

## Press Review 07/2012 - Vietnam, Water and Environmental Technology,

For more information please contact: Ms. Pham Thi Viet Ha ([hapham2310@gmail.com](mailto:hapham2310@gmail.com))

Short notice: Our new office address: 3<sup>rd</sup> floor – 170 Tran Duy Hung street, Cau Giay District, Hanoi - Tel/Fax: + 84 4 37835697

No	Title	Date	Source	Region	Catalogue	Description
1	Prof. Dr.-Ing. Jürgen Mallon is appointed to be the new President of the Vietnamese-German University	1/7/2012	German Embassy	HCM	Other	The Vietnamese-German University has a new president. The University Council unanimously appointed Prof. Dr.-Ing. Jürgen Mallon.
2	Water price to increase by 50%	1/7/2012	VN News	Vietnam	Water	Water prices are to go up by 50 per cent from July 11, under the Ministry of Finance's Circular 88.
3	Manila Waters buy into HCM City	1/7/2012	Asia News	Philippines Vietnam	Water	The Philippines concessionaire has deepened its commitment to the Vietnamese water sector.
4	News on Incinerator in Can Tho	1/7/2012	Can Tho News	Can Tho	Waste treatment	Incinerator is based in Can Tho Pesticide Company to treat hazardous solid waste.
5	Wastewater treatment still fails to meet green standard	3/7/2012	VN News	Vietnam	Waste treatment	Funding needed for environmental protection for all sectors and industries in Viet Nam is estimated at about US\$7.6 billion.
6	Delta riverbank erosion casts poor families out of homes	4/7/2012	VN News	An Giang	Environment	Hundreds of families living along eroded river banks in the Mekong Delta Province are too poor to build houses and move to safer areas.
7	Wastewater plant poses health risk	9/7/2012	VN News	HCM	Waste treatment	Thousands of households in HCM City have been facing health risks due to horrible smells emanating from the Binh Hung wastewater treatment plant.
8	Many rural poor to get tap water	13/7/2012	VN News	Vietnam	Water	Nearly 1.4 million poor people living in VN's rural areas will be given access to running water and financial support to help them install water-tanks.



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**Vietnamese – German Office for Water and Environmental Technology**

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9	Meeting reviews Mekong projects	13/7/2012	VN News	Mekong	Environment	Foreign ministers from Lower Mekong nations and the US convened for their fifth meeting yesterday in Phnom Penh to review the implementation of programmes on the environment, education, health and infrastructure.
10	More than \$5b needed for city drainage system	14/7/2012	VN News	Hanoi	Environment	The capital city plans to spend more than VND116 trillion (\$5.5 billion) for upgrading its urban drainage system in a massive project set to be completed in 2030.
11	Japan helps implement industrial waste treatment project	14/7/2012	VN News	Hanoi	Waste treatment	Japanese New Energy and Industrial Technology Development Organisation will help Hanoi implement a sample project to treat industrial waste in Nam Son waste treatment complex, Soc Son district, Hanoi.
12	Local authorities powerless in protecting underground water sources	15/7/2012	VN Net Bridge	Tien Giang	Water	Despite the strict regulations on protecting water sources, underground water is still getting depleted and polluted because of people's spontaneous activities.
13	Dust, noise, wastewater sicken villagers	16/7/2012	VN News	Ninh Binh	Environment	A skilled stonemason who works every day in his densely dust covered village without the aid of a safety mask in Hoa Lu District's in Ninh Binh
14	International Climate Protection Fellowship	18/7/2012	Alumniportal Deutschland	Germany	Others	Interested candidates from developing and emerging countries can now apply again for an Fellowship offered by the Alexander von Humboldt Foundation.



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15	Vietnamese Master Student from BMBF AKIZ among the first at the DAAD Summer School 2012	19/7/2012	Akiz	Can Tho	Others	Mr. Tran Trung Tin was born and raised in the Mekong delta, the tropical South of Vietnam. Since his young years, he was interested to learn about water protection, having experienced what serious impacts water pollution may have on people and the environment.
16	Dong Nai suffers increasing industrial pollution	20/7/2012	VN News	Dong Nai River	Pollution	Pollution was spreading in the Dong Nai River Basin, the main source of water for 16 million people living in the area, including HCM City, said Associate Professor Phung Chi Sy from the Viet Nam Institute for Tropical Technology and Environmental Protection.
17	HCM City threatened by stench from wastewater plant	21/7/2012	VN Net bridge	HCM	Wastewater	The Economy and Budget Committee of HCM PPC asked relevant departments to propose measures to deal with the persistent foul smell emanating from the Binh Hung Wastewater Treatment Plant in Binh Chanh District.
18	Sending waste to the rubbish bin	22/7/2012	Vfej	Vietnam	Waste treatment	Many foreign firms are not wasting their time nosing around Vietnam's dumping grounds.
19	Ca Mau spends \$3m on climate change	23/7/2012	VN News	Ca Mau	Climate Change	The southernmost province of Ca Mau is spending US\$2.9 million on two climate-change projects this year, according to a provincial official.
20	Water pollution, acid rain affects millions in HCM City	23/7/2012	Vfej	Dong Nai	Pollution	Pollution was spreading in the Dong Nai River Basin, the main source of water for 16 million people living in the area, including HCM City.



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21	Cities discuss climate change plan	26/7/2012	VN News	Vietnam	Climate Change	Authorities and experts have called for efforts to make Viet Nam's urban centers and cities more climate change resistant.
22	Illegal miners destroy rivers	30/7/2012	VN News	Lang Son	Environment	Rampant and illegal gold exploration along rivers in the northern province of Lang Son has altered the flow of rivers and led to landslides.
23	Climate change could spell doom for delta	31/7/2012	VN News	Vietnam	Climate Change	Average temperatures in northern central Viet Nam can rise by 3.5 degrees centigrade and dry season rainfall reduce by 30 per cent by 2100, according to a new climate change report prepared by MONRE.



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## **1. Prof. Dr.-Ing. Jürgen Mallon is appointed to be the new President of the Vietnamese-German University.**

The Vietnamese-German University (Vietnamese-German University, VGU) has a new president. The University Council unanimously appointed Prof. Dr.-Ing. Jürgen Mallon, a Kiel Professor of Manufacturing Engineering and Production Management, to be the new president of the Vietnamese and German jointly founded university in Ho Chi Minh City. The official appointment by the Ministry of Education took place in Hanoi on 01 June 2012.

Jürgen Mallon has already had many years of experience in Asia. He was the manager for three production facilities of Zwilling JA Henckels in Shanghai, where he was also responsible for planning and building a new factory. In 2006 he was appointed Professor of Manufacturing Engineering and Production Management at the University of Applied Sciences Kiel, and, in 2008, he was appointed head of the Institute of CIM- Technology Transfer (CIMTT) of the University of Applied Sciences Kiel. The 46-year-old is married and has one son. As the German President of VGU, Prof. Jürgen Mallon succeeds Professor Wolf Rieck, who retired from this position in May 2011. Since then, the Vietnamese Vice-Minister of Education and Training Professor Bui Van Ga has acted as interim president.

“It is a long road to create an excellent university, but we have already laid the crucial foundation necessary to achieve this important goal. I am looking forward to this challenge and I am sure that it will be an exciting time” said Jürgen Mallon. One of his most important tasks will be to lay the groundwork for the faculties, which will follow the German model for research and teaching, and will be staffed with senior Vietnamese professors. During the construction phase of the VGU, nearly all of the teaching is being done by the so-called “flying faculty”, i.e. visiting professors from the German partner universities who carry out the teaching in the form of block courses and supervise the students on site. For research projects, Vietnamese research assistants will be firstly trained and can be appointed as lecturer and junior professor after graduation. Until VGU can recruit its professors from its own graduates, Vietnamese professors, with international experience, will be appointed following a multi-step process based on the German model.

Another important task facing Jürgen Mallon is the establishment of research centers, whose primary research activities will be closely coordinated with VGU's study programs. Research at VGU will be oriented toward the areas of engineering and natural sciences with a focus on energy, traffic, transportation and logistics, water resources, sustainable urban development with protection of the environment and appropriate utilization of resources, as well economics.

The first research center was established in 2010, the “Vietnamese-German Transport Research Center” in cooperation with the Technische Universität Darmstadt and the Vietnamese University of Transportation and Communications. More research centers will follow.

To provide sufficient space for these ambitious goals, Viet Nam has allocated a 50 ha area in Binh Duong province, about 70 minutes by automobile north of Ho Chi Minh City. The university campus has been financed by a World Bank loan of \$180 Million USD and by reciprocal grants from Vietnamese government in the amount of \$20 Million USD. The first phase of the new campus for 1500 students is planned to be completed by 2017. In the second phase, the campus will be able to accommodate 5000 students and 12,000 students in the third phase.

For the first construction phase, an architectural competition based on the rules of World Bank will be announced in August 2012. Until the new campus is finished, VGU will continue to use temporary facilities.

[www.vgu.edu.vn](http://www.vgu.edu.vn)

**Contact:**

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## **2. Water price to increase by 50%**

Water prices are to go up by 50 per cent from July 11, under the Ministry of Finance's Circular 88.

The ceiling water price in urban zones would be increased to VND18,000 (US\$8.6) per cubic metre while in rural areas it was increased from the current VND8,000 (\$0.38) to VND11,000 (\$5.30).

Based on the water pricing framework, municipal and provincial people's committees would decide the water prices to be applied in their localities.

Nguyen Thuy Linh, who was now living with her older sister in Ha Noi, said her family paid around VND100,000 (\$4.80) per month for their water. If the water price was increased by 50 per cent, the amount might be VND150,000 (\$7.20).

"It is still not much," she said.

Linh added that the water price increase would have more of an impact on big families which consumed a large amount of water.

Meanwhile, a student of Viet Nam National University, Ha Noi, said he worried that his host would increase the water price which was fixed at VND60,000 (\$2.80) per month. "It is high for a student like me."

Last month, the Ha Noi Water Company proposed to the municipal People's Committee to increase the water price by 35 per cent, due to a loss of VND32 billion (\$1.53 million) during the first four months of this year.

Company director Nguyen Nhu Hai said the current prices of water were low and did not cover water production costs and the installation of pipes and meters. The low water prices also made it difficult to attract investment and encourage consumers to save water, he said.

In a previous interview with Viet Nam News, Koos Neefjes, the United Nations Development Programme's policy advisor on climate change, said water in Viet Nam was extremely cheap compared to other countries.

He added that without the necessary financial resources, water companies would not be able to invest in new pipes to prevent water losses.

Meanwhile, Dang Van Khoa, former delegate of HCM City People's Council, said it was unreasonable to factor a water loss of up to 29 per cent into the water price, quoted Thanh Nien (Youth) newspaper. Water companies should try to reduce their water losses rather than to keep increasing water prices.

According to statistics of Ha Noi Water Company, the current rate of water loss was about 30 per cent. The company planned to reduce the rate to 25 per cent by 2015 and 18 per cent by 2020.

# Manila Water buys into Ho Chi Minh City

The Philippines concessionaire has deepened its commitment to the Vietnamese water sector. It continues to be selective about which business opportunities to pursue.

Manila Water has bolstered its presence in the Vietnamese bulk water supply market by agreeing to acquire 49% of Ho Chi Minh City bulk water supply company Kenh Dong from local infrastructure company CII and other investors. At the same time, its parent company Ayala Corporation will purchase a 10% stake in CII, worth \$14 million at current market cap.

Kenh Dong Water Supply is a build-own-operate project for a 200,000m<sup>3</sup>/d water treatment plant. The plant is currently under construction and is due to go into operation in the second half of this year. Ronnie Lim, head of international business development at Manila Water, explained that while details of the contract are still under discussion with offtaker Sawaco, the bulk water price is likely to be higher than that for the Thu Duc BOO. Sawaco is committed to purchasing 150,000m<sup>3</sup>/d from the Kenh Dong plant.

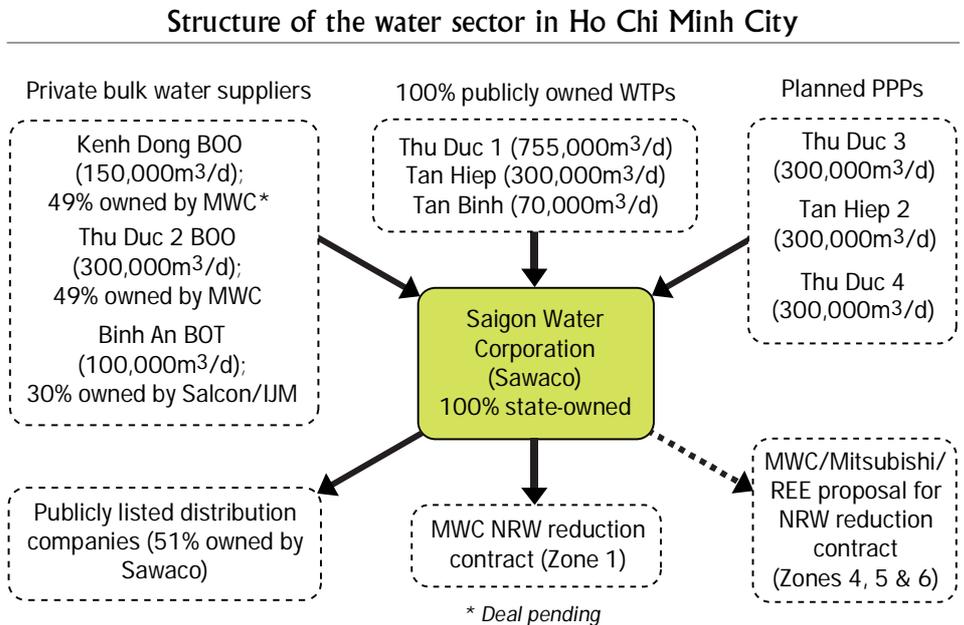
The latest deal comes hot on the heels of Manila Water's purchase of 49% of the Thu Duc Water BOO Corporation for PHP1.8 billion (\$42.6 million) in November 2011. Thu Duc BOO Corp also has a bulk water offtake guarantee from Sawaco for 300,000m<sup>3</sup>/d, but in 2011 supply from the plant stood well above the minimum, at 345,000m<sup>3</sup>/d. The company generated total revenues of \$15 million in 2011 and net income of \$3.9 million.

These acquisitions mark the deepening of Manila Water and the Ayala Group's relationship with HCMC. Manila Water has been working in the city since 2008, when it won a performance-based NRW reduction management contract with Sawaco covering Zone 1, the city's central area.

According to Lim, Manila Water has now reduced leakage by 65,000m<sup>3</sup>/d, beating the minimum set out in the contract of 37,500m<sup>3</sup>/d by August 2012. It aims to achieve a reduction of 75,000m<sup>3</sup>/d by the end of the six-year term.

The contract got off to a slow start, particularly with regard to the establishment of district metering areas (DMA). Blueprints of the network were incomplete, and getting excavation permits to carry out repair works was also difficult, according to Lim.

Despite this, the contract has given Manila Water a taste for more NRW reduction work. In October 2011, it submitted an investment proposal to Sawaco,



along with Mitsubishi and locally listed REE Corporation, for a further project in three other service zones (4, 5 and 6). This time, the contract would involve significant investment from the consortium, says Lim. Manila Water hopes that discussions with Sawaco about the proposal will be concluded soon, after which the contract will have to go through a government approval process.

When Sawaco opened a tender for a new DMA establishment contract covering Zone 2 of the city last year, however, Manila Water declined to bid. Given its experience in Zone 1, it is little surprise that the company prefers a model in which it has more management responsibility.

Manila Water's multiple contracts in HCMC add a further dimension to the city's already complicated organisational structure for water supply (see chart).

At the centre is Sawaco, the publicly owned corporatised utility, which buys bulk water from three private suppliers, in addition to sourcing water from its own plants.

Beneath Sawaco, six distribution companies deliver water to customers. These were originally branches of the utility, but in 2004-2007 they were hived off and established as 'joint stock' companies listed on the Vietnamese stock exchange. Although Sawaco retains a 51% ownership in each, other investors have proved more focused on maximising profits than rolling out coverage or plugging leaks, with

the result that relations among Sawaco, the companies and Manila Water have not always been perfectly smooth.

Yet more players may enter the sector if Sawaco's master plan, prepared in 2011 but not yet officially approved, goes ahead. Under the plan, supply volume will be increased by 2.3 million m<sup>3</sup>/d by 2025. The first three projects are slated for development under a public-private joint venture arrangement. All three are 300,000m<sup>3</sup>/d WTPs.

There have been hints that Sawaco may seek to buy back equity in the distribution companies to help it regain control over the current unwieldy arrangements. However, neither Sawaco nor the HCMC People's Committee (the local government) have pushed this forward. Their reluctance may stem from a fear that announcing the intention to purchase shares would drive up stock prices, making the acquisition more expensive.

The next step for Manila Water and other international companies seeking to build a presence in HCMC might be to take a stake in one of the distribution companies, although Lim says there are no serious plans yet for further acquisitions. However, like any foreign investor, Manila Water would face considerable administrative hurdles and would likely need to secure approval from national ministries and the local People's Committee before going ahead.

#### **4. Incinerators in Can Tho Pesticide Company**

Within the implementation scope of environmental protection projects for Can Tho City, on July 3rd, 2012, AKIZ Project coordinated with Technical Cooperation Organization GIZ (Germany) to organized and introduced with representatives of authorized agencies in Can Tho about the incinerator which is based in Can Tho Pesticide Company (CPC) to treat hazardous solid waste.

The incinerator has capacity of 50kg/hr, burning temperature 1,200 oC, ensuring the emission does not cause environmental pollution.

Mr Nguyen Thanh Tam, CPC's Production Manager expressed: The work has total investment of 1.3 billion VND, among of which, German side contributed 631 million VND, the rest is from CPC.

## 5. Wastewater treatment still fails to meet green standard

Funding needed for environmental protection for all sectors and industries in Viet Nam is estimated at about US\$7.6 billion.

About \$1 billion of this is required for the fisheries sector, said Dang Van Loi, deputy head of the Pollution Management Department under the Viet Nam Environment Administration.

Loi said, by the end of 2011, only 65 per cent of 180 industrial zones currently operating had wastewater treatment systems. Notably, about 90 per cent of nearly 500 existing paper-production enterprises did not have wastewater treatment systems or those that they had were inefficient.

According to experts, a main reason for the situation was the high cost. The Viet Nam Paper Company (VINAPACO), one of the rare paper enterprises that have proper wastewater systems, had to set aside nearly VND20 billion (more than US\$950,000) each year to maintain the operation of its system.

According to the company's technical department, in 2003 the company earmarked 15 per cent of its total funding for waste treatment at a total cost of about VND100 billion (\$4.76 million).

The technical department said investment in environmental protection required a lot of money and only companies with large scope were capable of investing in proper waste treatment.

They also said it was very difficult for enterprises to find financial assistance for environmental protection because the Government had limited favourable policies covering this area.

To ensure that their released waste meets national standards in concentration, some companies might mix it with a large amount of clean water to escape detection.

But experts said this not only failed to reduce the amount of waste water released into the environment, but also wasted a large amount of clean water.

Loi from the Pollution Management Department also said 30 per cent of industrial production factories of medium and large scale had wastewater treatment systems that did not operate up to the standard, or did not operate on a regular basis.

The total amount of solid waste produced every day in Viet Nam's big cities is estimated to be about 29,800 tonnes, but only 83 per cent of this is collected and treated. The figure is 30,500 tonnes a day in the countryside, while the amount collected and treated makes up only 50-60 per cent.

The common method of solid-waste treatment in Viet Nam is to bury it, which is not the best way. Also, more than 20 projects have been set up to recycle waste, but all of them are on a small scale and the recycled products are not popular in the market.

Meanwhile, trying to manage the number of environmental violations in Viet Nam is a headache for authorities.

Le Thi Kim Oanh, deputy chief inspector of the HCM City Department of Natural Resources and Environment, recently told the Sai Gon Giai Phong (Liberated Sai Gon) newspaper that it was impossible to control all the violations.

She said the city had only about 10 environmental inspection staff to look after more than 150,000 enterprises.

As a result, many enterprises still release untreated waste without being punished.

### **Inspected**

Oanh said that in 2011, more than 320 enterprises in the city were inspected and 98 were fined a total of VND3.7 billion (about \$176,200) for violations. Until May this year, 40 enterprises were inspected and 24 fined for environmental violations.

Nguyen Van Phuoc, deputy director of the HCM City Department of Natural Resources and Environment, told Liberated Sai Gon that the current Law on Environmental Pollution was difficult to implement because some of the rules were not clear and even conflicted with the Enterprise Law.

Environment inspectors said the equipment and staff for inspection and supervision were not adequate, making matters even more difficult to control.

According to the Pollution Management Department, so far only 17 cities and provinces throughout the country have drafted and approved solid-waste management plans. Twenty-five other localities are developing plans while 21 others have yet to implement Government Decision 798 on waste management.

The Ministry of Natural Resources and Environment plans to build seven waste-treatment areas over the next eight years for a total of about \$600 million.

According to the Viet Nam Environment Administration, waste recycling technologies in Viet Nam are out of date and ineffective.

This means that environmental industry is unformed of the limitations in technology, equipment and facilities.

The administration said Viet Nam needed to attract more investment from domestic and foreign enterprises in environment protection, especially in waste recycling technologies.

## **6. Delta riverbank erosion casts poor families out of homes**

Hundreds of families living along eroded river banks in the Mekong Delta Province of An Giang are too poor to build houses and move to safer areas, while authorities are unable to provide all of them with "resettlement" houses immediately.

At three such spots along the Hau River in Long Xuyen city and the Tien River in Phu Tan District, 183 families with more than 1,100 members have either lost their houses or live in highly vulnerable areas, and have to be relocated.

Most of them live with relatives or public places like schools. Some have to rent houses.

Most are manual labourers and poor, so losing their houses makes their lives harder, local authorities say.

While buying their own land and building houses is out of the question for them, even at resettlement areas they usually have to pay a part of the land and house foundation costs except under certain programmes.

Vo Van Thinh, who now lives in a tent on his neighbour's land in Binh Khanh Ward in Long Xuyen, said: "My family has seven members and we have to live in the rickety tent in poor living conditions. But we have to endure it because we have no choice."

Tran Kim Loan, deputy chairwoman of the Long Xuyen People's Committee, said 97 families in the city have been moved out of hazardous areas and require new houses.

"But the city cannot yet provide them house foundations, so they have to live with relatives or in temporary dwellings," she said.

Authorities are building two resettlement areas in the city – and hope to complete them by the end of September – but most house foundations there are meant for other beneficiaries.

Of the 97 families, the city is giving priority to those that lost their house and land to the erosion, Loan said.

The others had to wait for the construction of new resettlement areas, she said.

The An Giang Province People's Committee has instructed Long Xuyen authorities to develop a 10-ha resettlement area in the city's Binh Duc ward.

This is expected to accommodate everyone affected by the erosion, but take two to three years for completion.

The Long Xuyen People's Committee would try to complete the work at the earliest, Loan promised.

## **7. Wastewater plant poses health risk**

Thousands of households in HCM City have been facing health risks due to horrible smells emanating from the Binh Hung wastewater treatment plant - the one with the largest capacity of its kind in Viet Nam.

Affected households in District 8 and Binh Chanh District, who live not far from the location of the plant, said they would sue the company if nothing was done to stop the smell.

In 2008, the plant worth more than VND4.1 trillion (US\$196 million) in Binh Chanh District's Binh Hung Commune went into operation. With its capacity of up to 141,000 cubic metres of water per day, the plant was expected to collect and treat wastewater from 425,000 residents in four main districts of the city and improve the living environment of more than 2 million of residents near Ben Nghe, Tau Hu channels and Sai Gon River.

However, after three years of operation, the environmental protection project has been causing horrible smells for surrounding households. Last year, local residents sent letters of complaint to the authorities but the situation didn't improve.

Nguyen Anh Tu, local resident in Dai Phuc Residential Area in Binh Hung Commune, told Lao Dong (Labour) newspaper that he and other villagers had been tortured by the terrible smell day and night although his house was 1km away from the plant, instead of 50 metres as required.

"We have to breathe the unbearable smell. It's much more dangerous to our health than wastewater or mud pollution," he said.

"It's high time the city authorities revised the distance regulation between the plant and residential areas. We'll sue if the plant doesn't solve the problem."

Nguyen Thanh Son, local resident in Dai Phuc Residential Area, said the smell spread out within a radius of 5km, and those who breathed the air felt dizzy and sick.

Ly Tho Dac, deputy director of the HCM City Water Sewage Co Ltd has provided a document that outlines the reasons for the air pollution being connected to the plant's mud treatment system.

Stored mud was uncovered and buried after 15 days of fermentation. Thus, the smell was unavoidable.

The company has used chemicals to minimise the spread of the smell, but they have been ineffective. The varying temperature and the rainy season had increased the amount of organic in waste and worsened the situation, he said.

Nguyen Thi Quang Suong of Binh Hung Commune's People's Committee said the inspection implemented by the local authorities and environmental police last August showed the same results, adding that the committee required the plant to spray chemicals to keep the number of mosquitoes and flies down in the mud storage area.

Suong said in response to the locals' complaint the committee had took samples of water and mud for testing to find reasons for the recent increase in pollution. It would also report the case to the city's Department of Natural Resources and Environment for further solutions when the results were revealed.

To deal with the situation, according to Dac, the company would take some temporary measures, such as mixing mud with rice husks or installing more odour absorption facilities in the storage areas to reduce the smell.

## **8. Many rural poor to get tap water**

Nearly 1.4 million poor people living in Viet Nam's rural areas will be given access to running water and financial support to help them install water-tanks, heard a conference in Ha Noi on Tuesday.

The Community Hygiene Output-based Aid Programme in its second phase (2012-15) was held by the East Meets West Foundation Global Partnership and the Viet Nam Women's Union.

The programme aims to increase the rate of access to hygiene and promote changes in hygienic behaviour in poor communities in rural areas in Viet Nam and Cambodia, focusing on 20 per cent of the poorest households.

In the second phase, the southern provinces of Dong Thap, Tra Vinh and Tien Giang; the central provinces of Thanh Hoa and Ha Tinh; and the northern provinces of Hai Duong and Ninh Binh will all participate in the programme.

Poor households in 244 communes in the localities will receive financial support from VND1.4-10 million (US\$67-480) to improve toilets and water storage facilities.

By June 2015, 126,000 women will have received aid to help them install toilets and septic tanks, and about 2,600 volunteers will be trained periodically on community hygiene.

The first phase from 2010-11 was implemented successfully in the Mekong Delta, helping 4,200 poor and nearly poor families in the southern provinces of Tien Giang, Long An and Dong Thap to build toilets and install hand washing facilities with running water.

According to the World Health Organisation, about 50 million Vietnamese people do not have hygienic toilet facilities or septic tanks. Furthermore, poor hygiene kills 20,000 people in Viet Nam each year.

## **9. Meeting reviews Mekong projects**

Foreign ministers from Lower Mekong nations and the US convened for their fifth meeting yesterday in Phnom Penh to review the implementation of programmes on the environment, education, health and infrastructure.

This year's meeting saw the first presence of Myanmar as an official Lower Mekong Initiative (LMI) partner nation, together with Cambodia, Laos, Thailand and Viet Nam.

At the meeting, the ministers agreed to add a new pillar of agriculture and food security chaired by Myanmar, to establish the pillar "connectivity" on the basis of broadening the co-operation content in infrastructure, and strengthen co-operation with the Mekong River Commission (MRC) while broadening programmes on water.

The environment and water pillar, formerly known as the environment pillar, will be chaired by Viet Nam.

The meeting agreed to strengthen co-ordination among LMI countries through a co-ordination network. They also decided to establish an LMI working group of experts and outstanding figures.

The ministers also ratified a LMI concept paper and a plan of action to implement the LMI during 2011-15, while releasing a statement on gender equality and female empowerment. A LMI working group for gender was also formed.

At the meeting, US Secretary of State Hillary Clinton announced an LMI programme to 2020, pledging a US\$50 million assistance package for LMI activities over the next three years, as well as committing \$2 million for the fisheries programme and \$1 million for a MRC research programme on the impacts of hydroelectric dams on the main flow of the Mekong River.

On the same day, the Friends of Lower Mekong (FLM) Ministerial Meeting also took place in Phnom Penh, bringing together foreign ministers and high-ranking officials from the LMI countries as well as Australia, New Zealand, Japan, the Republic of Korea, the European Union, the Asian Development Bank and the World Bank, among others.

The meeting discussed working methods and mechanisms to promote the co-ordinating role of the FLM for regional co-operation programmes.

The meeting agreed on two working channels of the FLM, including information sharing between aid agencies and policy dialogues between foreign ministries on non-traditional and trans-national security issues, such as the environment, climate change, health, and infrastructure development.

The sustainable management and use of Mekong River water resources, especially the environmental and social impacts of hydropower dams on the main stream, were highlighted at both meetings.

The ministers called on the riverside countries to closely co-ordinate and increase the transparency in using and managing shared water resources. They also affirmed to continue co-operating with the MRC and help it to conduct research on the sustainable management and development of the Mekong River.

Speaking at the meetings, Vietnamese Foreign Minister Pham Binh Minh stressed that the operation of the LMI should focus on assisting Mekong countries in addressing difficulties and challenges on infrastructure, natural disaster management, climate change, food and water security.

He suggested the countries help the MRC make comprehensive, objective and scientific assessments on the impacts of hydropower dams on the main stream of the Mekong River.

The Vietnamese FM proposed two initiatives on the management of underground and dry-season water in the Mekong basin, which were applauded by the meetings.

The objectives of these initiatives are to ensure the effective and sustainable use of underground water resources, create regional co-operation mechanisms in managing underground and dry-season water, and improve the countries' capacity to cope with natural disasters, helping ensure water security for the region.

The 6th LMI Foreign Ministers' Meeting will be held in Brunei in 2013.

## **10. More than \$5b needed for city drainage system**

The capital city plans to spend more than VND116 trillion (\$5.5 billion) for upgrading its urban drainage system in a massive project set to be completed in 2030, according to Nguyen Van Khoi, Deputy Chairman of Hanoi People's Committee.

Khoi made the comment yesterday after the committee approved the plan. The funds for the project will come from Official Development Assistance (ODA), the State budget and bonds.

The plan aims to minimise surface water pollution and areas that suffer from flooding during heavy downpours by 2015, with priority given to the inner city and the outlying districts of Long Bien and Ha Dong.

Work will be carried out to stop flooding at about 25 flood prone spots in Hoan Kiem, Ba Dinh, Dong Da and Hai Ba Trung districts by upgrading the sewerage system with a capacity of 155mm of rainfall per day.

Larger lakes that are able to accommodate large inflows of rainwater will be renovated. Meanwhile sewage pumping stations at Yen So, Bay Mau, Kim Lien and Truc Bach areas with capacity of 220,000cu.m per day will be upgraded to ensure waste water from inner districts meet environment standards before being discharged into the Hong (Red) River delta.

For the 2016-2020 period a comprehensive drainage system will be built for the southern Hong River and Nhue River region with capacity to handle rainfall of 155mm per day.

Rain water and sewage systems in residential suburban areas are also scheduled to be completed during this period. Existing lakes are planned be renovated while new reservoir lakes will be built in some areas.

A network to collect waste water from inner city and industrial areas will be established and more waste water treatment plants will be built in Yen Xa, Phu Do, west of the Nhue River, Ha Dong and Son Tay.

The project will operate under build-transfer (BT), build-operate-transfer (BOT) or public-private partnerships (PPP).

## **11. Japan helps implement industrial waste treatment project**

Japanese New Energy and Industrial Technology Development Organisation (NEDO) will help Hanoi implement a sample project to treat industrial waste in Nam Son waste treatment complex, Soc Son district, Hanoi.

A Memorandum of Understanding to this effect was signed in Hanoi on July 6.

NEDO has worked with the Ministry of Environment and Natural Resources and the Hanoi People's Committee to study the project since 2010.

The project, worth 29.2 million USD with 22.5 million USD funded by Japan, applies advanced waste treatment technology with a daily capacity of 75 tonnes. The energy recovered will be used to generate power.

Japanese Hitachi Zosen and the Hanoi Urban Environment Company (URENCO) will jointly implement the project.

This model will then be duplicated in many cities and provinces nationwide

## **12. Local authorities powerless in protecting underground water sources**

Despite the strict regulations on protecting water sources, underground water is still getting depleted and polluted because of people's spontaneous activities.

Authorities officials in Tien Giang province have suffered a headache when a lot of local residents dig ponds right on the rice fields for aquaculture. This has led to the sharp fall of the land area for growing rice and caused serious pollution to the water sources, according to Dan Viet.

In Cai Lay district, 170 households have dug ponds on 114 hectares of rice fields, mostly in the communes of Thanh Loc, Phu Cuong, May Thanh Bac and My Phuoc Tay, to breed fish. Especially, the households have created 58 water wells from which they get water for fish farming.

The movement of farming fish was triggered in early 2011, when fish breeder prices escalated continuously, bringing big profits to farmers. The profits from fish farming was so attractive that people, including high ranking officials, also decided to farm fish on the areas reserved for rice fields.

Phan Van Khai, Deputy Secretary of the My Thanh Bac Commune's Party Committee was one of the pioneers, who used the agriculture land for fish farming. 96 other local households have followed him, digging ponds for fish.

Meanwhile, Secretary of the Phu Cuong Commune's Party Committee Nguyen Van Nguyen leased 6000 square meters of rice fields to others which have been used for aquaculture.

The leaders of Tien Giang province have been warned that the aquaculture in a large and spontaneous scale would lead to the sharp fall of the rice output in the province, thus threatening the food security in the locality.

Meanwhile, the aquaculture without following scientific procedures would seriously pollute the water environment, which would badly affect the lives and the production activities of the community.

Tran Kim Mai, Deputy Chair of the Tien Giang provincial People's Committee, has said that the local authorities are determined to keep the area for rice fields stable and prevent any behaviors which may spoil the agriculture production plan.

Mai also said that the provincial authorities have requested the Cai Lay district people's committee to stop the spontaneous well drilling.

However, Nguyen Minh Hien, Deputy Chair of the Cai Lay district, has admitted that the request may not be followed because of a lot of difficulties.

"I think that farmers would not follow the instruction by the local authorities, because they would have to spend much money to fill in the ponds. Meanwhile, the current regulations do not clearly stipulate how they would be punished, if they do not fulfill the instruction. The

district's local authorities cannot allocate budget for the work," he explained.

Not only Tien Giang, many other provinces and cities are also facing big problems with the underground water sources. Quang Ninh provincial authorities also still cannot settle the problems despite its big efforts to stop the behaviors to spoiling the water resources.

Thien Nhien has reported that even in Ha Long, Cam Pha areas, which are believed to have the most profuse water reserves; the exploitation capacity has been decreasing. The total capacity in the areas is just between 6000 and 10,000 cubic meters a day.

In HCM City, dwellers in districts 12, Thu Duc and Binh Tan have complained that they do not have clean water to use, because the underground water has become seriously polluted, while they cannot buy clean water from the water supply companies.

### **13. Dust, noise, wastewater sicken villagers**

Pham Van Thien, a skilled stonemason, works every day in his densely dust covered village without the aid of a safety mask in Hoa Lu District's Ninh Van Commune in the northern province of Ninh Binh.

"I don't feel any unusual symptoms, so I hardly ever go to the hospital," said Thien, who has worked as a stonemason for the past seven years.

I know the dust is very thick, but it's inconvenient for me to work with a mask, he said.

I don't wear glasses either because the dust sticks to the lenses and I can't see anything, he said.

The same can be said for many of the craftsmen in the village. Although they work in a substandard environment without safety equipment, they pay little attention to their health.

The development of stone craft in the village has contributed to the improvement of living conditions for local residents, however, it also pollutes the environment.

The 400-year-old village is about six kilometres from Ninh Binh City, and provides high-quality carvings to both domestic and international markets.

There are now 500 households and 3,000 local people who make a living from the industry in the village, according to statistics from the province.

Income from the job is estimated to account for 80 per cent of the village total.

People tend to work from home, so not only they but also those around them are affected by the pollution.

"I keep my door shut all day but the dust still gets in and sticks to the furniture," said Tran Minh Tranh of Tan Duong Village.

Statistics from the provincial Environment Protection Division showed that noise, dust and wastewater had heavily polluted the environment in the traditional craft village.

Thousands of tonnes of solid waste together with 95 cubic metres of wastewater are discharged into local ponds and lakes every day, the report said.

Air sample analysis showed that the dust concentration is 2-4 times higher than the permitted standard.

Nguyen Yen Binh, head of the Ninh Van Commune's Health Centre, said that people could contract diseases relating to the lungs or eyes due to the dust.

People also face the risk of tinnitus, sleeplessness and cardasthenia if they were subjected to the noise created by the work for a prolonged period of time, Binh said.

A recent periodical medical check-up conducted by the centre found that up to 30 per cent of the local population had contracted diseases such as pharyngitis, blepharitis and sinusitis.

In response to the situation, the provincial People's Committee approved a plan in 2005 to relocate some stone carving households to an area covering 23ha in Xuan Phuc and Xuan Thanh villages.

However, only 65 out of 500 households had been moved so far due to problems with agricultural land clearance, said Nguyen Quang Dieu, head of the Ninh Van Stone Craft Village's Management Board.

More than 2,800 local households still face the consequences of environmental pollution while they wait for a solution from authorised agencies.

## 14. International Climate Protection Fellowship

Dear Alumna/Dear Alumnus,



Interested candidates from developing and emerging countries can now apply again for an [International Climate Protection Fellowship](#) offered by the Alexander von Humboldt Foundation. The deadline for application is 1 December 2012.

The International Climate Protection Fellowship brings young leaders from developing and emerging countries to Germany for twelve months. Before submitting their applications, they must have selected and established contact with an appropriate host university or institution, where they will carry out free, independent research on a subject connected with climate protection and resource conservation. This year, the Alexander von Humboldt Foundation selects up to 15 young qualified leaders.

The International Climate Protection Fellowships are primarily intended for people who are already engaged in climate protection, one of the key aims is to promote exchange of ideas among the recipients of the fellowship. The idea is that the fellowship recipients build up a network which they can then draw upon later when they are working around the world as experts in a range of fields.

Read more about the programme on the [Alumniportal Deutschland](#) and find links to the Alexander von Humboldt Foundation for further information and application.

With best wishes,

A handwritten signature in blue ink that reads "Christian Poschmann". The signature is written in a cursive, slightly slanted style.

Christian Poschmann, Chief Editor  
**Alumniportal Deutschland**

## **15. Vietnamese Master Student from BMBF AKIZ among the first at the DAAD Summer School 2012**

Mr. Tran Trung Tin was born and raised in the Mekong delta, the tropical South of Vietnam. Since his young years, he was interested to learn about water protection, having experienced what serious impacts water pollution may have on people and the environment.

During his studies at Can Tho University, College of Environment and Natural Resources, he learned about subjects, such as Inland Water Resources, Living Aquatic Resources, Aquatic Ecosystems, Community Development Based Resources, Remote Sensing and GIS and Sustainable Development and finished his Bachelor study successfully as Environmental Engineer in 2007. Later he was lucky to be selected as Environmental Engineer and Head of Environmental Division of Can Tho Industrial Parks Infrastructure Construction Company (CIPCO). Here he became acquainted with the Vietnamese - German team of the AKIZ – Project (Integrated wastewater concept for industrial zones, “Integriertes Abwasserkonzept für Industriezonen”), which is a research project on industrial wastewater and a unique "Flagship Project" under implementation in the Industrial Zone (IZ) Tra Noc, Can Tho City, in the Mekong - Delta.



*Picture: Gate of Industrial Zone Tra Noc*

Accomplishing a local investment for the central sewage treatment plant of the IZ, the AKIZ - Project, (sponsored jointly by the German Federal Ministry of Education and Research (BMBF) and the Vietnamese Ministry of Science and Technology (MOST), with IEEM, the Institute for Environmental Engineering and Management at the Private University of Witten/Herdecke gGmbH at Witten/Germany as lead coordinator) is developing an integrated wastewater concept for tropical IZ to secure the efficient and sustainable functioning of the whole wastewater system including all its components.

Currently, Mr. Tran Trung Tin is doing his Master study on Environmental Engineering at Can Tho University, College of Environment and Natural Resources and is involved in the development of a sound wastewater monitoring and control system at IZ Tra Noc in close cooperation with AKIZ and local environmental agencies.



*Picture: Mr. Tran Trung Tin and AKIZ – researcher at Tra Noc IZ*

From this background, Mr. Tran Trung Tin wanted to learn more about Integrated Water Resources Management (IWRM) and applied for the DAAD Serial Summer School in September 2012 in Germany.

On 14th July 2012, he received the letter to be selected as participant and is looking forward to meet other international experts from all over the world, to learn about the integration of different disciplines and linkage of ecological, economic and social development goals as essentials when developing future waste water management concepts.

Mr. Tran Trung Tin will bring back home knowledge about German technologies and experiences in modern management tools and techniques to support the successful development of the environmental sector in the Mekong River Delta.

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## **16. Dong Nai suffers increasing industrial pollution**

Pollution was spreading in the Dong Nai River Basin, the main source of water for 16 million people living in the area, including HCM City, said Associate Professor Phung Chi Sy from the Viet Nam Institute for Tropical Technology and Environmental Protection.

Sy said that according to information from the Environmental Technology Centre, industrial zones, clusters and firms were the main causes of pollution in the region. Daily emissions include approximately 123 tonnes of dust, 1,100 tonnes of sulphur dioxide (SO<sub>2</sub>), 119 tonnes of nitrogen dioxide (NO<sub>2</sub>) and 29,5 carbon dioxide (CO<sub>2</sub>).

This pollution had led to acid rain, Sy said.

The Viet Nam Environment Administration reported that rains with a pH of less than or equal to 5.5 were common in the southern provinces of Binh Duong and Dong Nai due to rapid industrial development. The pH of rain is usually between 6.5 and 8.5.

Dong Nai's department of natural resources and environment reported that the province had 26 industrial zones with about 400 factories and manufacturers, but only 215 were equipped with emission treatment systems.

To save on production costs, many of them used materials including wood, coal, wood chip and bran for fuel instead of using oil, which contributed to the emissions problem in the area.

The department recently launched inspections at 89 municipal industrial enterprises. Of them, 14 were found not to meet the national industrial emission standards and were fined nearly VND450 million (US\$21,400)

Sy said the province should implement more inspections to evaluate emissions and acid rain which were probably being caused by industrial waste, and then propose measures to tackle the situation.

## 17. HCM City threatened by stench from wastewater plant

The Economy and Budget Committee of the People's Council of Ho Chi Minh City on Wednesday asked relevant departments to propose measures by latest July 25, to deal with the persistent foul smell emanating from the Binh Hung Wastewater Treatment Plant in Binh Chanh District.

Relevant departments and representatives of the committee met with the Urban Drainage Company, which is managing the wastewater plant, to determine the reasons and find solutions to contain the stench.

Nguyen Thi Quang Suong, an environmental official in Binh Hung Commune, said thousands of households in the commune are suffering because of the persistent stink from the plant.

Pham Dong Phuong, chairman of the People's Committee of Binh Hung Commune, said that the stink emanating from the plant day and night becomes worse after a rainfall or when it is bright and sunny.

According to Le Thanh Son, director of the Urban Drainage Company, the Binh Hung plant is under an environmental project of HCMC and was built to treat wastewater over an 825 hectare area with population of 425,000 people.

The plant's capacity in the first phase was 141,000 cubic meters a day.

Wastewater from Districts 1, 3, 5 and parts of District 10 runs through drains to Dong Dieu Pumping Station and then to the Binh Hung plant for treatment.

The wastewater treatment process generates mud waste, which is only buried after 15 days of fermentation. The stink emanating from the uncovered mud waste is causing unbearable stink.

Delegates at the meeting said that besides temporary measures to reduce the stench, the company should use more advanced technology to absorb the smell.

Pham Van Dong, head of the Economy and Budget Committee asked the Urban Drainage Company, the City Steering Center for Urban Flood Control Program and Binh Chanh District authorities to prepare a detailed report on this issue as well as propose solutions by July 25 to the committee.

## **18. Sending waste to the rubbish bin**

Many foreign firms are not wasting their time nosing around Vietnam's dumping grounds.

Japan's New Energy and Industrial Technology Development Organization (NEDO), Vietnam's Ministry of Natural Resources and Environment (MoNRE) and Hanoi Municipal People's Committee are headlining the trend by clinching a memorandum of understanding to construct a \$29.2 million pilot project to treat industrial waste at the Nam Son waste treatment complex in the capital's Soc Son district.

The one hectare project, whose \$22.5 million is funded by Japan's official development assistance (ODA) will be the first of its type in the region and implemented from 2012-2014 by Hanoi Urban Environment Company and Japan's Hitachi Zosen. With a lifespan of 30 years, the project will use advanced Japanese waste treatment technology with a daily treatment capacity of 75 tonnes.

"This project, helping reduce greenhouse gas emissions and creating a new source of energy, will then be multiplied in many cities and provinces nationwide," said MoNRE Deputy Minister Bui Cach Tuyen. NEDO vice chairman Sadao Wasaka said: "This project will help Vietnam build an energy-saving society and protect the environment."

Tuyen said many other foreign firms had also sought to cultivate their waste treatment projects in Vietnam, due to the country's growing population discharging an increasing volume of waste.

Northern Hai Duong province's Urban Environmental Company has inaugurated a plant to use households' waste to produce organic fertilisers. This project, based in Thanh Ha and Tuan Hung districts, has total investment capital of VND137 billion (\$6.6 million), of which VND60 billion (\$2.9 million) is financed by the Spanish government. This plant can annually process 64,000 tonnes of rubbish, using modern Spanish technology.

Hanoi-based locally-owned Technology-Trading and Investment Consultancy Joint Stock Company (Tecin), which is the representative of ReCycled Refused International Group (RCR) - one of UK's leaders in energy and waste treatment industries, said RCR was planning to implement a \$3.8 billion project to build 15 urban solid waste facilities in 15 provinces and cities under the public-private partnership model. Tecin has been working with localities for possibilities for constructing these facilities since last year.

Meanwhile, UK-based Spectrum Environmental Group is in the mix while French-invested APB Environment, Ecodas, Eau Pure, ISEA and the Pasteur Institute of Paris has worked with the Ministry of Health (MoH) and hospitals in Vietnam to introduce cutting edge technology for health waste treatment directly on site, which helps reduce greenhouse gas emissions by limiting their collection.

## **19. Ca Mau spends \$3m on climate change**

The southernmost province of Ca Mau is spending US\$2.9 million on two climate-change projects this year, according to a provincial official.

The projects focus on building sea dykes and embankment systems, stopping saltwater intrusion and restoring mangrove forests.

The funds comprise non-refundable aid from non-governmental organisations in the Republic of Korea, the Netherlands and Japan.

The first \$1.3 million project will assess the ability of seven coastal communes in the districts of Tran Van Thoi, U Minh and Phu Tan to adapt to climate change, .

The second, and similar \$1.6 million project, will focus the two districts of Nam Can and Ngoc Hien.

Chairman of the Ngoc Hien District People's Committee, Nguyen Truong Giang said Ca Mau province had 250km of coastline and 800km of rivers and canals that were almost below sea level.

"In the last five years, the sea level has risen higher and higher in this district, and only old-style houses with stilts are unaffected," Giang said.

Since the beginning of this year, Ca Mau has received \$7.5 million in aid from 11 NGOs to tackle climate change and rising sea levels.

This year, Viet Nam expects to receive \$248 million in aid to adapt to climate change from international donors linked to a support programme to respond to climate change.

Funding for the programme has increased from \$138 million in 2010 and \$142.5 million last year.

## **20. Water pollution, acid rain affects millions in HCM City**

Pollution was spreading in the Dong Nai River Basin, the main source of water for 16 million people living in the area, including HCM City, said Associate Professor Phung Chi Sy from the Viet Nam Institute for Tropical Technology and Environmental Protection.

Sy said that according to information from the Environmental Technology Centre, industrial zones, clusters and firms were the main causes of pollution in the region. Daily emissions include approximately 123 tonnes of dust, 1,100 tonnes of sulphur dioxide (SO<sub>2</sub>), 119 tonnes of nitrogen dioxide (NO<sub>2</sub>) and 29.5 tonnes of carbon dioxide (CO<sub>2</sub>).

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To save on production costs, many of them used materials including wood, coal, wood chip and bran coal for fuel instead of using oil, which contributed to the emissions problem in the area.

The department recently launched inspections at 89 municipal industrial enterprises. Of them, 14 were found not to meet the national industrial emission standards and were fined nearly VND450 million (US\$21,400).

Sy said the province should implement more inspections to evaluate emissions and acid rain which were probably being caused by industrial waste, and then propose measures to tackle the situation.

## **21. Cities discuss climate change plan**

Authorities and experts have called for efforts to make Viet Nam's urban centers and cities more climate change resistant.

At a conference organised by the Ministry of Construction, Viet Nam Urban Forum and Da Nang People's Committee, experts discussed directions for urban centres and cities – particularly technical solutions and better policy development of urban management – so they could adapt to growing climate change challenges.

Speaking at the opening, Trinh Dinh Dung, Construction Minister and chairman of the Viet Nam Urban Forum, said the country had made progress in urban development, resulting in economic growth and higher incomes.

However, rapid urbanisation had caused major challenges in population, energy and food security, since most of Viet Nam's urban centres and cities were located along the coast and on lowlands, facing threats of storm, floods and rising sea levels.

At the same time, cities located in mountainous areas had to cope with flash-floods, landslides, forest fires and drought.

Cities generated 70 per cent of the country's GDP and climate change posed a major threat to the country's continued efforts in sustainable development and poverty reduction, the conference heard.

Van Huu Chien, Chairman of the Da Nang People's Committee, said as one of Viet Nam's major coastal urban centres the city had been, and would be greatly impacted by climate change.

"If nothing can be done about climate change adaptation in major cities, it's expected that the lives of residents will be disturbed, for sure," Chien said.

Studies on climate change adaptation in the country's urban centres had already pointed out problems, particularly in the lack of planning solutions to climate change.

Viet Nam has a population of around 85.8 million, of which 25.4 million live in cities, the figure is expected to double by 2025.

## **22. Illegal miners destroy rivers**

Rampant and illegal gold exploration along rivers in the northern province of Lang Son has altered the flow of rivers and led to landslides.

A Viet Nam News Agency reporter said about 50 floating dredges were hunting for the precious mineral on three rivers running through Binh Gia, Huu Lung and Loc Binh.

Nguyen Huu Chien, a representative of the provincial people's committee, said local leaders were determined to put an end to the practice.

He said district heads who failed to act would be fined by the committee.

Despite efforts to control the mining, exploiters often operate at nights to escape attention.

If they decide to work during daylight hours, workers are sent up and down river to keep watch and phone if, and when, inspection vessels are coming.

Random checks reveal that most of the dredges do not have licences or if they do, they are just for sand exploitation.

Ten dredges have so far been fined between VND20-30 million (US\$950-1,400).

However, many believe the fines are not heavy enough to stop the operations. Miners often spend up to \$20,000-\$50,000 for a vessel.

Dredge owners can earn up to VND10 million (\$500) a day.

### **23. Climate change could spell doom for delta**

Average temperatures in northern central Viet Nam can rise by 3.5 degrees centigrade and dry season rainfall reduce by 30 per cent by 2100, according to a new climate change report prepared by the Ministry of Natural Resources and Environment.

The new predictions are based on updated data collected from 200 meteorological stations and satellites. It paints a worse scenario than an earlier report in 2009 which estimated average temperature increase at 2.8 degrees centigrade and rainfall reduction at 18 per cent.

In the new version, by 2100, hot days with temperatures over 35 degrees centigrade would double in comparison with now. Rainfall would raise 2-7 per cent in the rainy season but drop significantly during dry season.

The report divides climate change impacts into three categories: low, medium and high, depending on the level of emissions and socio-economic development.

At the medium level, if the sea water rises by 1m, around 2.5 per cent of land area in central coastal provinces, 10 per cent of the Hong River Delta, 20 per cent of HCM City and 39 per cent of the Cuu Long (Mekong) Delta would be inundated.

Four per cent of the railway system, nine per cent of highways and 12 per cent of provincial roads would be suffered.

If emissions increased at higher levels in Viet Nam and the world, the sea levels are expected to rise by 2m, in which case the Cuu Long (Mekong) Delta would virtually cease to exist with 92 per cent under water.

The Hong River Delta and HCM City would lose 30 and 36 per cent of their land respectively.

The scenarios sketched in the report are expected to inform plans formulated to tackle climate change by concerned ministries and departments.