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Urbanising Thailand

Implications for climate vulnerability assessments

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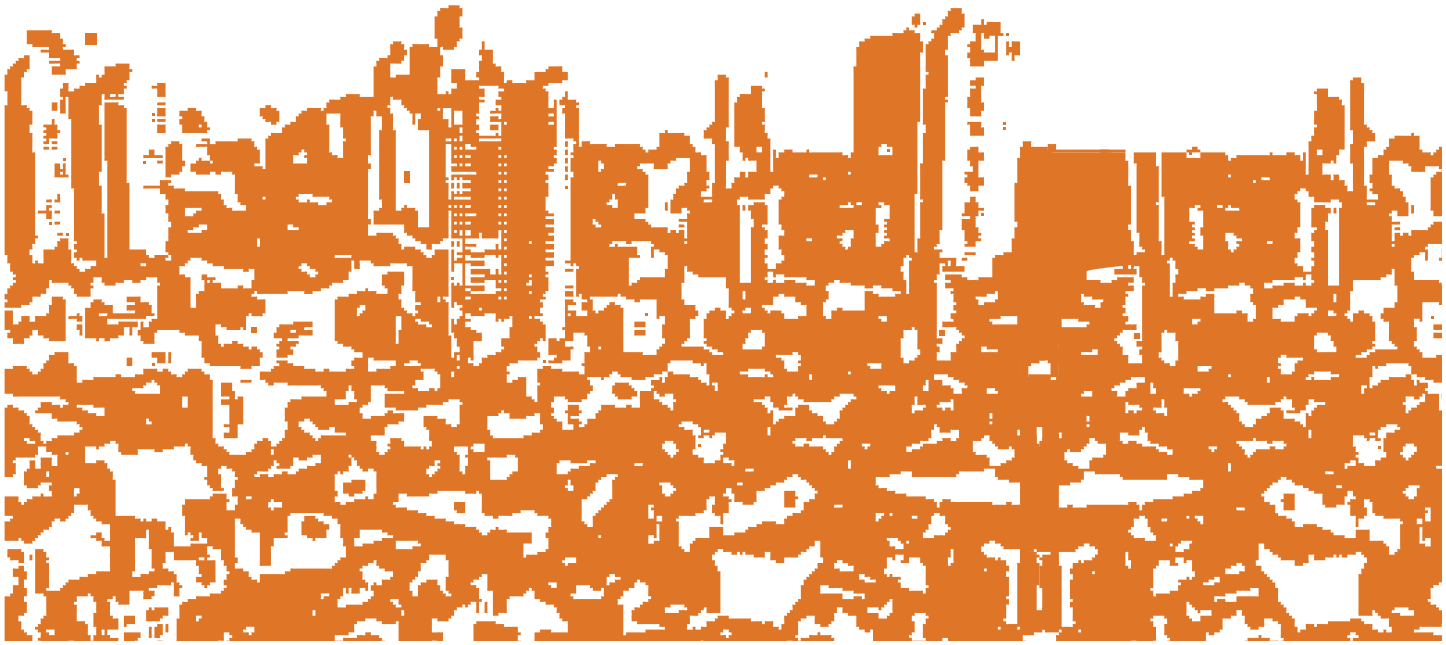

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Table 1: Academics and researchers involved in the research project

Name	Position/ Organisation
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Dr Poon Thiengburanathum	Faculty of Engineering, Chiang Mai University
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Asst. Prof Dr Yanyong Inmuong	Head of Faculty of Environment and Resource Studies, Maha Sarakham University
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Associate Prof Dr Jawanit Kittitornkool	Vice-Director of the Institute of Marine and Coastal Resources, Prince of Songkla University

Abstract

This report summarises a series of studies carried out by a multi-disciplinary team of Thai scholars. It focuses on the dynamics of urbanisation and climate change risks, and on the linkages between urbanisation, climate change and emerging patterns of urban poverty and vulnerability. It provides new and key insights, serving as a comprehensive background foundation for further research on urban climate vulnerability and resilience. Urbanisation processes as transformative processes are under-researched themes, not only in Thailand, but also in countries in Southeast Asia. Rapid physical and social transformations are taking place in these countries, yet the implications contributing to vulnerability are less well-understood. The research has focused on case studies from established and growing urban centres from across the country – Bangkok and the neighbouring area of Lad Krabang, Hat Yai, Chiang Mai, Udon Thani and Khon Kaen. Each case study presents its own specific insights into the history, drivers and implications of urbanisation, and also highlights many similarities. Drawing on a review of historical patterns of urbanisation and future risks associated with climate change, this research argues for a fundamental rethinking of future urbanisation in Thailand. This is a future that will need to be very different from current trajectories of urbanisation, based on a policy process that will need to be founded on informed public dialogue.

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Acronyms

AEC	ASEAN Economic Community
ASEAN	Association of Southeast Asian Nations
BMR	Bangkok Metropolitan Region
EIA	Environmental impact assessment
GHG	Greenhouse gas
GMS	Greater Mekong Sub-region
LAO	Local administrative organisation
SEZ	Special Economic Zone

1 Introduction

Understanding the pace and significance of urbanisation as it unfolds in Thailand presents numerous challenges. Urbanisation in Thailand has many similarities with other parts of Asia. The pace, scale and significance of urbanisation is often overlooked and underestimated. When viewed from a macro bird's-eye perspective, or from the position of the outside observer, this is often more apparent than when viewed from within. Often our understanding is constrained by limitations of concepts, terminology and definitions; by inadequate data and statistics; and the connotations of the language we use. It can be difficult to appreciate the pace of changes as they occur around us, or the scale and far-reaching significance from one location to another; or from one particular disciplinary perspective. Crucially, as dramatic change unfolds rapidly around us, being too close to the subject and everyday incremental changes can distort our view of the broader picture, and of the long-term consequences of change.

The old adage says: "a frog in cold water does not feel the rising temperatures until it is too late". Yet the same frog would never willingly jump into hot water. Urbanisation in Thailand is the tub of hot water that is increasingly close to boiling point.

The starting point for this research has been a concern that while Thailand is going through a period of accelerated urbanisation, there is neither a clear policy vision nor public dialogue on what an urban future might mean for the country and its citizens. At the national level, there is a policy established for an urban future that has not been implemented. Many urban areas in Thailand have adopted the rhetoric of a 'city worth living in' or 'liveable city' (*muang na-yu*) but this remains poorly defined both in word and practice. At the same time, current government policy is framed around developing urban areas in tandem with Special Economic Zones (SEZ) located in border areas, that are themselves linked to a broader process of regional economic integration, built on communications and energy networks, and the movements of goods, resources and labour.

Additionally, there is a direct linkage between urbanisation and global climate change. Thailand and the region are identified as vulnerable to climate change – with a long history of climate-related shocks. At a global scale, urbanisation is closely associated with climate change leading to changes in land use, transport energy use and consumption patterns associated with greenhouse gas (GHG) emissions. Moreover much of the urbanisation that is occurring does so in places that are hazardous and exposed to climate-associated shocks and crises, and in ways that create new patterns of vulnerability. Current investments around urbanisation (and industrialisation) in Thailand display a high dependence on a fossil fuel economy, with the expansion of petrochemical industries, and of coal-fired power production, along with an urban architecture that relies on privatised transport. Guiding future urbanisation will require addressing the local dimensions of these global challenges.

The combined influences of urbanisation and climate change therefore create new patterns of vulnerability that are currently poorly understood. At the same time, there is a global concern that urban poverty has been inadequately addressed, and that there are specifically urban causes and characteristics of poverty. Poverty in the future will increasingly be an urban phenomenon. This will require new approaches to understanding and addressing both urban poverty and urban climate vulnerability. Moreover, vulnerability in urban areas will be shaped by poverty, and by how poverty occurs.

The research has focused on case studies from established and growing urban centres from each of the core regions in the country – Bangkok and the neighbouring area of Lad Krabang, Hat Yai, Chiang Mai, Udon Thani and Khon Kaen. Each case study presents its own specific insights into the history, drivers, and implications of urbanisation – and also the many similarities.

Drawing on a review of historical patterns of urbanisation and future risks associated with climate change, the research argues for a fundamental rethinking of future urbanisation in Thailand. This is a future that will need to be very different from current trajectories of urbanisation, and based on a policy process that will need to be founded on informed public dialogue.

The research is based around three core themes:

- the drivers and patterns of urbanisation;
- how urbanisation influences patterns of poverty, and climate vulnerability; and
- emerging climate thresholds resulting from climate change.

The report presents the key insights coming out of these studies, serving as a comprehensive background for further research on urbanisation and climate change. Urbanisation as a transformative process in Thailand and Southeast Asia is an under-researched topic. The implications of fast paced physical and social transformation, contributing to increasing vulnerability, are less well understood.

2 Approaches to understanding urbanisation and climate change

The starting point for this collaborative research on urbanisation in Thailand has been an attempt to understand concepts and terminology. This has been all the more important in the Thai context given issues of language and translation, and the connotations of key terms.

Typically, the word 'urban' has been translated into Thai as the word *muang*. *Muang* and 'urban' are understood differently between the languages. Some definitions of *muang* describe a city, noting that the *muang* is somewhere where many people live and work in close proximity to each other and where people engage in different livelihoods and ways of life than in rural areas (Pakorn 2005). Some definitions define *muang* as a community or larger place that is important within a province. Some people take the word *muang* to mean the area that is managed and shaped by humans, in contrast to the area that is still nature. The word *muang* is also used to describe the largest and most important district in a given province (*amphoe muang*), and can be used as a word to mean 'country' when referring to Thailand (*muang Thai*). None of these different understandings has the same connotation as 'urban'.

Part of the challenge to understanding urbanisation is conceptual and theoretical. There are numerous conceptual approaches. Within government planning offices there are no agreed international definitions, although population size and density, and density of settlement remain the most widely applied key variables across the world (McGranahan and Satterthwaite 2014).

This collaborative research has approached the problem of 'urbanisation' and the city as being defined less by a specific space, location, or territory, and more as **a transformation of ecological and social-economic landscapes, social relations and structures that also shapes movements and locations of resources, people and capital, in a continuum from rural to urban**. Additionally, the character of contemporary urbanisation is defined by a high degree of dependence on complex infrastructure and technology systems that are networked, interlinked and interconnected (Graham and Marvin 2001), and that themselves require complex institutional mechanisms for their management. Increasingly urbanisation has global and regional dimensions, with cities linked to other locations and geographies such that the effects of shocks and crises cascade across different locations.

This research has also addressed climate change dimensions of urbanisation. The growth of cities and urbanisation and associated transformations in ecological landscapes, energy consumption and waste, are intimately linked to global environmental change. Urbanisation contributes to creating climate change, generating greenhouse gas emissions, and driving changing land use patterns. Moreover, urbanisation is occurring most rapidly in monsoonal Asia. Within Asia, urbanisation is occurring most intensively in locations that are already exposed to climate change. For instance, in the coasts, deltas, floodplains and river basins that have experienced climate related disasters, crises and stresses. The transformations of urbanisation and of climate change are thus tightly interwoven.

As global debates around theory and development policy increasingly take on the potential constraints of planetary boundaries, it is through urbanisation and cities that meeting these challenges will need to be realised. Conversely, given the inherent innovation and creativity that city life generates, it is through the urban arena that the greatest opportunities for humanity to address these enormous global threats manifest themselves. Yet despite its leading role in regional (and to some degree global) patterns of urbanisation, these are debates that have largely not occurred in Thailand.

The process of urbanisation contains many contradictions. Cities, for example, are seen widely as centres of innovation and economic wealth, but also of inequality, poverty and vulnerability. The core question addressed in this paper is not whether urbanisation is a good or a bad thing, but rather what kind of urbanisation are we creating and for whose benefit? Given the linkages between urbanisation and climate change, this is also a recognition that urbanisation of the future cannot follow the trajectories of urbanisation of the past. As well as the emerging climate change concerns, this relates to an established body of work on 'the right to the city' – that we regard not merely as a right of access to resources and services, but "the right to change ourselves by changing the city; the kind of city we have is linked to the kind of human beings we are willing to be" (Harvey 2012). This is fundamentally a right of access and control in shaping an urban world.

This section reviews the key conceptual approaches which are relevant to this study.

2.1 Urbanisation as a global and regional process

The history of the rise of cities has been built on patterns of trade, and as such, changes in modes of production and exchange. As trade routes have spread across the globe, so too have cities become entwined in global and regional networks. As this process intensified towards the end of the twentieth century, there was much academic debate on global cities, mainly focused on large metropolises that served as centres of trade, investment and production.

Increasingly, this relatively well-established group of cities has been joined by both a rising collection in China and other parts of East Asia, and also of smaller secondary cities. This interest in global dimensions can be traced back to world systems theory, and concepts of uneven development and dependency, centred around metropolitan cores (eg Friedmann and Wolff 1982). With the rise of East Asia on the global economic stage, and the dramatic pace of urbanisation, the global dimensions have become sharper, while at the same time blurring the lines of influence and dependency.

2.2 Urbanisation as a transformation of social and ecological landscapes, structures and relations

Urbanisation manifests at both local and global scales, as seen through the ways in which ecological and social landscapes are transformed. Much of the attention on urbanisation has focused on land use patterns within urban areas, and the degree of urbanisation, defined according to the extent of agricultural versus non-agricultural land.

Demographic change remains a key characteristic of urbanisation (McGranahan and Satterthwaite 2014). Demographics are key to how urban areas are defined as such, with most countries applying systems based on indicators of population density. From this point of view, there is a clear transition from low density population (rural) areas to urban areas, despite the variety of cut-off points of population density applied. But this demographic change can also be seen as creating a continuum of rural to urban, most clearly apparent in the ways in which rural household livelihood strategies might be diversified to include off-farm employment in urban areas, as well as direct engagement in agriculture.

At the local level, the migration of people from rural areas and agricultural production is a major driving force of contemporary urbanisation, as it has been in Europe. Through the expansion of its own immediate territory, urbanisation transforms local landscapes –converting agricultural land, floodplains and waterways into built-up space, and locations for housing and industrial production. The ecological reach of cities spreads far beyond the more localised hinterland, drawing in resources from far and wide, including labour, while also contributing to pollution in ways that have highly local, but also geographically distributed, impacts.

2.3 Urbanisation as a transformation of production, consumption, life-styles and values

Urbanisation transforms the way that people live – how they produce and exchange goods and services, how societies are structured, and the values and beliefs that predominate. This transformation is partly through the physical shape of the human-built environment, but also through the social and economic relations in which people move. This is part of the pull of cities – the ability to move in different social arenas, to find employment – and equally of social, cultural and leisure, and a whole set of consumption patterns and values. Urbanisation is governed by a whole complex set of formal and informal rules and institutions, networks, and alliances. As many critics argue, urbanisation is a product of and dependent on capitalist modes of production (Harvey 2012).

2.4 The city as a system

The metaphor of the city as a system has been an enduring metaphor in urban studies. The link with the natural world also led to presenting the city as an urban metabolism – meaning, an ecological system with quantifiable flows of energy, materials and information. This general approach has been developed into a view of cities bringing the natural and social world together, in line with concepts of the Human Ecosystem Framework where the city is a combination of biophysical and social factors (Machlis *et al.* 1997).

These approaches have a long history. The input-output model of cities highlights the level of resource use that is required to support cities of specific sizes in different ecological contexts, and the level of waste that such cities produce. Such approaches have been closely associated with efforts around establishing targets and indices of sustainability and of greenhouse gas emissions.

Yet this approach is also problematic. As a product of complex social, political and economic processes, the boundaries, structure and purpose of the city are inevitably caught up with meaning, arenas of contest, and conflicting values. The notion of a fixed, defined system of a city does not easily accommodate these more political-economy dimensions, nor the distribution of resources, costs, and benefits within and between cities. Additionally, the notion of a clearly defined city with established boundaries does not necessarily fit well with the rapidly changing urbanising context, which we currently face.

2.5 Urbanisation dependence on systems of infrastructure and technology

One of the most important characteristics of the contemporary city is the dependence on complex systems of infrastructure and technology, and the complex institutional arrangements to manage them, that are themselves networked across the globe (Graham and Marvin 2001). Increasingly cities are linked across regional and global scales as resources, capital, labour and information move on transport and communication infrastructure between and across urban areas (Friend and Moench 2013) to what is also referred to as a ‘pan-urbanism’ (Moris 2014).

Urbanisation creates a critical dependence on water, food, energy, shelter, waste, communications and transport systems that are networked, multi-scale and interlinked and interlocked, but equally, are not easily managed at one particular territorial scale (Friend and Moench 2013). It is also through fragility or failure in these systems, that some of the most acute aspects of vulnerability will increasingly be realised.

2.6 Urbanisation, climate change and planetary boundaries

Urbanisation contributes to climate change impacts, while also creating new sets of vulnerabilities and risks. The dramatic landscape and land use changes result in growing climate emissions, and the shifts in production and consumption contribute to increased consumer demand linked to climate change. The shifts in resource use associated with urbanisation also contribute to climate change beyond the immediate urban area.

The built environment is also associated with a phenomenon known as Urban Heat Island (UHI) in which urban centres are argued to lead to increases in temperature of between 4°C and 5°C, compared to neighbouring rural environments, with impacts that can extend for 82 km. Research on UHI in Bangkok suggests that there has been an increase in average surface temperatures of 13°C (Srivanit *et al.* 2012).

Much of the urbanisation that is occurring in Thailand, as well as in other parts of the world, occurs in space that is already hazardous – in coastal, deltaic, and river basin areas that are exposed to climate-related shocks and crises, or beyond existing ecological carrying capacity. From a national perspective, this represents a growing vulnerability with a greater proportion of population and economic assets located in a hazardous space.

2.7 Urbanisation and rights

The concept of 'the right to the city' has a long intellectual tradition, founded on regarding the city both in terms of space and in terms of social and economic relations as being collectively co-produced and recreated, and regarding urban life as inherently collective and interdependent. The right to the city emphasises the collective value of urban systems, and addresses how public space is produced, accessed and managed for social and cultural values.

More recently, rights to the city have been taken up within Europe, as well as by specific cities (eg Montreal in Canada), and debated by international agencies and grassroots movements as a mechanism for protecting core rights of residents (including migrants) as city citizens to shape their urban space, protecting access to a safe environment and to core services, and to participation in decision-making processes (Friend and Thinphanga 2014).

2.8 Summary

This range of theoretical approaches to understanding urbanisation and the growing significance of the city are framed around technocratic, transformative, ecological, institutional and juristic challenges, highlighting the need for multiple approaches to addressing emerging challenges, and shaping a future urban vision for Thailand and the region.

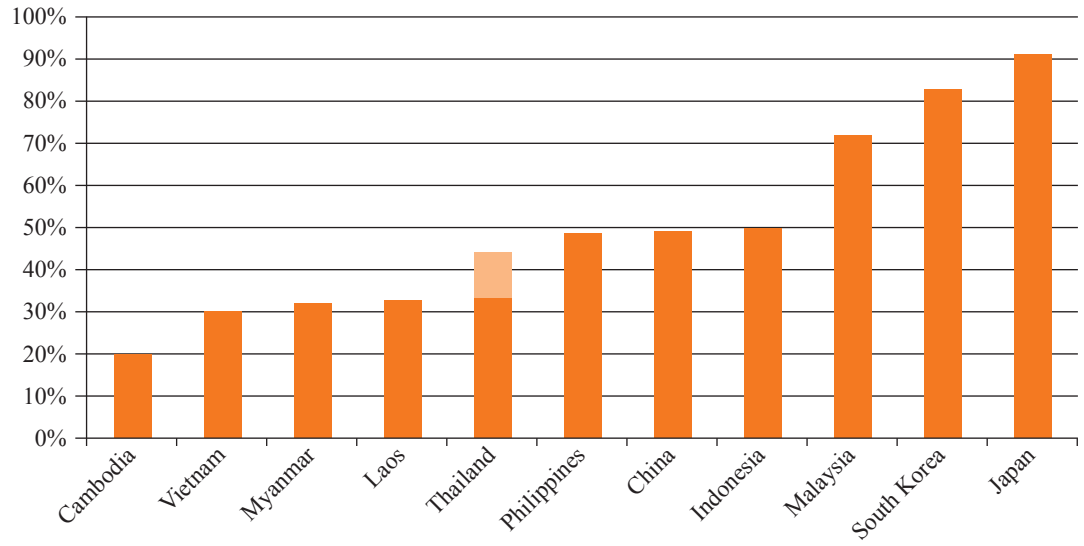
3 History and trends of urbanisation in Thailand

Thailand has a long history of urban centres. Historically, these have largely been centres of administrative, religious and military power of relatively small city states, associated with civilisation, linked through tribute and taxation to other city states.

However, in the last 40 years, Thailand has witnessed dramatic change occurring across the country. Thailand has become increasingly industrialised, and related to this, increasingly urbanised. Yet assessing the current state, rate, and pace of urbanisation is problematic due to terminology and classifications of urban, and due to the ways in which official statistics are prepared.

A perception of slow urbanization has influenced national policy. This perception was reflected in global assessments. For example, Lambregts' study reviews figures available up until 2015.

Figure 1: Thailand's urbanisation level in a comparative perspective (2010)



Data source: United Nations Population Division, 2014.
* The UN Population Division sets Thailand's urbanisation level at 33.7 per cent. This is likely to be an underestimate (Alkema et al. 2012). Thailand's 2010 Population and Housing census reports that 44.2 per cent of Thailand's population live in 'municipal' (ie non-rural) areas.

The official UN statistics of 2011 recorded Thailand as having only 34.1% of the total population as urban, placing Thailand at position 155 in a list of urbanised countries, out of a total of 196. In this place Thailand sits one position behind Laos and one ahead of Sudan (UN 2011). This assessment has been widely referenced, and seems to support a perception of Thailand as predominantly rural. This perception seems to have influenced climate change research in Thailand that remains largely focused on the environmental and rural dimensions of potential climate impacts.

Thailand is a leading economy in Southeast Asia, and while agriculture remains critically important in terms of employment and national income, the dominant role of agriculture has declined. This trend is set to continue.

This economic transition reached a watershed in 1988 when Thailand was declared a Newly Industrialised Country (NIC). Even in 2011 the Thailand Board of Trade reported that manufacturing now constitutes the sector with the largest contribution to GDP at 39 per cent, while agriculture contributes only 8.6 per cent. This situation is reversed when viewed from employment levels, with agriculture constituting 38.2 per cent of total labour force, while manufacturing's contribution is 13.6 per cent (see Table 2). However, the total non-agriculture labour force remains significantly higher, and much of the agricultural labour is highly seasonal, with workers also being engaged in off-farm employment for at least some parts of the year.

Table 2: Structure of Thailand's economy in 2011

Sector	GDP by sector (%)	Labour force by sector (%)
Manufacturing	39	13.6
Wholesale & retail trade	13.5	15.5
Transport, storage & communication	9.6	2.6
Agriculture	8.6	38.2
Construction and mining	4.3	6.1
Other services	25.0	24.0

* Note: Other services include the financial sector, education, hotels and restaurants, etc.

The statistics on rates of urbanisation have been updated recently, presenting a very different picture of urbanisation trends (UNDP, 2014). In these latest assessments, Thailand's urban population is recorded as being 49% of total population, increasing from 29% in 1990 and projected to increase further to 72% in 2050. The growth rate of urbanisation in the Mekong is quite staggering. Laos has the highest rate of annual average rate of change in the world, followed by Thailand.

Table 3: Urban Population in Mekong Countries

	Urban Population 000's			Rural Population 000's			Percentage of Total Population Urban			Average Annual Rate of Change %
	1990	2014	2050	1990	2014	2050	1990	2014	2050	2000-2015
Cambodia	1408	3161	8167	7649	12247	14022	16	21	36	0.9
Lao PDR	655	2589	6435	3589	4305	4144	15	38	61	3.1
Myanmar	10350	18023	32206	31773	35696	26439	25	34	55	1.6
Thailand	16649	33056	44335	39934	34167	17046	29	49	72	2.7
Vietnam	13958	30495	55739	54952	62053	47958	20	33	54	2.0

Figures taken from United Nations, Department of Economic and Social Affairs, Population Division (2014). *World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352).*

Yet even these revised statistics themselves do not show the full nature of Thailand's economic transition or the significance of urbanisation across the country. The ways in which the statistics are compiled reveal some clear conceptual and methodological gaps. While many people still regard themselves as being primarily farmers, the significance of (at least seasonal) migration by household members, or part-time employment in non-agricultural production and employment, suggests that the majority of the Thai population is no longer exclusively rural. This becomes particularly apparent at the household level, with at least some members of farming households involved in off-farm activities.

This level of dynamism in household livelihood strategies is not easily captured in census surveys. As agriculture becomes less attractive to younger people entering the employment market, and as the balance of wage-labour opportunities shifts away from agriculture, it is reasonable to anticipate that this shift will continue, if not accelerate. The reliability of the classifications applied in such statistical analysis is itself an area that requires closer critical scrutiny.

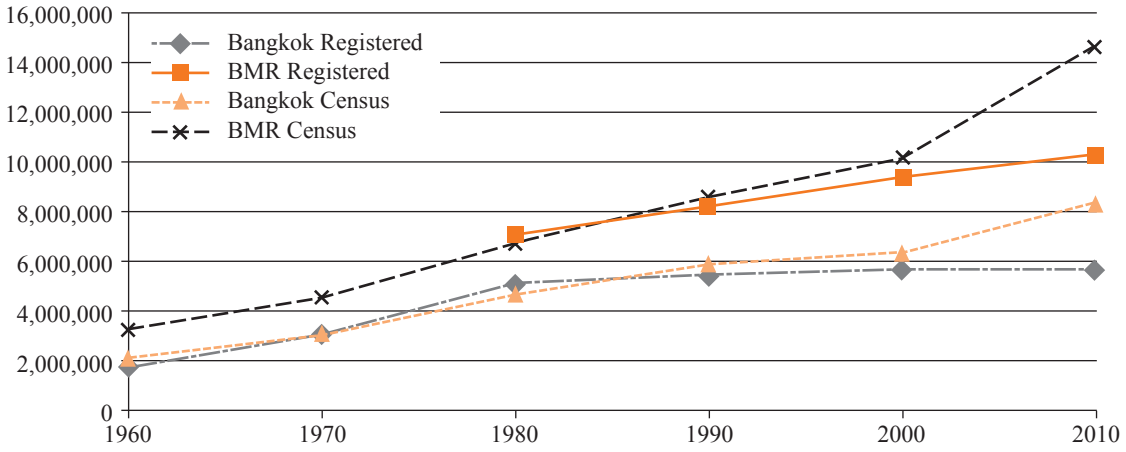
National statistics based on residence are equally problematic. Residence is determined according to where a person is registered and not where they reside or work. For example, a person registered in the provinces but working in Bangkok will appear as residing in the provinces. The classification of the administrative area in which a person is registered is also significant (see Table 4). There are several tiers of administration in Thailand, but it is only *Thesabarn Nakhon* that is classified as 'urban' – all other administrative units are classified as less urbanised and more rural. Tambon Administrative Organisation (TAO) is considered most rural. It seems reasonable to conclude that these factors contribute to an underestimation of the actual urban population. This is reflected in the case study of Bangkok (Lambregts *et al.* 2015), see Figure 2.

Categories of sub-national urban administrations

Table 4: The classification of Thai local governments (excluding the Provincial Administrative Organisation)

	Types of Sub-Provincial Administrative Units			
Criteria	**City municipality (Thesabarn Nakhon)**	**Town municipality (Thesabarn Muang)**	**Sub-district municipality (Thesabarn Tambon)**	**Sub-district Administrative Organisation (TAO)**
Population numbers	> 50,000	> 10,000	> 5,000	
Population density	Removed in year 2000	Removed in year 2000	Minimum 1,500 people per sq.km	
Revenue			> 12 million baht	

Figure 2: Registered and census populations for Bangkok and the BMR 1960-2010



Source: Lambregts et al., (2015) summarising *BMA Statistic Profile and NSO Population and Housing Census*

Despite the updating of these official statistics there is a well-established narrative that Thailand's rate of urbanisation remains low, and from some perspectives this low rate of urbanisation is highly problematic. This also seems to fit with a persistent cultural perception of the country as remaining largely agricultural and rural.

Looking to the future, it is increasingly clear that we are now entering a new phase of urbanisation for Thailand that is dramatically different from earlier historical phases. Urbanisation is projected to reach a rate of 72% by 2050. This is a phase of **rapid urbanisation**, and a phase in which the intensity of dependence on infrastructure and technology, and linkages to urban networks across the region will grow. Evidence from each of the case studies attests to an expansion of the urban area and increases in population, further demonstrated by rapid changes in land prices and patterns of speculative investment, and the movement of migrant labour from neighbouring countries, as well as a return of previous migrants to their hometowns. But critically, these trends are linked to regional flows of trade and investment, and the ways in which networks of transport infrastructure create linkages across the region.

Table 5: Average land prices in major cities in Thailand

City	Average land prices (THB / Tarang Wa (4 m^2))
Chiang Mai	84,000–250,000
Khon Kaen	40,000–200,000
Hat Yai	40,000–200,000
Udon Thani	30,000–150,000
Bangkok	20,000–800,000
Siam Paragon	800,000
Silom	700,000
Yaowarat	650,000

Source: data from the Department of Treasury (2012) and www.thaiappraisal.org (2014)

Each of the cities in these studies has its own history and particular context, yet the history of Bangkok looms large for many other cities. Bangkok is one of the early 'mega-cities'. It is often held up as being emblematic of both the best and worst of large contemporary cities. Within Thailand, the notion of the 'Bangkok syndrome' suggests much that is wrong with unplanned urbanisation – urban sprawl, traffic congestion and pollution. Indeed much of the current direction of urbanisation in Thailand is in terms of promoting secondary cities and growth moves beyond Bangkok.

Bangkok plays a pivotal role in the history of urbanisation in Thailand, and within a global story – becoming synonymous with the extremes of both economic success and of urban failings. Bangkok has a long history as the centre for national political administration, trade and commerce, dating back to the establishment of the capital in Thonburi. From its earliest inception, this has been linked to international trade and politics. Bangkok has come to dominate the national economy and is an almost archetypal primary city dominating all other Thai cities in terms of geographical area, population, or economic activity. Bangkok has also come to be the dominant city of mainland Southeast Asia. Despite this long urban history, Bangkok has gone through a period of dramatic change, with further expansion of the urban area of greater Bangkok being most notable in the last 20 years.

Urban sprawl and increased population have gone up and down. The rate of population increase in the decade between 1984 and 1994 was quite dramatic from a little over 5 million people to just over 8 million people, which was an increase of 60 per cent. The urbanised area declined by 8 per cent while population density increased by 75 per cent. Yet in the period since 1994, it appears that there has been a dramatic growth of 50 per cent in the urbanised area, with a population increase of only 18 per cent (see Figure 3).

Figure 3: Bangkok's population, urban area and density 1850-2002

Year	Population	Urbanized area (hectares)	Density (persons per hectare)
1850	160,000	580	276
1888	359,075	970	370
1900	600,000	3,480	172
1922	1,174,442	4,750	247
1953	1,560,520	10,500	149
1974	3,213,407	52,180	62
1984	5,158,434	96,500	53
1994	8,238,697	88,688	93
2002	9,761,697	133,515	73

Source: Angel *et al.* 2010

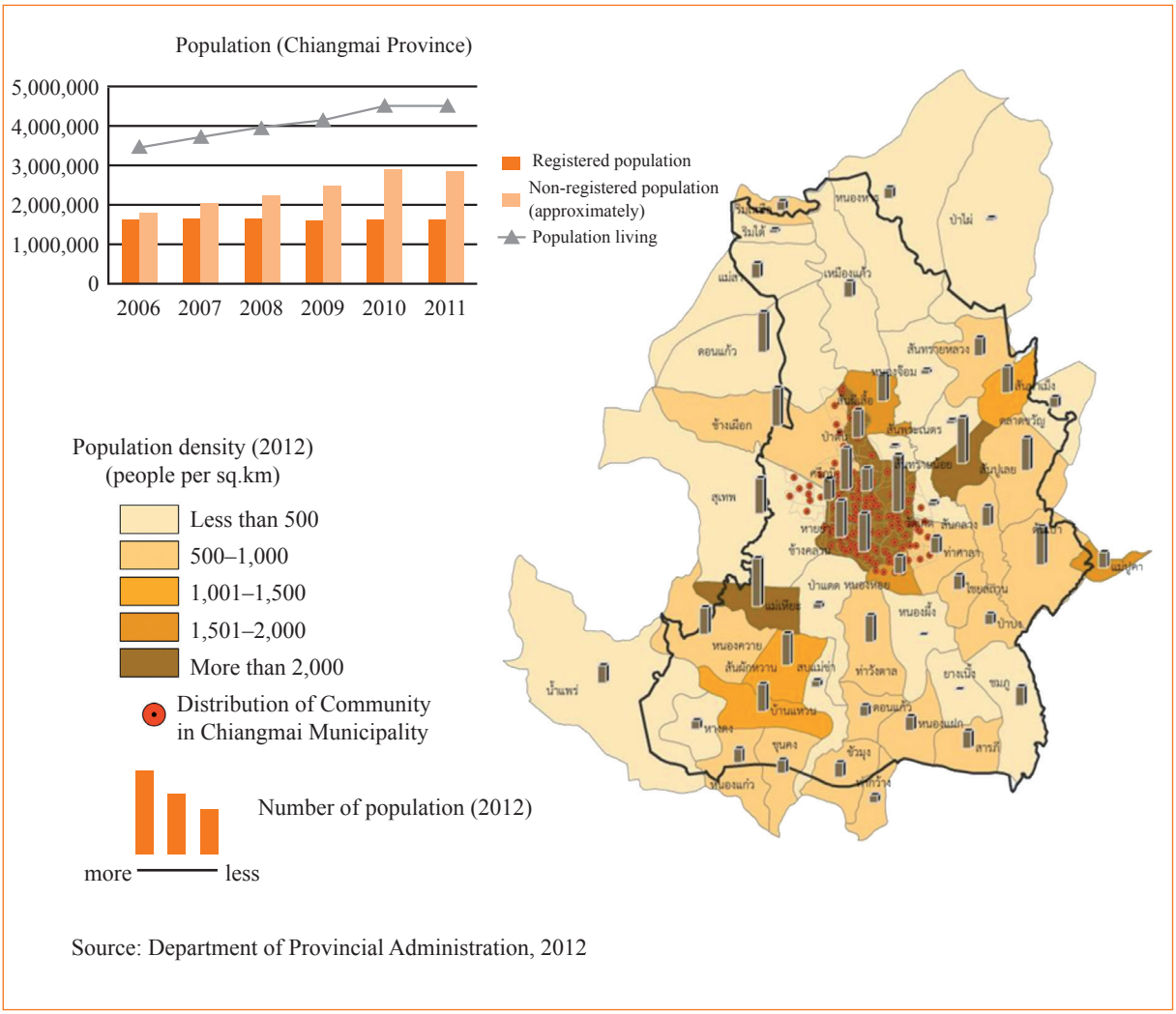
Chiang Mai, one of the case study cities, often stands out in the popular cultural imagination in marked contrast to Bangkok. As the second largest city in Thailand and the major city in the northern region, it has a distinct cultural heritage and is an alternative to Bangkok. Despite perceived differences between the two cities, there are remarkable similarities in the ways in which urbanisation is unfolding.

Urbanisation has largely progressed alongside economic development in Chiang Mai, which aspires to be an important business and tourism centre. The tourism sector caters both for domestic tourists, particularly from Bangkok, as well as foreigners. Services and industrial sectors are also growing in the city. Chiang Mai is looking to the opening of the

ASEAN Economic Community (AEC) in 2015, where it expects further opportunities for economic growth. Government policies, such as investments in mega-projects and support for economic zones, have been enacted to support this growth.

Chiang Mai has witnessed similar changes in population to Bangkok. While the registered population has remained more or less constant, but with a slight decrease in recent years, the non-registered population has been much higher than registered, approaching 3 million people. The combined population for 2011 is estimated at over 4 million people, an increase of 1.7 million people – or over 50 per cent - in only five years (see Figure 4).

Figure 4: Population in Chiang Mai

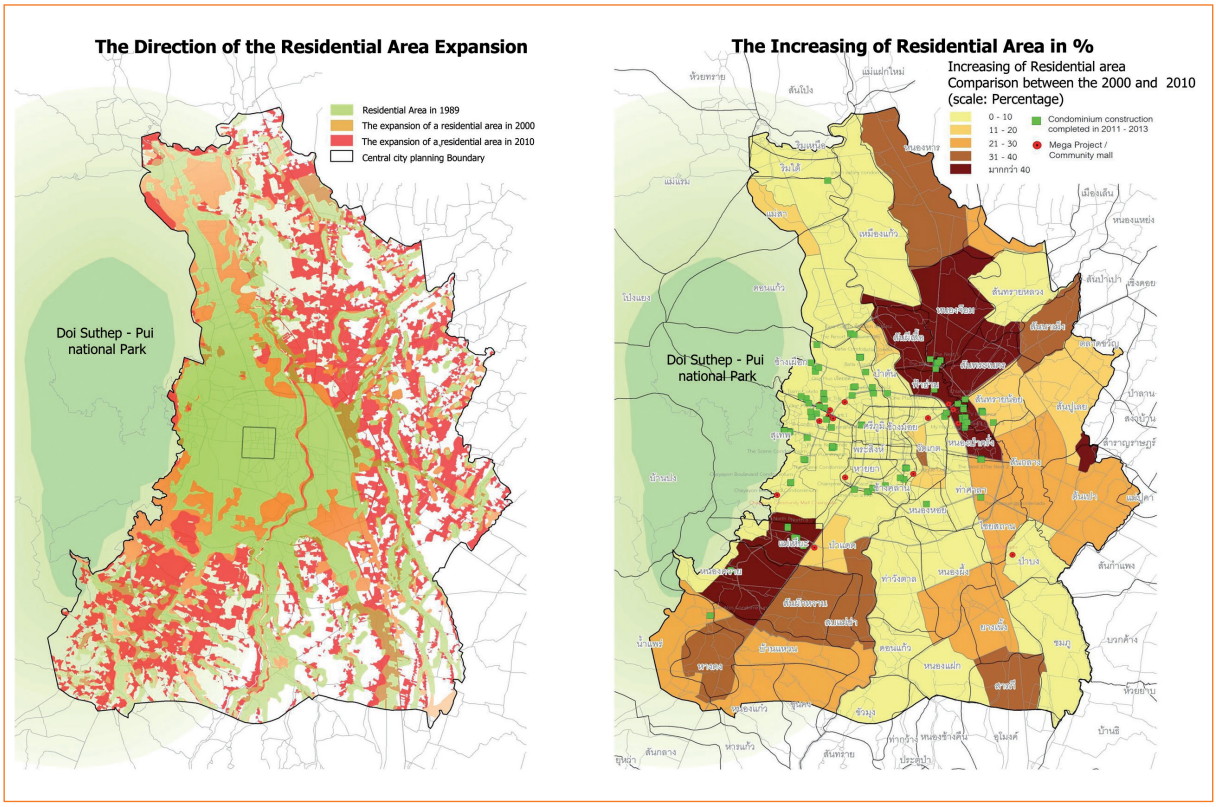


Source: Department of Provincial Administration, 2012

The chart on the upper left shows registered (blue), unregistered (red), and total population (green). The yellow shading on the map shows population density in the different sub-districts in Chiang Mai (people/m2). The bars on the map show relative population sizes, and the red dots indicate communities that are in the growing municipality.

The expansion of the urban area of Chiang Mai has taken place around the historic city centre that remains the heart of the tourist industry and the traditional cultural life of the city (Thiengburanathum *et al.* 2015). In the Comprehensive City Plan, specific areas around the city have been targeted for the expansion of residential areas, industry and education – based on the concept of satellite towns that would be linked to the centre and surrounded by green (agricultural) space (see Figure 5).

Figure 5: Two maps of Chiang Mai



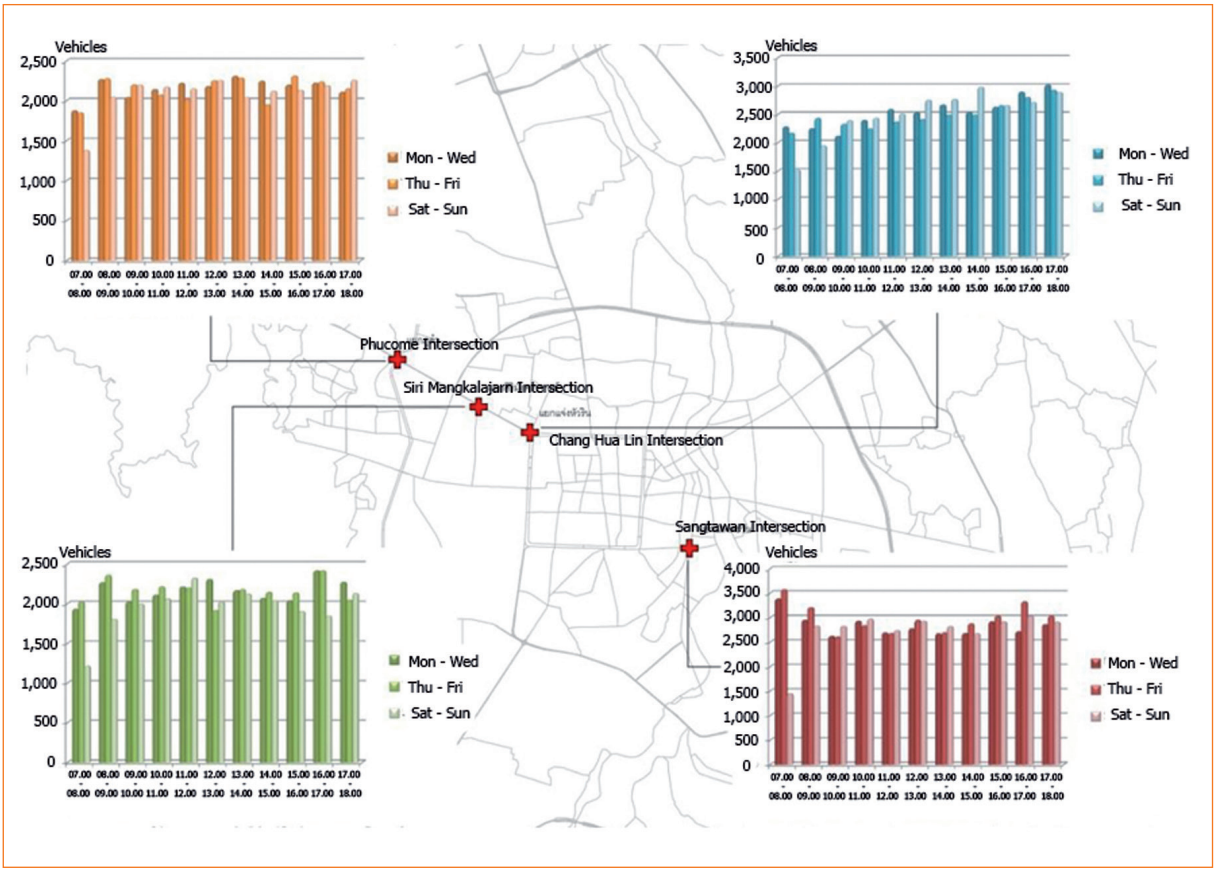
The map on the left shows the extent of developed land in 1989 (green), 2000 (orange), and 2010 (red). The map on the right shows percentage changes in urbanised areas between the years 2000 and 2010, with the darkest orange representing over 40 per cent growth in the urbanised area. The dots on the map indicate locations of new large developments such as condominiums (green) and community malls (red).

This pattern of single-use development – or specialised urban development – is well documented in urban studies literature, having become closely associated with the problem of urban sprawl that has been characteristic of much of urbanisation across the world. The central problem with this approach to urban development relates to mobility, which is the critical importance of being able to move between different zones of development, and the dependence of people on roads and private transport (cars and motorcycles) to be able to do so. The maps that illustrate the pattern of urbanisation clearly demonstrate that population density has increased most in the outer parts of the city centre, also encroaching on green space.

The extent of this intense development, and perhaps the driving force behind it, can be seen in the changing land prices for different areas around Chiang Mai, with some outer locations fetching double the peak prices of central areas. During 2012-2014, most of the new residential projects – whether townhouses or condominiums – as well as the mega projects, were located outside the city centre.

Population growth leads to increased numbers of cars and traffic congestion. Local authorities alleviate traffic congestion by commissioning new roads and ring roads to bypass the city centre. This in turn drives more urban sprawl as land along new roads is turned into housing development projects. Looking at the location of key facilities, services and employment centres in Chiang Mai, and the location of residential areas served by roads, we see constant peaks of traffic (see Figure 6).

Figure 6: Map of Chiang Mai showing traffic flows at target locations near key facilities, services, and employment centres



The heart of the problem of Chiang Mai lies in the combined influences of patterns of specialised spatial development and of transport that in turn push both ribbon development along the main roads that are put in to address transport, and the further encroachment of the green space that was originally intended to act as buffers between these centres of development.

This can also create a certain pathway dependency, unless the root causes are tackled. By this we mean that the current high levels of traffic congestion combined with the continued necessity for people to move from one specialised area to another, requires the further construction of transport linkages between the various centres, which in turn, creates more development along these routes, more traffic, and further traffic congestion. The initial dependency on specialised and geographically separate centres without effective public transport creates a cycle of further development that merely replicates the patterns of development that created the initial problem. As we discuss below, this concept of **path dependence** becomes manifest in the creation of climate-related risks, and the set of responses to deal with these risks.

However, current development plans for Chiang Mai appear to be steering a course that will further intensify these problems. With a greater interest in regional economic integration, and a continued commitment to private transport at the expense of public transport, and inadequate protection of public green space, it seems that Chiang Mai is committed to taking on the Bangkok Syndrome, while also espousing its commitment to avoid such an outcome.

In understanding the nature of urban sprawl in Thailand, it is important to consider the interplay of both transport and housing. This is revealed in the case study of Chiang Mai, and patterns of investment in road infrastructure and the privatisation of transport, and the nature of the critical core industry – tourism.

Hat Yai, in southern Thailand, has its own particular history of urbanisation (see Table 6). While it has never been an administrative centre, with the provincial capital remaining in Songkhla, the key transport connection that the railway provided both to Bangkok and Malaysia and Singapore, drove the creation of a core commercial centre around the railway station and along the railroad in Hat Yai. Significantly the early investment in road networks to link this commercial centre to the rural rubber-producing hinterland was driven by the private sector, with Chinese traders generating the finance themselves. Influenced by the Chinese trade and commerce community, public infrastructure and services were set up to support business operations and commercial projects. This concentration of commercial activity and road networks dictated early patterns of settlement, with little consideration for the flood risks of being situated in a low-lying basin. The establishment of the Prince of Songkhla University was the next significant development in the city, cementing its core business around commerce, tourism and education.

The pattern of private speculative investment has a rather special twist in Hat Yai, being directly related to the violent political unrest in the three Thai-Malay border provinces of Yala, Pattani, and Narathiwat (Choosuk *et al.* 2015). The ongoing unrest has encouraged those in the three border provinces who have savings and investment to place their capital in land, bricks, and mortar in the expanding urban area of Hat Yai, rather than keeping their capital in the more volatile and lower market returns in the border area. Such investment takes different forms, including speculative investment for rent and resale, as well as second homes, and second businesses. This type of investment reveals an important aspect of urbanisation and the links with capital – the need for surplus capital to move, but also to have a physical location that generates further surplus capital.

Table 6: History of urbanisation in Hat Yai

Year	Progress of urbanisation
1909	King Rama the 5th established a major railway junction in Hat Yai, connecting Thailand to Malaysia and Singapore
1917	Administrative area – Hat Yai district (Amphor) (area 5 sq. km)
1925	Hat Yai Tambon Municipality established (area 8 sq. km)
1949	Upgraded to Hat Yai Muang Municipality (area 13 sq. km)
1995	Became Hat Yai City Municipality (area 21 sq. km)
Before 2000	Expansion of residential areas occurs within the boundaries of the municipality (*Thetsabarn Nakorn).*
2000	Expansion of the rural area extends beyond boundaries of the municipality. New factories, industries, education centres, and other service centres are developed in the core of the city.
2010–2012	A ring road was constructed around the outside of the city, connecting Hat Yai to national roads in Thailand's three southernmost provinces.
2012–Present	Development of new residential areas occurred along the ring road, driving up land prices. Traffic increased along major roads as there was increased need for transportation between outer residential areas and facilities in the city centre.

Khon Kaen is the administrative capital of the northeastern province of Thailand, and has historically been listed as a priority city in national plans. The city has an established history as a centre for commerce and trade, originally serving as a key agricultural and services market, and hosts the largest university in the northeast, increasingly attracting students from neighbouring countries. Urban growth centred on these key areas has occurred rapidly over the years.

The city has experienced a rapid population increase, with people moving into the area in search of work at a rate of 3.95 per cent per year over the last ten years. At the same time, the urban areas have been expanding into the outerlying areas, which were previously agricultural areas.

An industrial estate is designated on a 4,100 *rai*[1] area in Tha Phra sub-district municipality, south of Khon Kaen city. Together with increased commercial, retail and housing projects, the planned industrial estate is driving up land prices, reportedly by 20-30 per cent over the last two to three years. The industrial estate is also driving urban sprawl as more shop/houses, townhouses, housing and commercial projects are developed.

Increasingly, Khon Kaen is emerging as an important regional hub. Located on the Mittraphap Highway linking Bangkok to Vientiane in Laos, the city is well-connected to other cities and towns in the northeast. It is relatively close to Mukdahan and by the bridge, to the Lao border town of Savannakhet, which links the growing coastal cities in Vietnam of Danang and Hue. It sits at the intersection of the east-west and central transportation corridors being developed under the Asian Development Bank's Greater Mekong Sub-Region programme, which connects it to Vietnam, Laos, Cambodia, and Myanmar. With the pending launch of AEC, and with regional trade expected to increase further, Khon Kaen will gain significance as a key node in the region (Promphakping and Phothaworn 2015).

1 A rai is a unit of area equal to 1,600 square metres (40 m × 40 m).

4 Drivers of urbanisation in Thailand

The patterns of urbanisation occurring in Thailand are part of a regional trend:

> *Every day an estimated 120,000 people are migrating to cities in the Asia-Pacific region and between 2010 and 2050, the proportion of people living in urban areas is likely to grow from 42 to 63 per cent. This is partly caused by demographic change. But more importantly this is the result of urban-biased development driven by globalisation and the consequent lack of adequate opportunities in rural areas* (ESCAP/ADB/UNDP 2003, p.3).

In this section we explore the core drivers of change that are manifest in Thailand.

4.1 Transition from agriculture – absorbing labour surplus, creating internal economic demand and markets

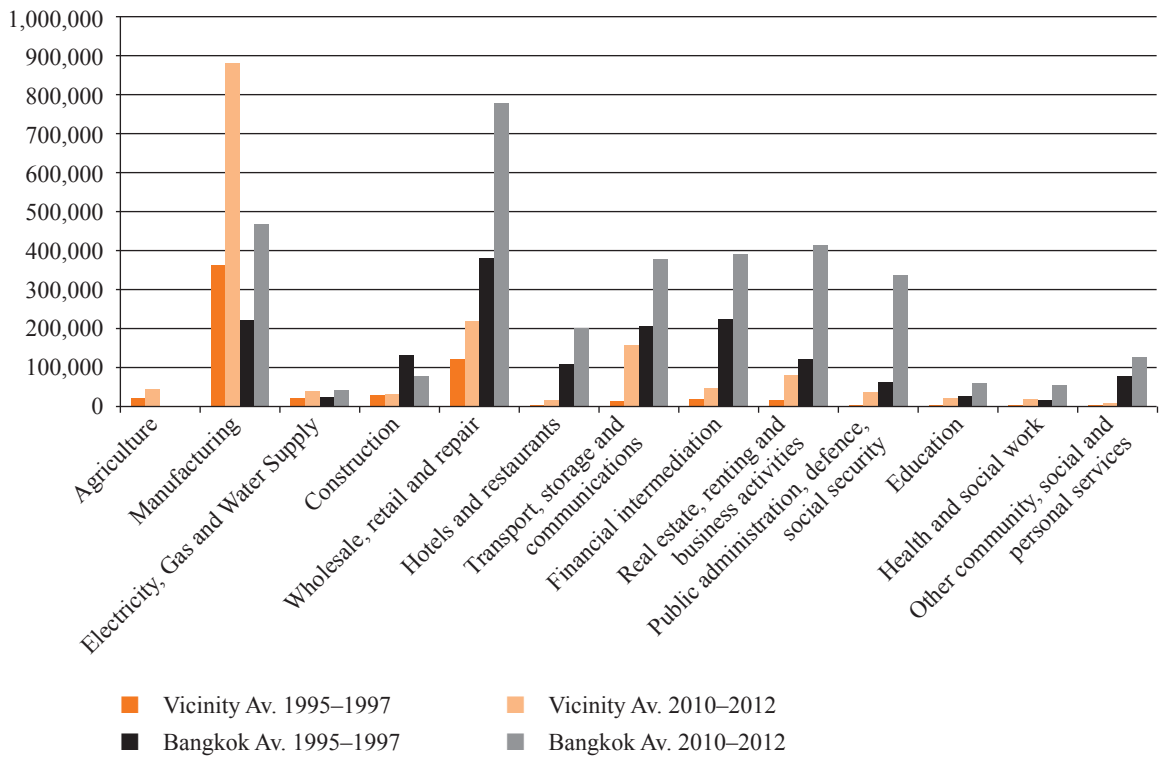
The enormous social and economic transition as the Thai economy and Thai workforce moves out of agriculture is a critical feature of the process of urbanisation. Within this broader story of change are a number of key dimensions to consider.

There is a huge momentum for urbanisation, and a desire to move out of agriculture. For many years, evidence has been growing on how the economic potential from agriculture is much diminished, and that farming generations see their children's future outside of agriculture. Within the agricultural workforce, there is a huge generational imbalance, with the average age of farmers steadily increasing. The proportion of young people seeking to earn a living from farming has declined significantly.

At the same time, the economic future for younger generations is very much framed around an urban existence, and urban employment, with a clear demand for non-agricultural employment and income. There are additional dimensions in the move away from agriculture. For those with clear land ownership, there are considerable economic and social opportunities to profit from the sale of agricultural land and potential investments. In many circumstances, land that was only recently of marginal economic value now has a market price well beyond the range of several years', or even a lifetime's, income. With reasonable landholdings, many rural people are able to benefit from these emerging market opportunities, while also maintaining sufficient land to allow for at least some engagement in agriculture.

This is clear in the case of Bangkok and surrounding provinces. As the urban sprawl spreads further, manufacturing and services begin to dominate in terms of income, employment and territory (Lambergts 2014). This is a trend that we see at the national level as well (see Figure 7).

Figure 7: Sector breakdown of the economy of Bangkok and its neighbouring provinces (contribution to Gross Provincial Product at current market prices in million baht)



Source: calculated using NESDB Gross Provincial Product statistics, various years (1995–1997 and 2010–2012).

The need for an economic and social transition from agriculture is established within state-led visions of economic development, founded on economic theory. This basic economic argument is also well-articulated by the banking sector in Thailand. Urbanisation is seen as a necessary precondition for further economic growth beyond the export-oriented economy that has shaped national development over the last few decades. According to this line of economic argument, urbanisation leads to changes in employment that generate higher incomes. With higher disposable income, there is a greater internal demand for goods and services, particularly in key economic sectors such as housing, automobiles and banking services.

The diverse motivations behind the promotion of further urbanisation are worthy of critical scrutiny (Friend and Thinphanga 2014). As the Siam Commercial Bank (2011) notes:

> *Urbanisation really matters. Cities facilitate development and domestic demand. Urban residents in Thailand have about twice as much income as non-urban residents on average, and they spend significantly more than their rural counterparts who earn the same income.*
>
> *Consumption is a particularly urban story. Urban residents want to live the urban lifestyle. Higher income consumers in urban areas are twice as likely to own a passenger car as their counterparts earning the same income in rural areas. They are also roughly 50 per cent more likely to own an air conditioner; a microwave; and a computer.*

From this perspective the slow rate of urbanisation that is suggested by current official statistics is seen as highly problematic for two reasons: i) Thailand's rate of urbanisation is not fast enough, and ii) Thailand has hit a middle-income block. At a more individual level, there are clear push and pull factors for people to migrate to urban centres, and to engage in urban economic activities.

The analysis presented above is important for a number of reasons. The intention here is not to critique urbanisation but to emphasise that from a key private sector perspective urbanisation is itself central to overall long-term national economic development in creating national markets. But it is also significant in that it also recognises that urbanisation is a matter of lifestyle, of values, patterns of demand, and consumption. These are not always in line with rational urban policy and planning, sustainability, justice, or resilience.

4.2 Regional economic dimensions

Urbanisation in the case study cities is being influenced by regional economic linkages. Each of the cities is at a major intersection in the regional transport and trade networks linking Thailand with the economies of neighbouring countries. These networks are strengthening to the point that they increasingly exert an influence on the ways in which urbanisation unfolds, shaping investments and land use change that in turn influence climate vulnerabilities.

When the prolonged military conflict in the Mekong region came to an end, the key development motif emerged: transforming a battlefield into a market place. The effort to expand the influence of the market, and to bring the countries of the Mekong into a more integrated market – with regionally interlinked roads and energy infrastructure, greater mobility of resources, goods, services and labour, and increasingly inter-regional financial investment – is driving the current, and most dramatic wave of urbanisation.

Thailand is the largest industrialised economy within the Greater Mekong Sub-region (GMS). With the AEC scheduled to come on board in 2015, urban centres along key transport routes are expanding at a rapid rate, with further support from central government investment in transport and communications infrastructure that will connect Thailand to the GMS region. This is a central part of the national development strategy to reduce economic dependence on Bangkok. Much of the growth in urban areas will therefore occur in medium-sized cities, particularly those in critical border regions, with significant trade potential and labour migration from neighbouring countries.

5 Changing patterns of urban vulnerability, poverty, and wellbeing

Urbanisation represents a fundamental transformation of employment, livelihoods and values.

Clearly it has brought many benefits for individuals and households, but there have also been losers in this transformation. The broader risks related to environmental quality and climate change created by historical patterns of urbanisation in Thailand now threaten to undermine many of the advances in poverty reduction and wellbeing, both for those who are currently poor, but also for those people who are not necessarily classified as currently poor. In addition to more familiar factors influencing poverty, future patterns of poverty and vulnerability in Thailand will be shaped by the nature of urban existence, and the fragilities and risks within urbanising areas, as well as the impacts of climate change.

This section draws on the case study research that has targeted areas that have urbanised relatively recently, or that are going through periods of urbanisation. The case studies focused on individuals and households at a critical change interface in order to better understand the dynamics of poverty and vulnerability from their own perspective, and the extent to which climate change risks influence patterns of poverty and vulnerability.

5.1 Patterns of urbanisation and infrastructure development have created new vulnerabilities

The ways in which urbanisation occurs through land use change and infrastructure development has become a key factor in shaping risk profiles. Refashioning of the ecological landscape has also created risks at individual and household levels. The design and location of roads and railroads cutting across natural floodplains has created barriers to natural drainage, contributing to new flood risks that are especially evident in Hat Yai, Khon Kaen and Lad Krabang. The need to protect the expanding inner city area has impacts for communities beyond these boundaries. For example, as Hat Yai city expands, the focus of flood protection is on the inner city. However Khlong Wa community in Hat Yai lies outside the flood control and protection area, and suffered higher flood levels and longer periods of inundation in 2010 (Kittitornkool 2015).

Changing patterns of flood risk have also influenced how local residents adapt their own housing, and how such individual action (sometimes referred to as ‘autonomous adaptation’) can create distributional impacts for other people and locations. In some cases, individuals and households have elevated their own housing by filling land, creating additional barriers to drainage that have had important distributional impacts, with some groups directly suffering the consequences.

But in many other cases, the space for such adaptation is constrained by limited assets, and limited ability to organise and influence.

Across all the case study sites, the privatisation of public land has gone alongside urban expansion. In a society that has until recently been largely agricultural with a high degree of dependence on common resources, this has been a significant factor in changing people's asset base. Public land, whether for cultivation, animal grazing, harvesting aquatic animals and plants, or harvesting non-timber forest products, has been of immense value to traditional rural livelihoods. Privatisation has denied people access to formerly productive resources. The lack of access to such common resources, particularly for land-short households has been a key factor in undermining the viability of rural livelihoods, a process that has also occurred in neighbouring countries. The privatisation of common land in Thailand has been all the more complex given the lack of formal land tenure for many rural households, and the ways in which power relations and patronage networks have shaped the day-to-day reality of land access.

The ability to respond to these changing circumstances brought by the location and design of road infrastructure is directly related to people's assets, entitlements, and rights. In many cases, those with a weak asset base have simply been unable to relocate, or refashion their housing in ways that might reduce the potential impacts of floods. Where roads pass through land that is considered of marginal agricultural value, or unclear ownership, it has often been the domain of poorer households with limited access to more productive or secure land. For example, in the case of Phra Lap in Khon Kaen city, poorer households settled on common land to farm, fish, and raise cattle but without clear land titles. When the road came to the poor households' area, people were not consulted. Since the poor households did not have titles, people were not eligible for compensation. The completed road was several metres higher than people's homesteads, which created a new set of flood risks. Large-scale, state-sponsored development schemes have also played a role in undermining people's access to public land, with people often being displaced or relocated under terms that are disadvantageous.

When considering who benefits or loses from the experience, it is important to draw a distinction between two main groups of people: i) those who are local to the area that urbanises around them; and ii) those who are newcomers, attracted to the area in search of work and economic opportunity.

For those living in the area as it urbanises, there can be significant benefits. In cases where such people have land assets and clear title, many have been able to benefit from selling land as values rise. However, the long-term benefit from such land sales has also depended on their ability to then reinvest the profits from land sales into productive activities and assets, including education for their children.

There are also cases of local people who have been dispossessed through the expansion of the urban and industrial areas. Even when compensation has been paid, it has often been inadequate to allow people to build a viable livelihood, or to sustain a suitable quality of life or economic activity. The value of compensation paid to them for land reclaimed is only a tiny fraction of the current market value.

Unfair resettlement and compensation is most clearly illustrated through the case study of Lad Krabang. The large-scale development of Lad Krabang, first with the expansion of industrial estates claiming land and water resources, and later with the construction of the international airport, has displaced local people (Hutanuwatr *et al.* 2015). The expansion has also reduced people's asset base and pushed people into new employment and livelihood strategies. People have often struggled and become increasingly dependent on industrial employment and uncertainties of wage labour.

In the first rounds of state-led relocation, compensation rates were fixed, allowing people to purchase enough land for a homestead and build a house. However, people were not permitted to continue their agricultural practices. Compensation rates have been insufficient in helping people adapt their livelihoods effectively.

Moreover, there has been a lost development potential for landowners who have been relocated. A massive difference exists between the current value of land that was reclaimed and the compensation payments that landowners received. The increased value of land has accrued to investors rather than to those who had an earlier claim to the land.

Additionally there are many local people who did not have significant land assets and were thus not eligible for compensation. Local people consequently became more marginalised. Without access to opportunities in agricultural production, local people have tended to become engaged in volatile casual labour markets. For those with limited agricultural assets, the transition to an industrialised economy and labour markets has been even more problematic.

Environmental pollution is a consistent feature of urbanisation in each of the case studies. Pollution takes many forms. In the case of Lad Krabang, the most heavily industrialised case study, there are widespread reports and documented cases of industrial waste being dumped into public water bodies and canals, killing fish and cultivated water vegetables. Seen with the naked eye, water quality has clearly been impacted. Local citizens also comment on air pollution and foul smells, often emitting from industrial parks and waste disposal areas. Similar cases of frequent unmonitored and unregulated pollution were reported in Khon Kaen.

The Bangkok international airport at Suvannabhumi has also created dramatic problems of noise pollution that have yet to be resolved. Several civil cases have been filed by local people for compensation and to place restrictions on flights over the area. That these remain unresolved is itself an indicator of the degree to which citizens are able to participate in decision-making processes, or hold the state to account.

A persistent feature of these cases is the lack of transparency, representation, and accountability that might allow for conditions that lead to direct and tangible impacts on citizens and communities. This is most clearly demonstrated in the direct impacts on people's natural environment and natural assets. This experience points to something deeper than lack of technical planning skills, and towards failures in governance, and the lack of transparency and accountability in infrastructure and land use planning.

5.2 Urbanisation and changes in livelihoods and community

Urbanisation creates enormous economic opportunities. There is a widespread enthusiasm for urbanisation. Culturally, urbanisation is associated with many of the core positive values of development (*karn pattana, khwam jaroen*), such as improved road and electricity access, the provision of health and education services, access to economic opportunities and markets, and the notion of 'convenience' (*khwam saduak sabay*).

Such values, and the general attraction associated with urbanisation is very much felt by younger generations transitioning from agricultural, rural backgrounds and is clearly evident in the changing age profile of the agricultural workforce. Increasingly, agriculture is an activity that only appeals to older generations.

In each of the case studies people have moved, or are moving from agriculture to wage labour with push and pull factors at play. Those who have moved to the urbanising area have a different perspective, depending on where they have come from, their original situation, and the situation they have left behind. People's experiences are often quite mixed. People moving to urbanising areas consist of several groups, including Thai nationals who have moved from other parts of the country. Within the group of Thai nationals are people who have moved from farming into other employment, as well as people already involved in non-farming employment but are moving to new locations. Those moving to urbanising areas also include a growing number of migrant workers from the Mekong region.

People are active in responding to changing circumstances and attempting to shape their futures. People adapt and adjust in different ways but their ability to do so is influenced by their own asset base and networks of support. Throughout the case studies, limited support was found from the state in creating new employment opportunities, or in providing training to develop appropriate skills for people moving to urbanising areas.

Particular groups of people are especially affected. For example, the elderly, retired or those laid off have struggled to support themselves. Compensation is inadequate for sustaining this group's livelihoods over a longer period of time, and at best with only limited state provision of welfare.

Understandably, there is a sharp decline in the number of people who derive their main income from agriculture, even in places where there is land available. This trend is evident in places such as Phra Lap where the process of urbanisation is only just unfolding; thus indicating a shift from agriculture that is itself being driven by deeper shifts in people's values and expectations, and emerging economic opportunities outside of agriculture. However in other places, people simply do not have access to productive land that would allow continued involvement in agriculture.

This is not a simple one direction trend of people moving away from agriculture. In each of the case studies there is also a clash of urban and rural space and livelihoods. People who wish to continue farming become constrained by the expansion of urban and industrial zones, and by the effects of environmental degradation and pollution. Some people still farm as the city expands onto their area. Farmers have to compete against the environmental impacts of urbanisation and industrialisation, in addition to the limited economic returns on their farming.

Quality of life also goes beyond matters of income. A clear aspect that is particularly evident in the transition away from agriculture relates to people's access to food of appropriate quality and variety. Transitioning from agriculture is a fundamental change of values, pushing people to greater dependency on food production and distribution systems over which they have no control. Food has enormous cultural significance in Thailand (as in many recently agricultural societies). There are also economic dimensions, with 50 per cent of monthly expenditure going on food in both the Phra Lab community in Khon Kaen (Inmuong *et al*. 2015), and the Ban Khlong Wa community in Hat Yai (Kittitornkool 2015).

5.3 Changes in urban communities

Urbanisation brings changes to how people organise themselves in households and communities. Increasingly households are engaged in 'stretched livelihoods' (Winkels 2012), with different members employed in different sectors and locations across the country.

The notion of community suggests some sense of shared values or identity, rather than simply shared location. In Thailand, the notion of community is most closely associated with the rural village.

There is also a confusion regarding the term 'community' as used by the Ministry of Interior that generally refers to a neighbourhood. But as urbanisation intensifies in Thailand, neighbourhoods become increasingly mixed and diverse with inhabitants representing a range of wealth, occupation, religion, ethnicity – and in many cases nationality – such that the sense of shared identity and values, and even attachment to their location, is less clear.

Despite these challenges of community in urban areas, there are 'community' level organisations that people have put together themselves. Often these seem to be extensions of the pre-urban rural communities. This also raises some challenges, as it is not clear how those who originate in other places fit within these community organisations. In the case of Lad Krabang, a local community organisation emerged from many of the households who were original inhabitants of the area, however they have also made concerted efforts to draw in recent settlers from other parts of Thailand.

The distinction between original inhabitants and more recent settlers is important for thinking through people's ability to organise. With the tendency for original residents to be more organised as the 'community', it is easy to assume that the group of original residents represents the community, and overlook the more recent settlers of migrants who live in the same neighbourhood, but who may not always be represented in the same 'community'.

People are also able to create their own communities across administrative boundaries, often drawing on pre-urban associations. For example, while in Phra Lap, the restructuring of administrative boundaries put people in different administrative communities, people still organise themselves as a community through such shared events as sports competitions, that are in themselves efforts to combat social problems, such as drug abuse.

The degree to which more recent settlers and migrants are able to represent their interests and organise within communities is a cause for concern across the case studies. This is additionally complicated in Thailand as registration of residence is tied to voting rights – and the local authorities' income is based on registered inhabitants, and their responsibility for service provision is targeted towards registered citizens within their administrative boundaries. Because non-official residents do not have voting rights, non-official residents do not have access to the same organisations, or to state welfare support during a crisis, or to any voice in shaping urban futures.

Urban areas include migrants from other parts of Thailand, as well as increasingly from other countries. These migrants do not enjoy the same rights as official residents. Migrants often live in highly hazardous locations, and engage in volatile, informal labour markets. This is a new experience and thus a new challenge for Thailand. Within a little over a generation, regions such as Khon Kaen and Udon Thani in the northeast, which were previously renowned for exporting labour abroad, are now becoming recipients of migrant labour from neighbouring countries.

5.4 Characteristics and causes of poverty and vulnerability

Urbanisation in Thailand presents a unique context that shapes poverty and vulnerability in ways that we are only just beginning to understand. The complexity of urbanisation encompasses a diverse range of people and communities becoming urbanised, and the equally complex ways that people earn a living and struggle to advance their wellbeing. Unpacking these complexities requires a combination of approaches – beyond income and expenditure.

Poverty and vulnerability can be understood through:

- Assets
- Entitlements
- Rights
- Wellbeing, and
- Risks and vulnerabilities.

This section provides some insights into these different dimensions of poverty, vulnerability and wellbeing.

Employment, income, expenditure and debt

Urban people have dynamic and diversified livelihood strategies, taking on a range of different activities to generate income within households and to be able to meet a range of requirements for wellbeing. This combination of a variety of different income-generating activities within the household is a central feature of urban livelihoods. The majority are involved in informal labour markets, often based on day labour, that provide limited income, but perhaps more importantly, limited welfare benefits or degrees of certainty. Similarly households are often engaged in some form of 'petty trade', with income again dependent on the vagaries of the market. Not being able to make future plans based on reliable employment and income flows has both an economic and a psychological cost. Similarly this high degree of uncertainty can be expected to be a constraint in people's ability to recover from various shocks and crises, whether economic or environmental.

Increasingly, global understandings of poverty adopt multi-dimensional approaches. These are especially relevant for understanding the urban context. Income is clearly a major factor in determining poverty or wellbeing, but it is not the only factor. While income levels might be considered reasonable in comparison to rural compatriots, the cost of living in

urban areas is substantially higher, with few of the fall-back mechanisms of access to common property natural resources that are characteristic of rural livelihoods. The lack of employment and income security, and thus the ability to save, plan and invest is extremely limited. With such high degrees of insecurity and limited savings, people's buffers against a whole range of potential shocks and crises is itself limited.

Additionally, given the range of demands on income, assessments of poverty based solely on gross income – even modified according to basic expenditures – are inadequate. Across the case studies, household income ranges enormously.

Even though the case studies have generated data about income, it is difficult to summarise the significance of income because income – and ownership of some key assets – varies so much.

The range of income can be seen in the case of female-headed households in Hat Yai who survive on a daily income of only 200 baht per day and depend on precarious labour markets. In contrast, a migrant household in Lad Krabang working in the construction industry reports a monthly income of 30,000 baht. In the Lad Krabang case their household asset profile also appears quite mixed – owning a pick-up truck but also living in basic, temporary accommodation. Assessing wealth status based on visible assets is thus challenging.

Income and expenditure are not adequate indicators of urban poverty or wellbeing. Given the irregular nature of employment and volatility of labour markets, and the quality of housing and related natural environment, a number of other factors need to be brought into an analysis.

On the other hand, debt is widespread and appears to be persistent as both a cause and characteristic of poverty, but also a contributory factor in household vulnerability. Rural debt is widespread and well-documented across Thailand, but often associated with costs of agricultural production, or costs associated with health. Much of the debt identified in the case studies is related to maintaining basic household functionality, rather than investments in production. This is doubly concerning – suggesting that many people are struggling merely to maintain household consumption needs. Again, such levels of indebtedness indicate risks to any kinds of shocks and crises that might interfere either with income or the ability to service debts. The rates of indebtedness are very common with 60 per cent of people in Phra Lap reported to be in debt, and some rates of debt as high as 460,000 baht/household (Inmuang *et al*. 2015). In some cases, high levels of debt are for investment in housing (up to 2 million baht). In other cases, debt is for covering household consumption needs, and for dealing with shocks and crises, particularly related to health. A similar situation is reported in Hat Yai (Kittitornkool 2015).

The sources of credit also reveal other dimensions of uncertainty and risk. Across a range of different sources of credit, interest rates are typically between 8 per cent and 20 per cent. Formal savings banks and savings groups tend to provide the lowest interest rates at 8 per cent, while village credit facilities are typically in the region of 15 per cent. However, informal money lenders are also important sources of credit for those with limited collateral or poor credit ratings. Interest rates stand between 18 per cent and 20 per cent. The very high proportion of household expenditure on food (50 per cent) and debt servicing among households in Hat Yai, suggests that people are living in very precarious circumstances, and are vulnerable to any kind of shock.

Across all the case studies, access to basic services – health, education and employment – and the opportunities that these services provide for advancement are identified as being a critical factor in determining people's wellbeing. A critical factor is whether people are registered, and thus, whether they are entitled to state-services. In Ban Ped, Khon Kaen, people who are registered and have access to the public water supply are able to cope with the degradation of natural water sources that are caused by the spread of water hyacinth (Promphakping and Phothaworn 2015).

Lad Krabang presents a stark case of inequitable access to services. Many of the people who live around the industrial estates do not have access to mains water supplies, even though they are close to the international airport and to the capital of Bangkok. For these people, they are able to negotiate with the factory owners in order to access the factories' water services. However this incurs a cost; they have to pay the industrial rates, rather than domestic rates. As key informants pointed out, the irony is all the sharper since these are the very same people who have to deal with the impacts of industrial pollution on their natural public waterways and natural water supplies.

Social capital and networks of family and friends, and linkages to state agencies and authorities are critical. Despite the apparent alienation of many urban settings, the case studies also reveal the ways in which people build and maintain networks of mutual support, often in order to fill a gap in the state provision of support. In times of crisis, particularly related to floods, as in the case of Khon Kaen, people reported that the major source of support comes from family and friends in the vicinity. People have maintained and even strengthened social networks across villages that are now urbanising, establishing groups with a formal chairman (*prathankum*) to oversee support for funerals, weddings and in dealing with natural disasters. In Lad Krabang, neighbourhoods organise themselves with local volunteers to provide basic support services in times of flood. While this is generally targeted towards longer-term residents, there is awareness of the needs of migrant workers in Lad Krabang, whether from other parts of Thailand or neighbouring countries, with volunteers providing support to people that they did not know throughout the 2011 floods.

Loss of natural productive assets

For people living in formerly rural areas, the benefits of urbanisation are offset by the loss of productive agricultural and natural assets. In the case of Lad Krabang, prior to the construction of factories and the international airport, original residents received compensation in the form of land for resettlement. This amounted to being provided 50 square *wah*[2] of land (or 200 square metres - the equivalent for a family homestead) as compensation for an agricultural holding of 60 *rai* (or 96,000 square metres). The value of the original agricultural holding would be hard to calculate at current market prices – but would certainly be in the realm of several millions of US dollars.

More important than the loss of land is the loss of livelihood and income, often with little alternative beyond working in the factories. There are important wellbeing dimensions in this transformation that are still being interpreted and negotiated by people themselves. Many people talked about this transition in terms of quality of life and living well. Agricultural work is often perceived hard and demanding. Industrial and factory work was certainly seen by many as being more 'modern' and less physically demanding, and thus preferable to farming. However, the ability to be one's own boss is often highly prized, and certainly has been eroded in the transition away from small-scale agriculture. Similarly, the ability to feed oneself, and to do so for free, is often highly prized. The feeling of merely coping, of having lost a sense of community and having lost influence over one's own life is a common sentiment amongst residents of Hat Yai, who described themselves as being just 'small people in the big city'.

This transition is seen as having generated cascading impacts that have individual, personal as well as social and cultural dimensions. In many people's minds urban life is associated with a host of social problems – with drug abuse, drinking and gambling appearing high on people's list of priority problems. In the case of Hat Yai, there are strong gender dimensions reported here as well, with many women having been abandoned, left to fending for themselves and raising families on their own.

Impacts of 'climatic factors' is less obvious – regular problems are higher priority

In all of the case studies the influence of climate-related shocks and crises to individual and household wellbeing is less clear-cut. For areas that are in the midst of urbanisation, there is a widespread sense that flooding is a seasonal problem and a natural phenomenon. It is seen as a low priority, and a phenomenon for which people have experience, and for which they can usually cope. The 2011 floods represent an extreme case, but as such, are an indicator of the risks that climate change might create.

2 *A wa or wah is equivalent to two metres.*

The longer-term significance of such crises is revealed in the ways that people report coping with specific events. Dealing with shocks and crises can cause serious setbacks from which it is difficult to recover.

Most strategies to deal with shocks are short-term, recovery oriented – taking loans from relatives or relocating temporarily. In the case of the 2011 floods, government compensation was used to repair houses and build flood walls, although the compensation levels were extremely low. On the whole, those with social networks resorted to support from family and friends rather than the state.

On the whole coping strategies appear autonomous, more dependent on individual and household level actions than collective actions, with the ability of people to cope largely influenced by access to economic and social assets and resources.

In the case of Hat Yai, recent experiences of dealing with serious floods can help people cope and be better prepared. But Hat Yai also points to the limitations and dangers of building on the experience of past events. In the 2010 floods, many people had prepared based on the extreme flood of 2001 – moving assets and people to first floor protection. However in 2010, the flood level in some parts of the city was even higher than in 2001, with many people thinking that they were better prepared, but they were eventually caught out.

The challenge can be seen as one of scale. Individuals cannot address root causes and local government does not have the clear role and remit or budget that would allow them to deal with these challenges. The flood events that were discussed in the case studies are all the product of land use change brought by patterns of urbanisation, and the poor management of these processes, rather than purely natural disasters. Where people attempt to protect themselves, there are risks and costs that can be redistributed to other people and places. Similarly the high levels of indebtedness, and the weakness of state-sponsored social protection measures, indicate the limitations of such individual level actions, as well as the wider risks that might arise from a series of shocks and crises.

6 Approaching climate thresholds

Climate change has yet to have any significant influence on the policy agenda, neither at national nor local levels. Where climate change does have some impact has tended to be in terms of efforts around mitigation, and the development of adaptation strategies for key sectors under the responsibility of specific ministries. However policy is often inconsistent and contradictory. For example, while the Ministry of Transport has developed strategies around green transport, and green freight, recent government policy has encouraged private ownership of cars as a means of stimulating the domestic car production sector. None of the cities under this study has a viable public transport system in place. Strategies that are framed as supporting 'green space' (*pheunti si kheow*) are essentially tree-planting projects in urban spaces, rather than opening up new areas of green, public spaces or preserving greenfield sites. Support for renewable energy is offset by emerging commitments to invest in large-scale coal-fired power production and the expansion of exploration of natural gas and oil.

Where issues of climate change have had the greatest impact at city level has been in terms of addressing the impacts of natural disasters, largely floods. This has gained additional impetus with the dramatic experience of the 2011 floods that affected much of the Chao Praya River Basin, as well as parts of the northeast of the country. The focus of responses has been around putting in place the physical infrastructure of flood protection, while also opening floodways to facilitate drainage. Despite the influence of patterns of urbanisation in flood-prone areas of the Chao Praya Basin – a process that is now being repeated in each of the case study cities –there has been no policy response to address gaps in land use planning and zoning. As the case studies illustrate, the processes of urban expansion are not informed by flood risk assessments.

Within the research community, the linkages between urbanisation and climate change have received limited attention. The draft National Climate Change Research Strategy for Thailand[3] focuses largely on the impacts of climate change on agriculture and natural resources. Urban issues appear in current thinking as a potential location of impacts, but with some interest in mitigation around energy efficiency and solid waste management.

The experience of the cities under this study illustrates that, in several critical aspects, urbanisation is pushing the cities close to critical thresholds that will be further exacerbated by climate change. This is not simply in terms of the impacts of climate-related disasters, but also in terms of the challenges of meeting the needs of resources and services in an increasingly uncertain climate.

3 *At the time of going to press, this research strategy still remains in draft*

The key lessons emerging from these studies – and associated work conducted in Thailand – demonstrate:

- Land use change associated with urbanisation does not adequately consider climate change risks and implications, with much of the expansion occurring in hazardous and exposed spaces, and in ways that exacerbate climate risks.
- In all of the cities in this study, the major part of critical urban infrastructure was put in place several decades ago, and designed for different needs, and for a different climate. Such infrastructure is approaching the end of its designed lifespan, but has been poorly maintained.
- Each of the cities has experience of where critical infrastructure systems have failed – although the consequences of such failure have not been evenly distributed among urban people, locations and sectors.
- Current institutional structures and processes – including levels of authority and coordination between different administrative tiers and sectors – does not allow for dealing with the increased uncertainty and risk associated with climate change.

The ways in which these issues come together can be illustrated in the case study of Udon Thani (Siriwattanaphaiboon 2015). Until recently, Udon Thani was known as one of the poorer provinces, notorious for exporting labour to other parts of the country and overseas. With emerging transport and trade connections to China and neighbouring countries under the GMS and the AEC, Udon Thani has the highest rate of GDP growth in the country, with its own plans to double its size in terms of both area and population by 2020.

The city remains dependent on one main source of water – the Huay Luang reservoir. This reservoir was designed and constructed over forty years ago in order to meet the needs of an agricultural economy that was largely based on small-scale rice production. However, as the city has grown, overall demand for water has increased and shifted between different users. At the same time, patterns of rainfall are changing, with risks of both flood and water shortage within the same years, and from year to year.

On average, annual rainfall in the northeastern region of Thailand ranges from 800 to 2,850 mm. Udon Thani receives between 1,101 and 1,400 mm of average annual precipitation or approximately 3,670 million cubic metres of water, but only 850 million cubic metres of rainwater can be stored in the reservoir and irrigated waterways.

In 2000, Udon Thani experienced a flood crisis. Unusually high rainfall of 247.5 mm in July in a single day led to nine days of floods with 0.5-1 m of flood depth. The floods impacted 80 per cent of the city with 1.5 billion baht losses and damages. In 2001, Udon Thani was flooded twice in one month. On 10 August 2001, 240.1 mm of rainfall caused inundation for seven days and on 5 September, another 104.3 mm of rainfall caused further inundation. With already saturated soil, the second round of flooding lasted eight days, with 1.5 - 2.0 m flood depth that caused one billion baht loss and damages.

These flood events exceeded existing design thresholds of critical drainage infrastructure. Within the Udon Thani city municipality administrative area, drainage capacity to control flooding is at 80 mm / hour. Past events show that rainfall can exceed the capacity of existing infrastructure.

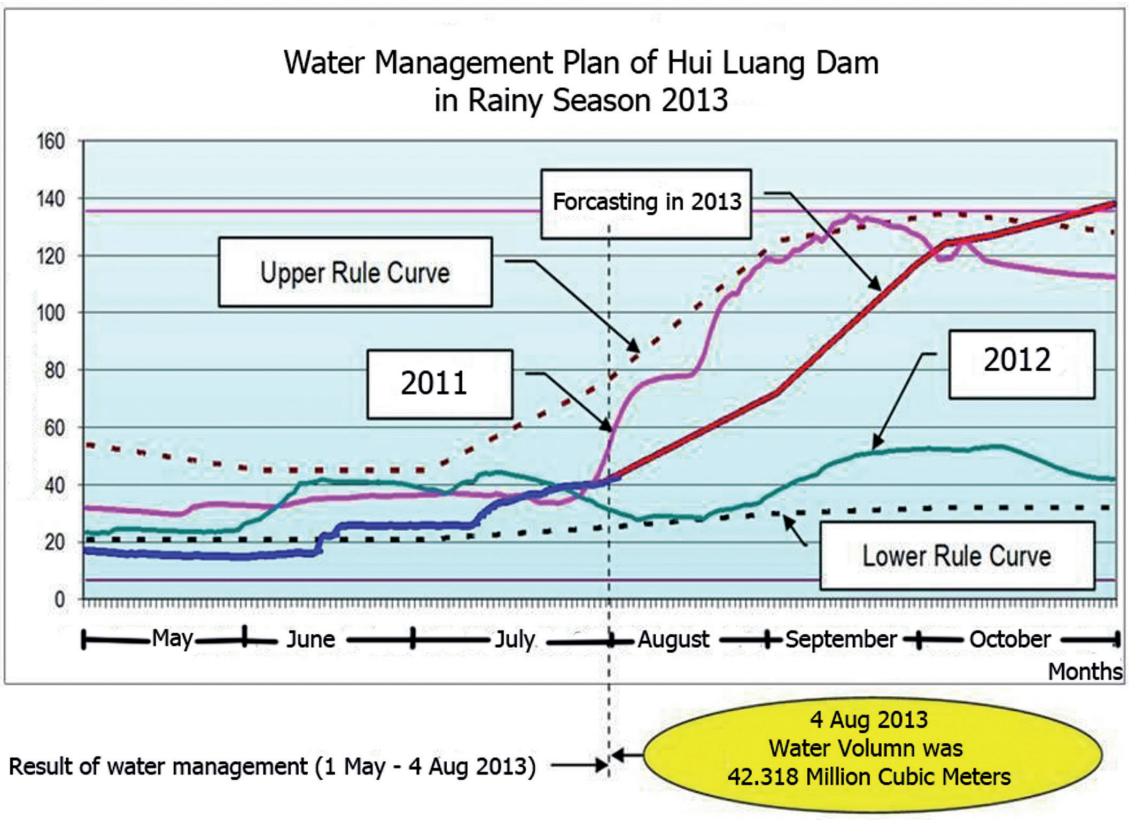
Huay Luang reservoir, with a maximum capacity of 135 million cubic metres, provides water for all sectors, including household consumption, agriculture and industry. Located in the Huay Luang watershed, the reservoir is rainfed and water is managed by the Royal Irrigation Department (RID). Year to year, as well as seasonal water availability in the reservoir varies significantly. In May 2013, the reservoir had a total of 15 million cubic metres of water and subsequently only 6 per cent of the maximum reservoir capacity was available for use, while in September 2011, the mega flood year, the water volume was 98-99 per cent of the maximum capacity (see Figure 8). Increased year-to-year rainfall variability – that may well be linked to climate change - is making it difficult to manage the reservoir. Following the 2011 flood disaster, there was a water shortage by the end of 2012. With an expectation of heavy rainfall in the monsoon season, RID discharged water in August 2012 to prevent overflow of the reservoir that could lead to flooding of the city. But the rain never came to refill the reservoir.

The institutional challenge is largely around managing to reservoir to ensure peak capacity in the rainy season, in order to store sufficient water for the increased demand for water in the dry season. As Table 7 below illustrates, the rainfall has varied significantly over the three years. This poses a critical problem for reservoir managers and operators –when the rains come later than expected there is pressure to fill the reservoir as quickly as possible. However, in 2011 the reservoir had reached peak capacity before the end of the rainy season. As a series of typhoons were projected to hit Udon, the reservoir managers were order by RID central command in Bangkok to release water in order to avoid the risk of over-spilling and flooding the city. This emergency release left the reservoir well below capacity. On this occasion additional unexpected rainfall later in the season restored storage – but even this level of storage was insufficient to meet water demand in the following dry season of 2012.

Table 7: Annual rainfall (mm) and number of wet days in Udon Thani

Year	Rainfall (mm)	Number of wet days
2000	1850.5	128
2001	1654.7	126
2002	1777.0	127
2003	1374.4	108
2004	1511.8	124
2005	1423.1	122
2006	1324.0	130
2007	1159.9	113
2008	1664.2	145
2009	1513.9	113
2010	1507.7	128
2011	1714.5	132
2012	888.5	112
2013	1352.4	128

Figure 8: A graph showing the water capacity in the Huay Luang reservoir (volume of water in million cubic metres on the y-axis and months on the x-axis).



The Solid Pink Line shows the actual observation of water during the 2011 flood year. The graph also shows less water in the same period in 2012 (green solid line). The red solid line is the 2013 projection.

Water shortage occurs when the dry season is prolonged. The rainy season usually begins in May, but in some years not until July. This leads to severe water shortages in some areas between June and July.

The case of Udon Thani further exemplifies climate-related challenges facing urbanising areas of Thailand, beyond issues of flood and disasters. Each of the cities is expanding in ways that increase demand for water, but with little consideration of how to meet such demand. As urbanisation occurs, the natural wetland ecology that characterises much of the landscape is refashioned; natural drainage is impeded, and wetland areas filled in for industrial and residential development. Without addressing the root causes of these emerging challenges, policy responses are remarkably similar across the country, focusing on large-scale infrastructure solutions. In the case of Udon Thani this includes revisiting plans that date back to the 1960s of a large river basin transfer scheme to divert water from the Mekong River to the Huay Luang basin. Once again, it is a case of old plans and old technologies repackaged to address future circumstances and challenges.

7 Challenges of governance, policy, and planning

Urbanisation in Thailand presents a range of governance and administrative challenges.

7.1 National policy – urban visions

Current national policy presents a broad vision of an urban future in which cities are compact, environmentally friendly and provide public green space. Thai cities are also envisioned to be energy efficient with improved transport option – bringing together cultural, social, and ecological dimensions of urban life (see Box 1 below). Based on our research, however, the laudable vision of Thai policies remains far removed from current local urban realities. The challenge remains of redirecting urban transformation in Thailand - or at the very least, gaining some degree of control over unfolding patterns of urbanisation.

Box 1: National Economic and Social Development Board (NESDB), 11th National Plan (2012–2016)

5.2.3 Develop environmentally friendly cities with an emphasis on integrated urban planning having cultural, social and ecological aspects:

1) Develop compact urban designs where areas are used creatively, with emphasis on the expansion of green spaces and increased energy efficiency. Infrastructure design technology, improved transport systems and energy-saving residential buildings should be promoted. In addition, an ecologically sound urban model should be developed and specific green areas set aside for agriculture and urban farms.

2) Utilise tax support and other incentives to redirect technology and materials toward renewable energy. Regulations should be updated to increase efficiency in energy management.

3) Supervise intensive land use both inside and beyond cities and establish measures to curb urban sprawl. Plan to incorporate public art and designate cultural heritage sites. Communities and local administration organisations (LAOs) should develop areas at the sub-district, district and provincial levels, and these should be relevant to the means and lifestyle of the inhabitants as well as to the sustainable capacity of these areas.

4) Manage an integrated urban environment by using innovative technology for wastewater and solid waste management, using the 3R principles (reduce, reuse, and recycle). LAOs should build capacity to manage the environment efficiently with participation by all stakeholders.

Source: National Economic and Social Development Board 2011

As Kloosterman and Lambregts (2014) argue, urbanisation is co-produced, managed and accommodated by public, civic and private interests. Shaping an urban future for Thailand at both the national and local levels should thus consist of a range of informed actors and processes that encourage meaningful participation. Informing actors and ensuring participation requires placing issues of urbanisation firmly in the public arena and on the national policy agenda. As yet, such concerns around urbanisation are not prominent in development agendas at either the national or local levels.

Underpinning this notion of collaboration between and across public, civic, and private interests are issues of rights and responsibilities that still remain poorly defined in Thailand. Despite longstanding commitments to principles of public participation in local development decision-making and environmental management, application of such principles is often still limited. In particular, the relative roles and responsibilities of citizens and the state remain murky; to the extent that it appears that we have reached a point of deadlock. Neither the state nor citizens are prepared to take on responsibilities that each regards as being in the domain of the other. There are also legal dimensions to this struggle as seen in current debates around solid waste management. Municipal administrations bemoan the lack of civic responsibility in managing solid waste, or willingness to pay for waste management services. From the public perspective this is further evidence of the weakness of the state in fulfilling its obligations to citizens. The private sector is often able to identify its own particular short-term solutions to waste management that can bypass existing legislation, with illegal dumping of waste widely reported across the country, but rarely addressed either in terms of policy and practice, or through the courts.

7.2 The effectiveness of governance – the land use plan

While urbanisation is driven by a range of different factors, the way that it manifests in the shape of cities in Thailand is influenced significantly by failures in urban governance. Similar patterns and problems exist across all of the study cities.

In each of the cities covered in these case studies, urban development has been led by an expansion of communications and transport into outlying areas, fuelling a cycle of speculative land investment. The identification of areas for urban expansion has been largely based on land prices and issues of proximity to existing transport infrastructure, and often access to major water bodies. This has generally occurred with very little consideration, if at all, of ecological factors or climate-related risks and vulnerabilities. A similar pattern has unfolded whereby roads and trains come first, followed closely by the provision of water and electricity which has been the main investment of local administrations.

The failure to protect green public space, or prevent negative environmental impacts, is widespread across all of the case studies, and is closely related to failures of urban policy and planning, especially around land use planning.

Hat Yai stands out as an example of urban expansion that has occurred in spite of flood risks. After the devastating floods of 2011, Hat Yai received significant financial support from the central government to protect the city from future floods. A study conducted by Kasetsart University advised that the main floodplain area should be designated a green area and protected as a floodway in land use planning. However, this has been one of the areas in the city that has been most vigorously targeted for expansion of residential areas and is now completely built-up. None of the planned floodway exists.

The case of Lad Krabang exemplifies both the pressures of urban expansion, and the failures of effective urban governance to manage these pressures effectively. Despite a long established tradition as an agricultural area with high rice production levels since the 1960s, Lad Krabang has been targeted for industrial development. Some of the first foreign-owned factories were established in Lad Krabang. Despite Lad Krabang's low elevation and the annual occurrence of floods (as represented by its local name of 'King Cobra Swamp'), the area was also identified as a site for the new international airport. Subsequent development of Lad Krabang has revealed numerous institutional, administrative challenges around land use planning and zoning, and the management of various environmental and social impacts.

The Lad Krabang case study documents in detail the critical lack of effective environmental monitoring around pollution from the various factories in the area, and the weakness of legal mechanisms for redress and remedy in specific cases of pollution. The power of both local administrations and local citizens to manage urbanisation and industrial development appears tightly constrained in the case of Lad Krabang.

Without provision of public transport, this creates a high dependence on individual, private transport, consisting largely of motorcycles and cars. Provision and use of private transport, in turn, leads to additional problems of congestion and pollution.

Land use planning around urbanising areas has been notoriously weak in Thailand. The foundations of land use planning based around zoning to concentrate urban development in certain areas while protecting agricultural land and green space around urban centres have been established in the formal policy and planning processes. However these have failed to adequately balance the urban development needs of different people and sectors with many well-documented cases around the country. The expansion of the industrial and residential areas in the lower Chao Praya basin went against earlier land use plans, and has been identified as contributory factors in the scale of impact of the 2011 floods. Similarly, expansion around Lad Krabang has created numerous conflicts between local residents, industrial parks and the airport. Indeed the decision to locate the main international airport in an agricultural area that provided drainage services for greater Bangkok was also highly controversial. Tensions around the main industrial and petrochemicals site in Map Tha Put, an industrial estate in Eastern Seaboard, Rayong, have led to civil law cases, and a record of industrial accidents and environmental pollution that the NESDB recognises will be difficult to deal with.

Underpinning these cases has been the inconsistencies of land use planning, the poor enforcement of land use plans, and the ease with which political and economic interests have bypassed formal planning processes. Public access to information around land use planning has been tightly constrained, with information being considered as economic capital, allowing certain groups to benefit from speculative land investments. The process of environmental impact assessment (EIA) has been weak, with limited monitoring of pollution, environmental and health impacts.

Moreover, institutional complexities, and limitations of the role and remit of sub-national administrative agencies, have acted as constraints against integrated urban planning. At the same time, there are clear incentives for local authorities to become increasingly urbanised and thus to be designated at a higher administrative level. The benefits relate largely to increased direct income that derives from greater allocations from central budget, and from taxation, and the secondary benefits that are seen to accrue from private investment.

The experience of these urbanising areas raises important questions around local administration's capacity, as well as budget availability amid increasing demands and pressures. There are also costs associated with becoming urbanised that are not always sufficiently compensated. Urbanisation requires provision of additional public services – ranging from health, education, and transport to solid waste management. Yet, qualitative research reveals that local governments do not feel the need to provide additional health services. Newcomers therefore use private health care providers. Local governments' ability to manage solid waste is already limited and unlikely to be able to cope with additional demands that will inevitably emerge from urbanisation, industrialisation, and population growth. As municipalities grow in population they struggle to provide adequate space for landfill sites, becoming obliged to rent land from smaller, nearby local administrations. This is essentially a process of transferring the problem of waste management to a lower tier of administration.. Additionally, such growth is most easily associated with an increase in the volume of traffic, requiring a whole range of additional road infrastructure, which again comes with its own costs and is largely beyond the provision capacity of local administrations to manage.

7.3 Justice and equity considerations

The central challenge in terms of rights is that there are no adequate systems for the regular monitoring of environmental standards. For example, in Lad Krabang, while there are suspicions that factories discharge pollutants into public water bodies, and sudden deaths of fish are regular occurrences, there is no independent mechanism to assess water quality, or to attribute these fish deaths to the actions of a particular industrial site. Currently, it is the responsibility of the factory operators themselves to monitor water quality. Without regular independent monitoring it is not possible to determine the impacts of pollution, or to begin any legal process to ensure environmental protection. As local people report, if complaints are raised, investigations are rare and even if they are pursued, the penalties are so low that they do not act as disincentives to pollute.

At the heart of this is an institutional conflict of interests in which the state in the form of either national government or local administrations fails to operate in its regulatory role, and the private sector has the responsibility for monitoring its own environmental performance and in applying standards. There is no effective monitoring of environmental conditions and quality, and no effective mechanisms for redress and remedy. This core challenge is exacerbated by the poor coordination between different local administrations. It is a case of **the polluter monitors, and never pays**.

From the perspective of poverty and vulnerability, the lack of effective planning, and in particular access rights and accountability, means that people's 'right to the city' has been constrained. People are not actively shaping urbanisation through their own interests and benefits. A majority of public land, which people have previously depended upon, is being targeted. A lot of the infrastructure also pushes people into certain ways of acting, thereby creating new sets of dependencies.

Policy level commitments to green cities, urban public space, and maintaining urban environmental quality (see the NESDB 11th Plan in Box 1 on page x), and to people's rights to participate in how their environment and development pathways are shaped, are not manifest in the implementation of urban planning and practice, whether in terms of land use planning, or in the accountability of large-scale investment by the state and private sector.

Concepts of the 'right to the city' are not only about income and consumption, or access to employment. The 'right to the city' is concerned with quality of life, meaning the quality and value of employment and the immediate natural and physical environment, as well as the right to shape the urban environment.

This is indicated in the high priority people place on concerns around social problems of indebtedness, drug abuse and crime, which are identified as higher priorities than concerns around climate-related shocks and crises.

Box 2: The 'right to the city'

The 'right to the city' broadens the traditional focus on improvement of people's quality of life based on housing and the neighbourhood, to encompass quality of life at the scale of the city and its rural surroundings, and is a mechanism of protection for the population that lives in cities or regions with rapid urbanisation processes. This implies initiating a new way of promotion, respect, defence and fulfilment of the civil, political, economic, social, cultural and environmental rights guaranteed in regional and international human rights instruments.

In the city and its rural surroundings, the correlation between rights and duties can be demanded in accordance with the different responsibilities and socio-economic conditions of its inhabitants, as a form of promotion of just distribution of the benefits and responsibilities resulting from the urbanisation process; fulfilment of the social functions of the city and of property; distribution of urban income; and democratisation of access to land and public services for all citizens, especially those with fewer economic resources and in situations of vulnerability.

World Charter on the Right to the City (International Alliance of Inhabitants 2005, p.1)

- Planning and management of the city
- Social production of habitat
- Equitable and sustainable urban development
- Right to public information
- Freedom and integrity
- Political participation
- Right to associate, gather, manifest, and to democratic use of urban public space
- Right to justice
- Right to public security and peaceful, multicultural coexistence
- Right to water and to access and supply of domestic and urban public services
- Right to public transportation and urban mobility
- Right to housing
- Right to work, and
- Right to a healthy and sustainable environment.

8 The way forward

8.1 Consequences and implications of current trajectories

There are well-established trends and trajectories of urbanisation in Thailand that have clear consequences. Addressing these consequences will be critical in ensuring an ecologically- viable and socially-just urban future that is also resilient to the uncertainties and risks of climate change.

A common feature of all the case studies is of rapid processes of change driven by many forces but in which **development is largely unplanned**, and in which core governance challenges are exposed. The most critical yet rudimentary element of urban development rests on effective land use planning and zoning. Yet, the experience of each of the cities attests to large failures in land use planning. Land use plans themselves are not based on a long-term strategic vision of urban development in the future. Land use plans do not adequately take on board ecological considerations around appropriate land use for specific conditions or constraints, or calculations of risks associated with natural or climate-related shocks and crises. Additionally the process of land use planning – when it does occur – is largely a technical process out of the public domain. Information on future land use planning has important political and economic value, being the basis for speculative land investment from those in-the-know, and thus can be tightly guarded. The implementation of land use plans is equally disappointing with widespread infringement of land use plans. Future plans are merely an attempt to catch up with on-the-ground realities rather than setting future planning directions.

Patterns of urbanisation are directly linked to changes in population and demographics. While the overall population increase in Thailand has been relatively stable for several decades, changes in the age composition of Thai society, as well as in the skillsets and costs and demands for labour, will have dramatic effects in the future. Thailand is now entering a period in which a higher proportion of the population will be 60 years and older. Thus, fewer people are able to work and contribute taxes to the national economy. The elderly are increasingly in need of a range of social services that are currently limited or poorly funded. Additionally, as the country becomes increasingly urbanised, there will be a greater need to consider urban environments, and access to services according to the needs and circumstances of this ageing population.

At the same time, Thailand is seeing a significant growth in the numbers of migrant labourers, which are currently estimated to be in the region of around three million people. Thailand continues to have a high demand for migrant labourers, while neighbouring countries have an even higher potential of supply. As the AEC opens up national borders and facilitates the movement of labour across the region, Thailand's labour market – particularly for lower skilled, manual work and employment in the services industry – will continue to attract migrants from across the region. This will also create challenges to ensure fair labour rights, and access to the core rights and services that other urban residents require. In many parts of Thailand, housing and access to the core social services of health and education for migrants are extremely limited.

Significantly, both older people and migrant workers are readily identified as groups who are among the most vulnerable to the impacts of climate change.

The patterns of urbanisation of the past have already set in place a degree of path dependency so that future options appear to be largely shaped by urban planning decisions, investments, and infrastructure already in place. Path dependency became apparent during the 2011 Chao Praya floods. The floods were in large part caused by the expansion of residential housing, industrial estates, and the international airport onto areas that were known to be flood-prone. The construction of key transport infrastructure across floodplains also exacerbated the problem. Such patterns of urbanisation placed critical economic assets at risk and forced a flood response based around diverting floodwaters against the natural hydrology. After having put so much economically important infrastructure in hazardous space, the main response of the government after the flood was to create more infrastructure to protect the existing infrastructure – even while recognising further risks of infrastructure failure in the future.

This degree of path dependency is also evident in the way in which cities across Thailand have addressed issues of mobility. Transport systems, along with shelter, are essential public assets for urban areas. Mobility determines people's ability to earn a living and to access the various services and benefits of urban life. Across Thailand, and particularly in the growing secondary cities, public transport is extremely limited and ineffective. Urban areas in Thailand have grown up on a staggering degree of private transport dependency, with traffic congestion (and associated problems of pollution) documented across the country. However, with no effective public transport system in place, the universal policy response to such traffic congestion is to expand the road system, a process that seems to have no end. Each of the cities in the case studies has a ring road in place, designed to ease congestion. However, each of the cities has already or is at the point of building additional ring roads. The effect of such investment has increased rather than reduced the volume of traffic. The initial dependency on private transport creates an ongoing dependency on private transport-based investments.

However that is not to say that such dependencies cannot be broken. There are many examples of large cities that have been able to develop mass transit systems, such as Taipei, Seoul and Curitaba. In these cases, mobility has been addressed alongside land use, with an effort directed to controlling urban sprawl as well as providing access to transport. There are also issues of equity and access. While the Bangkok mass transit system of sky trains and the underground has reduced traffic congestion in some parts of the city, it is a system that is largely unaffordable to the majority of people in the city.

Many urbanising areas appear to be reaching the **limitations of local ecological constraints** and planetary boundaries that will further impede their development. These constraints are most clearly evident in the cases of water shortages to meet the growing demands from various sectors, including urban domestic use, agriculture and industry, as well as in the growing problems around pollution and waste management that affect the urban area itself, and surrounding areas.

These demographic changes compounded by ecological constraints and future climate vulnerabilities present some of the most striking challenges for Thai cities of the future in the provision of critical services. Much of the urban infrastructure is incomplete and inadequate for fulfilling its function. For example, in Bangkok only 40 per cent of wastewater is treated, and in Chiang Mai only 40 per cent of households have access to piped water (Thiengburanathum *et al.* 2015. Solid waste management has become a critical issue across the country. Increases in the volume of solid waste and the limited availability of suitable sites for landfill are creating environmental problems and additional social tensions. While many local authorities are keen to embrace the economic benefits associated with urbanisation, few are positioned to provide the additional social services that will be required. Additionally, such services will be further undermined by potential shocks and crises arising from climate change.

Most importantly, as mentioned, the ways in which urbanisation occurs in Thailand contributes to global environmental change and climate change through increased emissions and land use changes; and also creates additional vulnerabilities by expanding into hazardous space and altering ecological landscapes.

Urban expansion – both in the spaces that are targeted and in the way in which urbanisation occurs – has not been guided by environmental risks of climate change. The core challenges of climate change that are already emerging are related to changing precipitation patterns and consequences for water balance and availability, intensifying the risks of flood and drought.

Lack of strategic vision of an urban future for Thailand

It is striking that despite over three decades of rapid urbanisation, there is still no clear strategic vision of an urban future, either at the national or local level. It is a process that appears to be unfolding according to its own momentum. Yet, there are numerous possible visions and scenarios of an urban future, and similarly a wide range of choices that can be made.

8.2 Realising urban visions of the future – specific options; a new way of governing urbanisation in the future

In many ways, the challenges discussed in this paper are familiar and well-documented, if not necessarily from the perspective of our understanding of urbanisation. Problems of urban sprawl, traffic congestion, poor air quality and waste management are widely reported. However, it is rare for these challenges to be presented within the context of seeing urbanisation as an unfolding process.

Despite the many problems associated with current patterns of urbanisation, many of the planning and management tools and basic legal frameworks that are required for sound urban development do exist. The basic requirements of land use planning, zoning and EIA, as well as the application of planning principles such as Floor Space Ratio, have been applied in Bangkok, but these have yet to be put in place strategically and effectively.

Of course, as is widely noted, the greatest challenge lies in the application and implementation of these tools. This becomes all the more urgent with the rapid pace of change and growth of urban areas, and the growing threats of climate change.

From the experience of the case studies presented in this report, urban areas are already approaching critical thresholds. Service providers in urban areas are struggling to provide adequate services to urban citizens, including the growing number of non-registered migrants (both domestic and overseas). Service providers are challenged with meeting water needs, managing waste adequately, and addressing mobility issues. Each of the city case studies has already experienced climate-related events that have pushed critical urban infrastructure, particularly around drainage, beyond design capacities.

From the perspective of this research, the current trajectory presents two main possible outcomes:

Urbanisation will continue in the current direction to the point that cities reach a gradual point of crisis, where there are increasingly unliveable, or ultimately towards potentially collapse.

Urbanisation will continue to the point of a major systemic failure, and potentially catastrophic event.

Neither of these outcomes provides much reason for optimism. Yet in stating this, there are also many opportunities for halting the present trajectory, and redirecting urbanisation towards a brighter future with help with a clear vision founded on principles of equity and social justice, environmental sustainability, and climate change resilience. We strongly believe that this is achievable, but requires immediate action.

Such action should consider four key areas:

1. Building public awareness and participation

It is striking that the general public awareness around urbanisation remains limited, and the topic rarely appears in the media or on the public policy agenda. In each of the secondary cities, there is a sense among citizens and local government of wanting to avoid an urban future that would be similar to the development history of Bangkok. Even so, in each of the cities, the patterns of urbanisation appear to be remarkably similar.

Despite these trends and trajectories in each of the cities, there is remarkably little public demand for alternative urban futures; issues of public green space or access to public transport have not yet appeared on the political agenda in any of the cities. It seems that there is not yet the basis of alternatives that could allow for a public process of shared visioning in the cities.

2. Addressing land use planning

Despite the lack of general understanding around urbanisation itself, there is growing awareness and debate around land use planning and the history of failures. This came to the fore in the widespread floods of 2011. However land use planning has been highly ineffective in shaping patterns of urbanisation. In each of the cities, and in Bangkok itself, the ability of vested political and commercial interests to shape such plans – and the overall inability to follow plans on the ground, is widely acknowledged.

3. Mobility

The design of cities has been shaped around private modes of transport. With public transport in most urban centres virtually non-existent, there is a high degree of dependence on private transport in order to make employment and access to basic social services viable. This has created a high degree of path dependency. As roads become more congested, the only policy solution offered is the construction of more roads. Unless this degree of dependency is broken, efforts towards building more compact cities with access to viable public space will be undermined.

There are some success stories, but even these must be presented with caveats. For example, the Bangkok Mass Transit System, also called the BTS Skytrain, as well as the Metropolitan Rapid Transit [MRT] subway in Bangkok have been widely welcomed. Both mass transit systems have made an enormous contribution to reducing congestion along main transport routes in and around the city. However, these transport systems also represent dualistic systems. For instance, ticket fares are simply beyond the financial means of a large number of Bangkok citizens and residents. The more accessible forms of public transport are buses. The Bangkok Metropolitan Authority has had some success in introducing free or heavily subsidised bus routes.

When planning future mobility within and around cities, it is essential to ensure that transport systems are equitable and accessible for a wide range of people of different economic status.

4. Housing and shelter

Access to affordable, quality housing – including access to public housing - is also a basic right of urban citizens. The design of housing helps establish the social and cultural quality of a city. Additionally, flood resilience can be supported by the adoption of contemporary technologies for energy efficiency and housing.

It is in this area that there is enormous potential to draw on the rich architectural and cultural history of Thailand in the way that traditional housing was designed around the use of available and affordable materials, with design to take advantage of air flow and shade, while also providing protection from seasonal flooding. The combination of traditional architectural principles with contemporary technologies is rarely considered in Thailand.

5. Public space

Each of the cities is characterised by a remarkably low level of public space. Where there is public space it is not always easily accessible - largely due to issues of mobility and land use planning discussed above – and fails to function in terms of recreation or providing social and cultural activities. The space that brings people together is largely commercial, either in the form of open-air markets, or increasingly, shopping malls. Such spaces are designed for consumers rather than citizens.

There is an important connection between public space and the sense of community. Access to public space provides the arena for people to come together, and create a sense of shared identity and interest. Given the mixed nature of neighbourhoods, with growing numbers of migrant workers from neighbouring countries, public space can play an important role in turning neighbourhoods into communities. Concerns for the sense of community, and anxieties over social problems such as drug abuse, were high priorities in people's assessments of wellbeing and vulnerability, but as yet are not reflected in the physical layout of Thai cities.

In making these recommendations, it is clear that the potential for addressing deep structural problems in the larger cities – particularly Bangkok and to some degree Chiang Mai – is perhaps limited. The greatest opportunities for addressing urbanisation issues lies in secondary cities. But it is also through these cities that much of the pressure on Bangkok itself could be eased. The high economic dependency on Bangkok as an archetypal primary city could be reduced.

9 Conclusion

The starting point for this current study, and for the network of academic partners involved, was to move away from looking at urbanisation solely through location, or through density of population and buildings. While this narrow understanding urbanisation has shaped the definition of 'urban' administrative boundaries in Thailand, as in many other countries, we find that it is increasingly inadequate in capturing the complexity of the urbanisation process. The limited perspective using location, population, and buildings also makes it difficult to frame responses – whether in terms of policy or local action – for dealing with the myriad of challenges that urbanisation poses.

Much of the planning, regulatory structures, and technical approaches for urban development are in place, but application and implementation remains lacking. A change in mindset among key actors is required.

The additional element that gives greater urgency to these longstanding challenges of urbanisation in Thailand comes from climate change. So far issues of climate change are not considered in urban planning. Much of the demand for the necessary changes to urban planning and management will need to come from a more informed and more engaged citizenry, and from a private sector that can recognise the benefits and opportunities that might emerge from addressing climate change.

From a research perspective, the case studies summarised in this report also reveal some of the conceptual and methodological challenges of addressing urban climate change impacts in Thailand. The focus of each of the case studies has been on urbanising – or recently urbanised – parts of the country. The case studies have not engaged directly with established urban groups. Increasingly such groups are diverse, with a growing number of migrants now working and living, and making invaluable contributions to the growth of urban areas in Thailand. Many of the research methods that have been applied in these studies have a grounding in more rural-oriented approaches; these do not always fit the needs of urban studies. Building the capacity of a new generation of academics and researchers to address challenges of urbanisation and climate change will be an essential element towards putting these issues on the public policy agenda.

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