The Multi-level Perspective and the Scope for Sustainable Land use Planning in Chiang Mai City

Somporn Sangawongse[1]*, Frans Sengers[2] and Rob Raven[2]
[1] *Department of Geography, Faculty of Social Sciences, Chiang Mai University, Chiang Mai 50200 Thailand*
[2] *School of Innovation Sciences, Einhoven University of Technology, P.O. Box 513, 5600 MB, Eindhoven, The Netherlands*

Abstract

This paper examines stability and change in land use and urban planning in Chiang Mai province, northern Thailand. Inappropriate land use zoning, lack of enforcement of city planning, lack of public transportation and many unresolved problems (e.g. frequent floods, traffic congestion) are indicative of how current land use / urban planning practices have failed to lead to sustainable and desirable directions for urban development in Chiang Mai. In response, a heterogeneous coalition of actors representing various elements of strong and vibrant civil society groups have rallied around a series of issues and voice their desire for change. This has contributed to the construction of a protected space (niche) for thinking about alternative (more participatory) ways of planning with considerable momentum. This collective action has not been in vain and some of their ideas have been incorporated in the modified land use planning. In order to analyze these processes and to 'contextualize' the situation and ongoing land use issues in Chiang Mai, this paper uses a framework called the 'Multi-level Perspective' (MLP). This perspective is relatively new for the field of urban planning, but it proved to be useful for investigating stability and change in Chiang Mai city and it might be a promising framework for analyzing (sustainable) developments in urban planning and land use for other rapidly developing cities.

Key words: Land use changes/ Land use zoning/ Urban planning/ Regimes/ Multi-level perspective

1. Introduction

This paper examines stability and change for land use and urban planning in Chiang Mai province (northern Thailand). 'Stability' can be defined as the ways of thinking, the routines and the unwritten rules that structure current land use- and urban planning practices in Chiang Mai. 'Change' points to land use change and the efforts of specific actors to secure a foothold for (more sustainable) alternative approaches to land use and urban planning.

The area of study lies approximately between latitudes 18° 40' N to 18° 55' N and between longitudes 98° 50' E and 99° 05' E in the Ping River basin. It covers the Chiang Mai Comprehensive Plan (CMCP) area, which was designated by the Department of Public Works and Town & Country Planning (DPWCP), as shown in Figure 1 below.

*Corresponding author:
E-mail: somporn.s@cmu.ac.th,
Tel. +665 389 8548 ext. 933, +665 322 2763

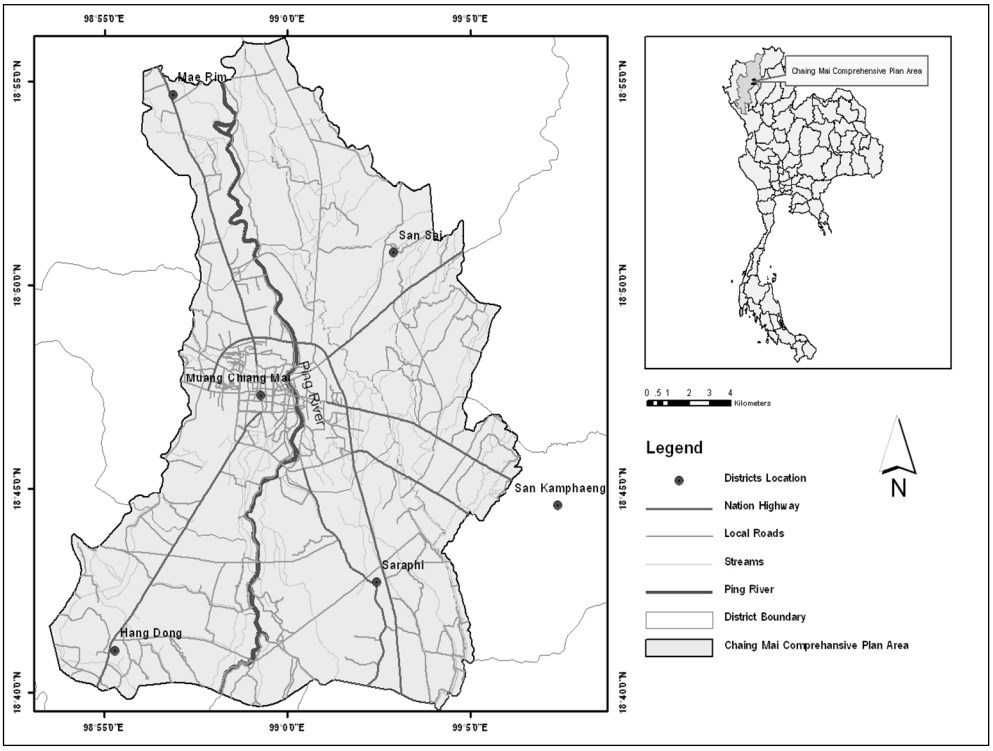

Figure 1 Location map of the comprehensive plan area in Chiang Mai Province

The total CMCP area (3rd revision) is about 430 square kilometers, which encompasses 7 districts and 49 sub-districts of Chiang Mai Province. The first plan was initiated in 1965 and projected to 20 years ahead, but it has no legal status (Apavatjrut, 2007). The second plan was enforced lawfully and remained valid for 5 years (1984-1989). Between 1989 and 2006, DPWCP has revised CMCPs 3 times. The 1st revision of CMCP was enforced law fully and remained valid for 5 years from 1989 to 1994 and, for the 2nd revision, was extended to 1995.

CMCP consists of two sub-plans: landuse plan and transportation plan. The transportation plan proposed to construct two new ring roads (middle and outer ring roads) in order to ease traffic flows between towns, which may direct ongoing urban sprawl into the agricultural land.

Many problems related to urban expansion stubbornly persist because of the lack of consideration for three important elements: historical contexts appreciation, geographical comprehension and local participation. Furthermore, the 3rd revision started in 2006 and it is expected to be completed by 2012 (updating this plan is a time consuming process that involves many steps, so approval is still pending).

Planning for land use and transport is intimately related. Transport and access are crucial since Chiang Mai was designed as a regional economic centre and a transportation hub linking various countries in the Greater Mekong sub-region (GMS) and to establish links with South Asia (National Economic and Social Development Board, 2012). The city plan did not designate appropriate land use zoning and this has led to the improper use of land. For example, human settlement in the flood-risk zone is the cause of frequent flooding problems. The continuing expansion of Chiang Mai city is influenced by new spreading centers and road construction (Sangawongse, 2006), which has led to urban sprawl at the urban-rural fringe. This kind of growth has accelerated land use conversion, especially from agricultural plots into residential area

(previous studies have indeed revealed that agricultural fields around Chiang Mai city were converted into real-estate (Sangawongse, et al., 2011)

National policy plays an important role in the urbanization of Chiang Mai (for 'spatial urbanization' regarding changes in land use towards dense residential and commercial districts, but also for 'social urbanization' regarding population growth and increased population density as the result of policies at various levels of government (Prakasvuthisarn, 2009). For example, in the 5th National and Social Economic Development Plan, Chiang Mai was promoted as the regional economic center and education hub in northern Thailand. As a result, many business centers and a network of roads were developed and led to extensive urban development. Land use- and transportation plans directed urban expansion into fertile land areas suitable for rice growing. As a consequence from inappropriate and ineffective land use planning policies and practices, Chiang Mai city has experienced severe floods, traffic congestion, and air and water pollution.

This paper first elaborates on the details and dynamics of land use changes and land use zoning in the CMCP area (section 2). In section 3, we broaden the scope of our analysis and 'contextualize' the situation and ongoing land use issues in Chiang Mai by means of the Multi-level Perspective (for the purposes of this case study and the field of urban planning). This perspective essentially comprises a novel way to look at stability and change. The paper ends with a brief conclusion and points for discussion (section 4).

2. Stability and change in land use and urban planning in Chiang Mai City

2.1 Land Use Change Analysis

Two approaches were applied for obtaining land use types and land use change information in the CMCP area. The first approach is to classify the multi-temporal satellite data into major land use types and to conduct the change detection analysis. The second approach is to model urban growth and land use change using the SLEUTH model (Clarke, Hoppen and Gaydos1997). The LANDSAT-5 Thematic Mapper (TM) data at 30m resolution, acquired in 1989, 2000, 2006, and 2009 were analyzed for obtaining7 major land use types (urban, paddy field, orchard, forest, water, bareland and other). Then, the change detection analysis was performed for obtaining areas of change from different land use types. It was found that major change in the CMCP area was from paddy field to urban/built-up areas (Sangawongse et al. 2011). The findings correspond well with the land use classification conducted by other agencies such as the Department of Town and Country Planning, Ministry of the Interior,1982).Future land use changes in the CMCP area was forecasted in 5 year intervals spanning between 2010-2030 (Sangawongse et al., 2011) as shown in Table1 and Fig.2. These studies predict that proportion of urbanized areas could increase from 38 % in 2010 to about 80 % in 2030 and a decrease in the proportion of paddy fields proportion from 17 % in 2010 to 6.65 % in 2030.

Table 1 Proportion of future land use changes in the CMCP area

Land Use	2010	2015	2020	2025	2030
Urban	38.37	48.23	60.03	71.15	79.93
Paddy field	16.96	15.59	12.58	9.41	6.65
Orchard	24.05	20.41	16.44	11.99	8.20
Forest	7.95	6.17	4.32	2.96	2.06
Water	3.81	3.16	2.50	1.92	1.48
Other	8.67	6.32	4.08	2.55	1.67
Bare Land	0.21	0.12	0.06	0.03	0.01

Table 1 shows a significant increase in the proportion of urban area and a significant decrease in the proportion of paddy fields in Chiang Mai. If the proportion of urban area could reach as high as 80 % in 2030, most area could have been filled up with settlements and a mere 20% would be left for other uses. These predicted land use changes are expected to have a tremendous social and ecological impact on Chiang Mai city and its surroundings. Fig. 2 shows the future urban development in Chiang Mai comprehensive plan area in 2009, 2015 and 2030, accordingly.

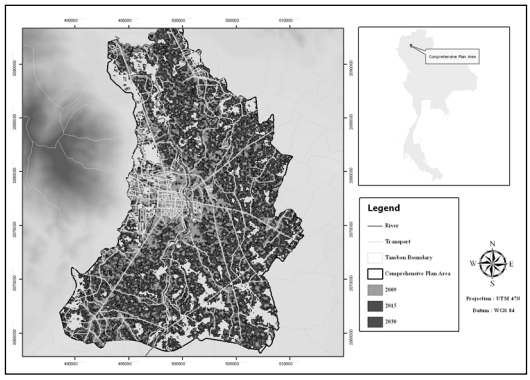

Figure 2 Prediction map of urban development in CMCP area in 2009, 2015 and 2030

2.2 Land Use Zoning

Land use zoning in Thailand is enforced by the Department of Public Works and Town & Country Planning through regulations, policies and guidelines for managing land use and transportation systems. According to the 3rd revision of CMCP, land use was classified into 11 types and can be organized into two main zones: (1) development zone and (2) conservation zone (Arkorn Buaklai: DPWCP Chiang Mai Provincial Office, personal communication, May 2012). The development zone consists of 5 land use types, for example, low-density residential area as yellow, medium-density residential area as orange, commercial area and high-density residential area as red, and industrial area as purple. The conservation zone consists of 6 land use types, such as rural and agricultural land as green, open land for recreation, environmental protection as light green and religion institution as light grey.

It has been acknowledged that land use zoning designated by DPWCP does not fit well with the physical and cultural conditions of Chiang Mai city as indicated by the improper land use zoning (Apavatjrut, 2007). For example, the road expansion project designed only for increasing road surface, without controlling the area alongside of the roads has led to (and will inevitably lead to more) urban sprawl associated with this co-called 'ribbon development'. During 2008-2009, residents in Wat Ket and Fah Ham areas have protested against land use zoning and road expansion/construction projects. Social surveys in the Wat Ket area, using questionnaires and in-depth-interviews, revealed that 80 % of the residents prefer the traditional life style and wish to conserve arts and architecture as part of their community and as a "Historic Site" for cultural tourism (Apavatjrut, 2006). This is the main reason why local groups in Chiang Mai (most notably communities in the Wat Ket and Fah Ham areas) have objected to land use zoning and road expansion projects.

3. The Multi-level Perspective (MLP)

The goal of this section is to broaden the scope of our analysis and to 'contextualize' the situation and ongoing land use issues in Chiang Mai. A potentially fruitful way to look at current urban planning and land-use practices in Chiang Mai or other cities and the scope for changes in a more sustainable direction is provided by the framework introduced here: the Multi-level Perspective - MLP (Geels, 2002). This perspective is often employed in the academic field of Transition Studies to investigate socio-technical transitions to sustainability in a variety of domains / societal functions. Using the MLP means that the processes of sociotechnical change are conceptualized in the light of interactions between three levels i.e. regimes, niches and landscape.

A 'regime' refers to the rules and institutions (both formal and informal) that structure the practices in a given domain, such as guiding principles, problem-solving routines, cultural meanings and formal standards and regulations, all of them embedded in networks of actors and in technologies and infrastructures. In short, regimes are the 'grammar' of a socio-technical domain such as urban transport.

A 'niche' can be conceptualized as a protected space where experimentation with novelties / alternative sociotechnical configurations is possible. Given time (perhaps decades) these alternative configurations can eventually transform or even substitute incumbent regimes (different transition pathways are possible (Geels and Schot, 2007).

The 'landscape' can be viewed as the backdrop against which niches and regimes battle for dominance. This level constitutes exogenous events and is usually framed in terms of (long term) developments/trends putting 'pressure' on a regime, which in turn provide 'windows of opportunity' for niches.

Now that the basic elements of the MLP have been defined, we can turn to what the interactions between the regime-niche- and landscape levels mean for the conceptualization of transport and urban planning in developing cities in general (section 3.1) and for Chiang Mai city in particular (section 3.2).

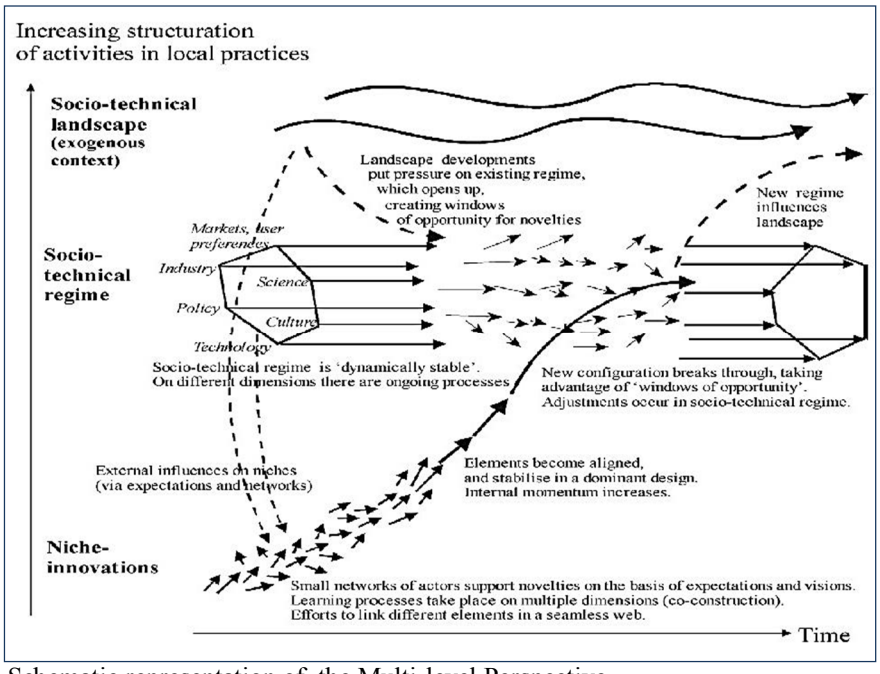

Figure 3 Schematic representation of the Multi-level Perspective
(Source: adapted from Geels, 2002)

3.1 The MLP and urban planning in developing cities

An urban environment is a 'hub' in many ways: all kinds of systems and flows converge in the confined geographical space we call the city. In a city, a number of different regimes could be said to fulfill the necessary societal functions (e.g. an electricity regime, a waste-disposal regime, a housing regime, a transport regime etc). These domains (and consequently, the regimes that dominate them) sustain urban life and keep the city's material metabolism going. These different urban regimes and their past and present interactions result in the present day urban form. A way to conceive of a land use / urban planning regime is that it is in a sense an 'overarching' urban regime spanning across the functional space of a collection of other regimes (like a waste-disposal regime, a housing regime, a transport regime, an agricultural regime at the urban fringe etc) with the goal to spatially integrate and regulate the interactions (and material flows generated) for these various regimes in order to sustain urban life and to achieve a desirable outcome regarding future urban form.

In many developing cities urban planning regimes can be characterized by relying on the ideals of modernist planning (shaped by the global diffusion of 19th century Western-European 'master planning'). At the very least it is questionable how appropriate / compatible this way of planning still is with fast growing and often sprawling present day developing cities when the reality on the ground bears little resemblance to illusions of top-down control in the plans on paper. When there is a certain degree of (landscape) pressure to deal with current and future urban problems related to climate change, dependence on fossil fuels, food security, degradation, marginalization of some, etc. In the face of these contemporary issues, modernist planning approaches can be seen as 'solutions for old problems', and there is a need to fundamentally rethink urban planning regimes in rapidly developing cities. At the niche level (in various places around the world) some novel approaches to urban planning have emerged to engage with projected urban form in a different way, both in terms of planning procedures as well as in terms of substance. UN-HABITAT (2009) identifies a number of these, for example new forms of procedural planning aimed at producing new urban forms (like compact cities), strategic spatial planning for selected areas, participatory processes and partnerships at the neighborhood level (like community action planning), etc. In terms of substance, cities around the world are experimenting with integrating sustainable technologies in urban planning, such as distributed renewable energies, small-scale, distributed water systems, and new public-private transport combinations and cleaner transport technologies.

Despite some similarities between land use /urban planning regimes in different developing cities (like the reliance on the assumptions of partly outdated ideas of modernist planning), developing cities as such do not constitute a single meaningful category. There are indeed many differences between developing contexts in terms of the composition of urban planning / land use regimes. Compared to other Asian cities, Thai cities perform relatively poorly on planning and are essentially self-organizing systems rather than planned ones (partly because of a mismatch between various local, provincial and national governance levels (Vorratnchaiphan and Villeneuve, 2006). Substantial existing problems are related to extensive suburbanization, urban sprawls and the lack of decent public transport. For Thailand, one pronounced case of misplanning

(Rujopakarn, 2003) and the relationship with unsustainable transport is Bangkok city spilling into adjacent provinces. This first led to ribbon development and more recently to spread out settlement patterns and suburbanization characterized by the so-called the 'donut-effect' (Burapatana and Ross, 2011). Historically, Bangkok has never had any real plan to guide its direction and long since there has been a tendency focus only on road building. Plans in the 1970's prescribed a mixed strategy of investing expressways and mass transit, but only the expressways would then be built and public transport neglected. Some problems in Chiang Mai city are similar, yet the case of Chiang Mai is also different in many respects and should be contextualized (by means of the Mullti-level Perspective) in its own right.

3.2 The MLP and urban planning in Chiang Mai

By applying the MLP framework to the situation in Chiang Mai, each of the three MLP levels can be explained as the following:

Landscape: Processes of decentralization have taken shape, but the fact remains that governance in Thailand is still highly centrally organized. From the late 1970's on, plans started to emphasize channeling growth away from Bangkok to regional centers (like Chiang Mai) in order to counter the sharp economic disparity between Bangkok and the rest of Thailand. In many ways this strategy (initially) failed (and the disparity kept growing). Apart from the national push for regional economic centers, there are other profound landscape factors at play. Many of these factors are similar to other medium sized cities in Asia, most notably rapid urbanization and expansion of settlements to the urban fringe at the cost of prime agricultural land. It is against the backdrop of these landscape developments that current dominant ideas behind planning for Chiang Mai should be analyzed.

Regime: The guiding principles of the land use / urban planning regime in Chiang Mai are similar to other developing cities (e.g. reliance on outdated inappropriate ideas of modernist planning - see section 3.1). Notably, technocrats from DPWCP used urban planning theories from the western countries not well suited to the social, economic, cultural and political reality of Chiang Mai. A number of regime actors have made their mark on the Chiang Mai Comprehensive Plan. The following can be identified: Central government (DPWCP), National Economic and Social Development Board-NESDB, Local government (e.g. Chiang Mai municipality, Tambon Administration Organization-TAO). Some of these actors have different underlying assumptions and interests (a regime is not necessarily a fully harmonious configuration; in many ways influential stakeholders have different - sometimes conflicting - interests and ideas). In Chiang Mai the top-down imposition of the idea for making Chiang Mai a regional economic hub may have amplified many of the shortcomings and pronounced problems associated with inappropriate modernist planning and the current land use / urban planning regime.

Niche: In response to the land use zoning and the expansion of roads in CMCP, many social groups in Chiang Mai city have opposed initial plans (shaped by regime actors). These groups have been set up on a voluntarily basis for coordinating with local government, NGOs and other parties on social and environmental issues in Chiang Mai city. One of the active groups called "Rak Baan Rak Muang" was formed by volunteer villagers from Wat Ket, Nimmanhemin, and Soi Wat Umong areas. This group consists of volunteers from different occupations/organizations (e.g. technocrats, urban development

institute foundation). They have negotiated and taken part with DPWCP regional office in Chiang Mai for solving land use zoning problem using many strategies. By the end of 2006, this group organized two workshops in Wat Ket area to raise public awareness which emphasized on basic human rights and responsibilities in order to expand the villager's vision on community mind an how to legally deal with DPWCP officers. Between December 2008 and March 2009, many formal meetings were organized between the group and the DPWCP committees. Available public medias, including posting of group activities on the internet, posting banners and signs on houses and public premises around Wat Ket area were used as means of collaborating with the central government. According to the DPWCP committee meeting in Pethaburi province in December 2010, land use zoning in Wat Ket area was corrected and approved. As shown in Figure 4, the Wat Ket-Fah Ham area in the north east of the city accounts for about 2.4 square kilometers has been changed from red color into yellow with white diagonal lines, for conservation and residential uses. The height of buildings should not exceed 12 meters. For Nimmanhemin and Wat Umong areas, no change in color has been made, but only some agreements on zoning as a medium density residential area (Surapon Sarttatat: DPWCP Chiang Mai Provincial Office, personal communication, March 2012).

Figure 4 Land use zoning after the modification

In summary, a heterogeneous coalition of actors, representing various elements of strong and vibrant civil society groups, have rallied around a series of issues. This has contributed to the construction of protected space for thinking about alternative (more participatory) ways of planning with considerable momentum. This collective action has not been in vain and some of their ideas have been incorporated in the modified land use planning. However,

only time can tell to what extent this kind of collective action can bring about more fundamental change in the regimes of land use and urban planning and to what extent participatory planning can become the norm rather than the exception in Chiang Mai**.**

4. Conclusion and Discussion

Inappropriate land use zoning, lack of enforcement of city planning, lack of public transportation and many unresolved problems (e.g. frequent floods, traffic congestion) are indicative of how DPWCP's efforts failed to lead to sustainable and desirable directions for urban development in Chiang Mai. Collective action by civil society groups to achieve change has not been in vain: land use zoning was adjusted and a new land use category for the the Wat Ket area took shape on the map). However, it remains to be seen to what extent these local groups will have a more profound effect on more fundamental changes regarding're-thinking' of current land use/ urban planning regimes. This re-thinking is necessary, since current urban planning land use regimes (in Chiang Mai and in many other rapidly developing cities) rely on outdated and inappropriate planning ideals and change in sustainable direction will be very difficult or impossible within the bounds of this way of thinking.

Satellite data can be best applied for analyzing and mapping land use changes in Chiang Mai, because this kind of data can be obtained on a regular basis at the minimal cost. Historical land use data are useful for explaining previous land use changes. They can be used for making a comparison with the current land use data for a change detection analysis. The prediction result obtaining from the SLEUTH model shows the increase of urban development in the Chiang Mai area over time.

Using the MLP proved to be useful to contextualize this case, but it could also be useful for other cases for rapidly developing cities with different challenges concerning urban development and land use planning. A promising strategy for analyzing and improving urban planning in Chiang Mai (or other rapidly developing cities) might be to take a broader outlook to and to participate in transnational city networks to learn for planners in cities facing similar problems.

Besides, learning from cities abroad, there are other interesting cases of community action and participatory urban planning within Thailand's borders. Further research could compare urban planning in Chiang Mai and the activities of Rak Ban Rak Muang with previous community action in the Ban Krua community in Bangkok (see Townsend, 2003) and, more recently, with best practices in participatory urban planning in Khon Kaen (DELGOSEA, 2011).

The use of the MLP and other concepts from the field of Transition Studies could be promising for the academic field of urban planning, especially for setting up new research agendas and calling to the fore *new* research questions. Future use of the MLP for fields of enquiry related to urban planning could also highlight technological developments and other trends in adjacent urban regimes. Developments in transport, housing, waste disposal and other regimes can have profound effects on urban life and on the way planners envision and plan for future cities.

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