly examined, especially environmental factors. More importantly, the competence of environmental administrators must be enhanced■

References

1. HCMC Industrial Parks and Export Processing Zones Management Board (2011), “Báo cáo tổng kết 20 năm xây dựng và phát triển KCX-KCN Tp. Hồ Chí Minh” (Report on establishment and development of IPs and export processing zones in HCMC over the past two decades).
2. Ministry of Natural Resources and Environment (2009), “Báo cáo hiện trạng môi trường quốc gia” (Report on the national environmental fact).
3. Ministry of Natural Resources and Environment (2009), “Mối quan hệ giữa môi trường và phát triển kinh tế xã hội” (Relationship between environment and socioeconomic development).
4. Trần Đức Hiến (2010), “Ô nhiễm môi trường ở nước ta hiện nay – Thực trạng và một số giải pháp khắc phục” (Environmental pollution in Vietnam – Fact and solutions), *Khu Công Nghiệp Việt Nam*.

