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**Private Sector Investment Decisions in Building and Construction: Increasing,
Managing, and Transferring Risks: A Case Study of Thailand**

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This case study presents some information on how the Thai government perceives disaster risk and regulates building and construction in the private sector, particularly industry. This paper also discusses how the private sector considers Disaster Risk Reduction (DRR) issues specifically relating to flood vulnerability, taking the 2011 flooding disaster as an example. Information is gathered from a literature review and interviews with key stakeholders in both the government and private sector.

Comprehensive Plan

In Thailand, the comprehensive plan is used as a land management tool together with the city planning code on land usage. The main purpose of the comprehensive plan and its regulatory framework is limited to controlling urban development. However, it is often ineffective due to the excessive bulk of these regulations and their inefficient enforcement, exacerbated by the improper use of future land-use map for zoning.

There are three main instruments of land management: planning, regulation and fiscal tools. For planning, zoning is presented in the form of a coloured map, segregating land into residential, commercial, industrial, cargo, agricultural, floodway and conservation areas. Each colour is also divided by different densities and land use requirements. However, the zones and blocks tend to cover large areas. One large zone may include many smaller communities and neighbourhoods with different land-use patterns. As for the legal tools, some important landmarks in the area of land legislation include Zoning Regulation, Floor Area Ratio and Open Space Ratio. These serve as a broad control framework but do not provide an actual blueprint for urban development. Finally, the potential of fiscal instruments to reshape land use also remains underutilized. While levies such as the Local Development Tax and Housing and Land Tax are already in place, these are not effectively employed to produce targeted land usage outcomes¹. One positive development in recent years is the publication of the 2006 Bangkok Comprehensive Plan. Though long overdue, this represents a major step forward for Thailand in terms of providing a clear framework for the development of its cities, with detailed specifications for aspects such as spatial ratios and plot size.

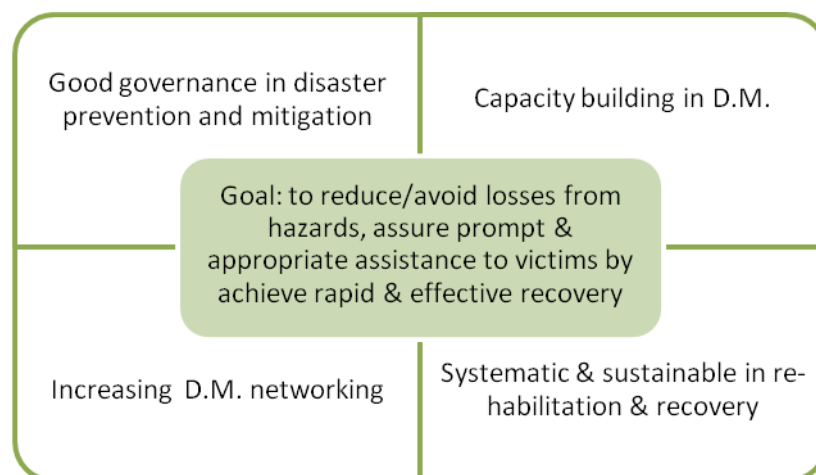
Nonetheless, given pre-existing development and the limited effectiveness of these new controls, in practice undesirable or conflicting land usage can often occur. Furthermore, inefficient and fragmented controls on urban planning and land use have meant that private construction and real estate has frequently been driven solely by speculation, profit and short term economic gain. The devastation of the 2011 flooding highlighted the cost of improper and inconsistent land use development, such as the obstruction of natural flood drainage systems.

Disaster and Risk Management – The Public Sector Response

¹ Orapan Srisawalak-Nabangchang and Warin Wonghanchao, *Evolution of Land-use in Urban-Rural Fringe Area: The Case of Pathumthani Province*. http://std.cpc.ku.ac.th/delta/conf/Acrobat/Papers_Eng/Volume%201/Orapan%20Warin.pdf

The Department of Disaster Prevention and Mitigation (DDPM), under the Ministry of Interior, is the main agency responsible for managing disasters in Thailand. DDPM also works in collaboration with local municipalities. In terms of Disaster Risk Assessment, there is no single body or mechanism overseeing these processes: assessments are conducted by various government departments, but with DDPM nevertheless playing a major supervisory role. It has a number of projects and activities to prepare people for future disasters, including training, drills, exercise, volunteer recruitment and awareness raising campaigns. It is important to note that the Disaster Management Strategy 2012-2016 mainly focuses on immediate disaster response and relief. Post Disaster Management, on the other hand, involves needs assessment, recovery assistance measures, victim support networks, sanitary measures, financial mechanisms, basic facility restoration, and other tools². These disaster concerns, extending beyond relief to adaptation and resilience, are strongly reliant on the capacity of Thailand's urban planning system to deliver long term improvements.

Disaster Management Strategy 2012-2016



Source: adapted from Department of Disaster Prevention and Mitigation

Thailand's Industrial Sector

For industrial land use, there are two main types of land use, each with separate requirements in terms of environmental planning. Land Type A is for the manufacturing industry that produces less pollution. Land Type B is for more heavily polluting activities and is described by law as industrial parkland.

The industrial parks are one of the most visible intersections of industrial development and urban planning in Thailand. These estates, totaling 42 across the country, are allocated specially designated zones by the Ministry of Industry, and then developed by private sector partners and investors. With a minimum size of

² Thailand Disaster Management Structure and Links to the ASEAN Agreement on Disaster Management and Emergency Response and Beyond, 2010 <http://www.aseansec.org/publications/AADMER%20WP%202011.pdf>

500 Rai (about 0.8 square Kilometers), 60-70% of which is designated for factories, these 'cities' usually boast all the infrastructure of a typical urban area, such as electricity and sanitation. Importantly, this also includes flood protection³.

The development of these estates is circumscribed by some degree of governmental regulation. In particular, the Industrial Estate Authority of Thailand (IEAT)'s requires the industrial sector to select an appropriate area for its activities, with estates located on low-lying areas and a polder higher than 50 cm capable of withstanding a 10-year flood event. However, industrial flood mitigation can often be excessively dependent on infrastructural prevention, designed around past flood events and limited return periods that may prove irrelevant in the wake of an extreme future flooding event.

There are also EIAs and other forms of assessments that aim to highlight potential adverse impacts and guide the development of appropriate systems to mitigate these effects. One example of this is the requirement of industrial operators to test their wastewater themselves if their volume of discharge exceeds an agreed limit to ensure it is abiding by the terms of the Factory and Building Act.⁴ Nevertheless, problems such as waste water pollution still exist.

Resource Scarcity and the Role of Industry – the Case of Thailand's Eastern Seaboard

The intersection between industry and the environment is particularly visible at moments when resource stress impacts substantially on economic productivity. The well-documented case of the drought affecting Rayong Province in 2005 and its catastrophic impact on this hub of industrial production demonstrates that not only is industry often a cause of environmental strain, but also sometimes a victim of its consequences. That year, serious drought in the region led to widespread water shortages which brought local industry almost to a halt. While this was to some extent the outcome of an extreme weather event, it also reflected a fundamental insecurity in the region's water supply. In fact, subsequent research by the Hydro and Agro Informatics Institute found that Mab Ta Phut district, where a large industrial estate specializing in petrochemicals and other heavy industries is located, is still under normal conditions at possible risk of drought. Furthermore, two neighboring areas that provide Mab Ta Phut with water were found to be at severe risk of drought – with one of them also vulnerable to flooding. This has very real implications for the area's management and also shows how industry has not only an obligation to monitor and assess its environmental impact, but also a vested interest in doing so. In this regard, environmental trauma is a crucial dimension of business risk that cannot be overlooked. Thus in future, Thailand's industrial sector must recognize the value of protecting water supplies and other

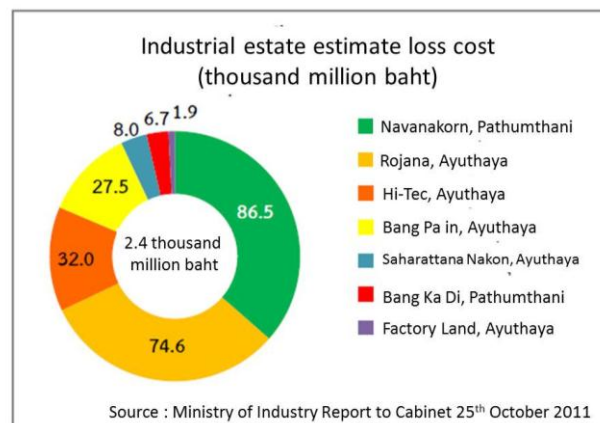
³ http://ns.boi.go.th/korean/how/industrial_estates.asp

⁴ <http://www.un.org/esa/agenda21/natlinfo/countr/thai/industry.pdf>

environmental resources not only out of corporate responsibility, but also as a central component of its strategic risk management⁵.

The 2011 Flood Crisis: Government and Industrial Sector Response

In 2011, Thailand suffered its worst flooding in more than fifty years, with devastating social and economic consequences for the country. Covering some 90 billion square kilometers, amounting to over two-thirds of the country, it proved to be the world's fourth most costly natural disaster⁶. Nor was the industrial sector spared. In Ayuthaya and Pathum Thani alone, damage to almost 1,000 factories in seven industrial estates in these provinces resulted in over 700 billion baht in insurance claims. Preliminary estimates by the World Bank in early December 2011 put the total economic damages and losses at THB 1,425 Bn (US\$ 45.7 Bn), with US\$ 32 bn in the manufacturing sector alone⁷.



Yet though the crisis was the result of an extraordinary confluence of natural factors, including months of unprecedented rainfall, it was also to some extent manmade. Consequently, in the aftermath, Thailand has been forced to confront some painful lessons about the limitations of its current approach to urban and environmental planning. In this regard, many of the solutions will have to come from increased cooperation between the public and private sectors. In terms of regulating future urban development, in particular, there must be a clear recognition that natural vulnerability must be respected for the common good of Thailand's environment and its economy.

The Role of the Public Sector in Response to the 2011 Flood

The government, through the Office of the Insurance Commission (OIC), has provided support in the wake of the flood with a 50 billion baht insurance program to assist community households and private businesses in dealing with future

⁵http://www.haii.or.th/wiki/index.php/Risk_Management_of_Water_Resources_in_Thailand_in_the_Face_of_Climate_Change#III._Case_Study_of_the_Risk_Management_and_Policy_Framework_for_the_East_Coast_-_Gulf_Basin

⁶<http://www.thaiwater.net/web/index.php/ourworks2554/379-2011flood-summary.html>

⁷ <http://www.worldbank.org/en/news/2011/12/13/world-bank-supports-thailands-post-floods-recovery-effort>

environmental risks. 30 billion baht of this will be allocated towards offsetting the anticipated costs of future disaster events, while the other 20 billion baht will serve as leverage to purchase reinsurance contracts from international providers – opening up an added 300 billion baht in coverage. Significantly, though, the scheme will also include provisos and caveats that factor in the real costs of environmental risk. For example, properties situated in flood-prone areas will not be eligible for this government-sponsored natural disaster coverage⁸.

Analysis of the Government Challenges: An Interview with Dr. Anond Snidvongs

Dr. Anond Snidvongs, director of the Geo-Informatics and Space Technology Development Agency (GISTDA) of Thailand and a member of the National Water Management and Flood Committee, was interviewed for this study about the current state and future prospects of government policy on flooding and other disasters. He highlighted a number of significant elements in the short term strategy of flood prevention, including:

- Adjusting reservoir operation rules to reserve a capacity ~15,000 mcm
- Negotiating with residents in water retention areas (~5,000 mcm)
- Negotiating with residents in floodway areas (for emergency drainage)
- Dredging all major waterways
- Fixing and installing water control structures, e.g. dikes, water gates, pumps, etc.
- Establishing a single command center during crisis

The government has also, as part of its short to medium term mitigation strategy, designated 3 different zones with an accompanying framework to protect their functions and assets. For the outer zone, encompassing Ayutthaya and the Pasak river, the primary objective is to lower flooding levels from 3-4 meters to 2 meters to ensure that its industry and infrastructure can continue to operate. In the middle zone, incorporating outlying provinces of Bangkok such as Pathumthani, the focus will be on reducing the flooding to 30% of the total area. In the inner zone, on the other hand, the emphasis is on alleviating the effects of runoff and flash flood.

Nevertheless, the government alone can only achieve so much. For more comprehensive and long term solutions, collaboration between the public and private sectors is essential. While the DDPM is primarily responsible for managing risk to local communities, the industrial sector is in charge of its own risk mitigation strategy. Important areas such as building regulation for polder and flood wall construction have not yet regulated by the Department of Public Work and Town and Country Planning.

In terms of the government's long-term strategy, Dr. Snidvongs also concluded that:

- There was still too much emphasis on reducing exposure, particularly through engineering solutions

⁸ <http://www.nationmultimedia.com/opinion/Govt-insurance-scheme-aims-to-protect-business-30177642.html>

- No engagement on how to reduce sensitivity of current urban systems through more appropriate urban and environmental planning
- Some development of coping mechanisms, but without much in the way of innovation or progressive measures

In addition, Dr. Snidvongs also concluded that the national economic and social structure of Thailand needs to be adapted to cope with climate change and disaster risk reduction. The current concern is whether the government can be relied onto create the necessary trust and encouragement for all stakeholders to adapt together. Environmental concerns, as reflected in instruments such as EIAs, should be redefined to incorporate the possible risks and impacts of a project on the human as well as the natural environment.

Analysis of the Challenges to the Private Sector: An interview with Mr. Pitak Pruittisarikorn, an executive vice president of Honda Automobile (Thailand) Co Ltd

According to Mr. Pruittisarikorn's comment, the company was not only impacted by direct damage to the industrial site and the significant number of cars destroyed during the 2011 flooding. There were also substantial opportunity losses due to the closure of factories and industrial plants as a result of disruptions to the global supply chain. As a result, he considered that the industrial sector had two main disaster responses: distributing its risk in terms of the site and insurance coverage of its assets, and building flood prevention walls. Concerning the second option, the larger industrial estates are better placed to respond quickly to future risk by constructing and maintaining flood protection infrastructure. Large industrial sectors have the financial capacity to raise the advance budget for flood prevention and can be relied on to pay back loans, which is not always the case for smaller industrial estates. The Board of Investment in Thailand (BOI) also launched a special tax incentive for flood-affected companies and industrial estates to invest in flood prevention infrastructure.

Furthermore, Mr. Pruittisarikorn also reported that, in terms of investment, the 2011 flood disaster had to some extent affected decision making among some companies on their future expansion. The alternatives were to expand elsewhere within Thailand or even relocate to a neighboring country instead. The decision to do so usually factored in other natural risks such as earthquakes as well. Nonetheless, Thailand is generally still considered desirable by the foreign industrial sector due to the long history of collaboration and trust that has been developed over decades.

In terms of the public sector's role, Mr. Pruittisarikorn emphasized that how the Thai government chooses to support the industrial sector in the implementation of their plan is crucial. Moreover, it is important for the government to take greater steps to reduce risk to the private sector beyond the current framework. The government could share flood data and information with the BOI. The BOI could also translate this output into different languages and disseminate it to foreign industrial companies through its network. This would greatly help the industrial

sector in their analysis and decision making, enabling them to manage data much more quickly and so further reduce risk.

Concerning the government's tax incentive, he considered that it was only a short term response. This is because insurance company is not likely to levy insurance on disaster, the cost is higher. It is important that the government ensures efficient water management to boost the confidence of the insurance company in the industrial sector, which will in turn reduce their insurance premiums. This would greatly help smaller businesses that, unlike the larger industrial companies, do not have the ability to transfer risk to different insurance companies. In this light, risk policies should include not only flood and water management plans, but also include measures aimed at the insurance sector and its premiums.

Conclusion

The recent 2011 flood event has demonstrated that natural protection, besides being a moral responsibility, is also an irreducible element of business risk and so must be a primary feature of the industrial sector's vulnerability reduction strategy. Both government and private businesses have important roles to play in achieving this.

One approach for reducing risk is to **decrease the sensitivity of Thailand's urban planning system**, factoring disaster risk into its codes and regulations. In this regard, the government has to set out clear and enforceable guidelines to steer future urban development, particularly the growth of industrial estates, towards more positive outcomes for communities and businesses as well as the environment.

The government should also **develop a solid economic structure of tax incentives**, estimating the cost of effective risk reduction in terms of infrastructure and construction investment that can then inform negotiations over premiums and coverage with insurance companies. By imposing effective controls on water management and other environmental practices on companies, the government can help raise the confidence of insurance firms in Thailand's industrial sector and so encourage lower insurance costs for companies in the medium term.

Finally, **information and data on flooding should be provided** by the government and then disseminated effectively by the private sector among national and foreign firms to inform decision making. This should result in a more informed approach by businesses to the reduction of environmental risk in future, benefitting them economically as well as bringing substantial gains to the local communities and the environment.