

• *Megacity – Vulnerability – Living conditions – Urban village*

Rainer Wehrhahn, Anna Lena Bercht (Kiel), Christian L. Krause, Rafiq Azzam, Florian Kluge, Ramona Strohschön, Katharina Wiethoff and Klaus Baier (Aachen)

Urban Restructuring and Social and Water-Related Vulnerability in Megacities – the Example of the Urban Village of Xincún, Guangzhou (China)

Urbaner Strukturwandel und soziale und wasserbezogene Vulnerabilität in Megastädten – das Beispiel des Urban Village Xincún, Guangzhou (China)

With 5 Figures and 5 Photos

Economic and demographic growth and restructuring processes have led to severe social and ecological problems in Chinese megacities. Using the vulnerability approach as analytical framework, the study presented here investigates formal and informal processes which determine the ecological as well as the social vulnerability in an urban village in the expanding city of Guangzhou. The main questions are: In what way and why do living conditions of different population groups change? What are the central institutional factors for these changes? And which agency strategies exist for households of different origin and socioeconomic background to cope with the rapidly changing socioeconomic and natural environment?

1. Introduction

Chinese megacities and even smaller metropolises have experienced extremely rapid changes in recent years. Transforming economic, demographic and social structures as well as structural changes of the built environment and the urban ecology have been observed. Megaurban areas like the Pearl River Delta (PRD) in Southeast China have

increased their economic power and number of inhabitants substantially within a short period of time, cities like Shenzhen or Dongguan have quickly grown from being small cities to megacities with more than five million people and modern high-tech industries that are highly interlinked with the world market (Lu and Wei 2007; Wu et al. 2007). These dynamic growth processes transform urban economies, population struc-

tures and urban morphology with more and more people living in high rise buildings instead of traditional Chinese town houses (Wu and He 2005). Urban villages as distinct urban units in Chinese cities with specific legal regulations are among the areas that have been transformed most rapidly in the last two decades (Li 2002, Yan and Wei 2004). The dynamic urbanisation processes cause severe transformations of the quality of life within these cities. Settlement structures and housing forms are changing, people are living in different environments and open space structures, neighbourhoods and city quarters change their functions, and ecological parameters like water and air quality are worsening. The redevelopment of urban space in Guangzhou and the changing socioeconomic parameters at different spatial levels have been researched by various scholars from different angles, see for instance Wu and Yeh (1999), Wu (1998), Li et al. (2005), Xu and Yeh (2005) and Shen et al. (2006).

The main focus of this paper is to analyse these changing living conditions on a micro-level with respect to the social and ecological vulnerability of the population concerned. The vulnerability concept offers an analytical framework for interdisciplinary research of socio-ecological processes in given areas such as a megacity or a city quarter (Turner et al. 2003; for details see next section). Taking the urban village of Xincún as an example and starting at the micro-level of households and neighbourhoods, we differentiate between different population groups, especially between urban villagers and migrants. These two groups seem to be differently affected by transformation processes and, as a consequence, to use very different coping strategies in order to reduce vulnerability and raise resilience. The effectiveness of stress and risks depends not only on the individual coping capacity of people but also on the social, economic, political and environmental contexts at different spatial levels that define the framework for the agency options people employ. Our research takes into account both

perspectives: agencies and agency options at the individual level as well as structural conditions.

2. Analytical Concept and Methods

Various academic disciplines have used concepts of vulnerability to analyse risks. Hazard research has used 'vulnerability' since the 1970s (Blaikie et al. 1994; Turner et al. 2003; see below). Hydrogeology, for example, has since the end of the 1960s researched vulnerability of groundwater to contamination on the basis of Albinet and Margat. They define aquifer vulnerability as "the possibility of percolation and diffusion of contaminants from the ground surface into natural water-table reservoirs under natural conditions" (Albinet and Margat 1970, cited by Vrba and Zaporozec 1994). The contaminant load of groundwater is mainly influenced by the length of the period of time the water takes to pass through the overlying strata. "Vulnerability assessment of groundwater is not a characteristic that can be directly measured in the field", but rather the idea that some "land areas are more vulnerable to groundwater contamination than others" (Putra 2007; Vrba and Zaporozec 1994; see also Gogu and Dassargues 2000).

Furthermore, social and health scientists work with concepts of risk, vulnerability and resilience (cf. Chambers 1989, Beck 1986 and 2007, Obrist 2006). In order to integrate these concepts for sustainable (megacity) research (cf. IGBP 2002, Ehlers 2006) and to combine the approaches of natural and social sciences, Turner et al. (2003: 8076-8077; adapted by Bohle and Glade 2008: 111) proposed a framework for the research of exposure, sensitivity and resilience in the context of vulnerability at different scales that we refer to in our study.

Basically, the research of vulnerability encompasses complex structures and processes thus bringing numerous variables into consideration. On closer inspection, assumedly uncomplicated

systems turn out to be multifaceted and very complex rendering the empirical analysis of all variables impossible (Bohle und Glade 2008: 110). For example, the household of a family – functioning as a social system itself – is involved in superordinate social networks which are, like the household on the subordinate level, influenced by various impacts of (changing) external structures and processes. Obviously, this multifarious system is too complex to allow a detailed analysis covering all issues related to risk and vulnerability. Due to this high level of complexity, even large-scale studies only concentrate on selected components. Investigations of poverty, for example, predominately consider the effects of vulnerability; whereas ecological analyses focus on the risk itself and the consequences, disregarding reactions to risks; and livelihood approaches however, focus particularly on these reactions and analyse different modes of coping strategies (Bohle and Glade 2008: 110, DFID 1999).

The research focus of this study made the local level investigation of the household itself indispensable. Altogether 20 in-depth interviews were conducted with inhabitants as part of the case study; each interview lasted about 30 to 40 minutes on average and basically broached the issues of socioeconomic and demographic data, livelihoods, social vulnerability and resilience. A Chinese geographer and interpreter assisted during the interviews and gave a direct translation from Chinese to German and vice versa. Research on poverty in rural areas as well as research on urban issues in cities demands linking different spatial levels because living conditions are always influenced by external factors on the micro- and macro-level (e.g. socioeconomic, political and cultural transformation). Thus the regional, national and global scales were embedded into the research framework of the multi-level analysis.

In addition to the difficulties of combining natural and social research approaches, transferring existing concepts of vulnerability to the struc-

tures and processes of a megacity characterised by high dynamism and multifarious interrelations is a huge challenge. Further, highly complex models of vulnerability research (e.g. of Alexander 2004, cited in Bohle and Glade 2008: 108, or of Turner et al. 2003) have to be adapted to enable feasible empirical research.

According to Bohle (2001), vulnerability can be seen as having an external and an internal side. While the internal side, coping, refers to the capacity to anticipate, cope with, resist and recover from social and ecological impacts, the external side, in contrast, involves exposures to certain risks. To reduce the complexity of the multifaceted term “vulnerability”, our research investigations emphasise social and ecological risks that are induced by urban restructuring processes on the macro-level (e. g. the initiation of a city’s new development axis) that have both positive and negative impacts on a small neighbourhood and its inhabitants on the micro-level. We consider that vulnerability is the result of a perceived imbalance between the demands of a person’s environment and the available resources with which that person can respond to those demands. Basically vulnerability can be defined as a relationship between a person and the environment that is judged by the person as being taxing or as exceeding his or her resources and endangering his or her well-being. When faced with a risk, a person evaluates the potential threat and judges the event as harmful, positive, controllable, challenging or irrelevant (Freedheim et al. 2003: 457). At the same time, appraisals relate to coping behaviours and involve “a judgement concerning what might and can be done” (Lazarus and Folkman 1984: 53). We act on the assumption that – against the background of profound risks and changing environmental circumstances (e.g. increase of water pollution, loss of agricultural land due to sale of land) experienced by the people interviewed – perception and judgement processes are conscious and people are aware of their living conditions, at least from their subjective point of view.

We understand resilience as a dynamic process by which individuals exhibit positive behavioral adaptation when encountering significant adversity. People, for instance, who manage to overcome lack of income due to unemployment by doing occasional jobs in the informal sector minimise their level of vulnerability and actively cope with a risky situation. In general, facing a risk can be seen both as a risk and an opportunity. If there are no stressful or demanding situations people will not actively change negative factors in their environment and, consequently, their level of vulnerability will stay the same or even increase. If a threat exceeds (adequate) coping strategies though, people face a high level of vulnerability in many ways (e.g. pollution, health problems, poverty, exclusion from social life activities). The perception and appraisal of certain risks always depends on the frame of reference and subjective beliefs and goals. For example, a Chinese rural worker who left his home province to find work in a megacity like Guangzhou has different priorities and demands than an urban resident who already has a job but has no sufficient access to drinking water. From an external perspective it is thus impossible to divide people living in the same neighbourhood and exposed to similar risks into generalised vulnerable and less vulnerable groups. Only qualitative research enables a deeper understanding of the multifaceted issues of vulnerability and coping options and efforts.

The specific dynamics and the high complexity of megaurban space analysed in this study are characterised by the following processes:

- rapid land-use change (e.g. from agricultural land to industrial areas or settlements in peri-urban areas),
- large-scale and far-reaching constructional changes (e.g. surface sealing and formal and informal densification of housing areas),
- complex demographical and/or social changes in neighbourhoods (e.g. as a consequence of the demolition of historic districts and their replacement with bigger residential areas within a short period of time; in combination with a partial or total change of inhabitants),
- specific and rapidly changing institutional environment (formal and informal rules regarding different modes of land-use patterns in urban and peri-urban areas), and
- direct linkage between the previous processes and impacts on the complex urban and peri-urban environment (e.g. sealing and groundwater systems, water pollution, formal and informal sewage systems, access to drinking water).

In order to reduce complexity, we concentrate in this paper on

- the water-related socio-ecological impacts, neglecting other ecosystem dimensions,
- the differentiation between migrant and non-migrant urban population, largely neglecting (other) socio-economic structures, and
- the case study of an urban village: Xincún.

Analysing socio-ecological impacts demands an interdisciplinary approach to empirical research. We opted for joint field research, thus enabling a constant direct interchange between the three disciplines of human geography, landscape architecture and hydrogeology. The human geography group concentrated on interviews (see above), photographical documentation of land use structures and specific arrangements relating to social security and vulnerability (e.g. security equipment). The landscape architecture group focused firstly on a qualitative as well as quantitative analysis of built and open space and secondly on specific spatial studies (e.g. on detailed housing structures for use in time-space reconstructions of the settled area). The hydro-

geologists collected and analysed samples of water and surveyed water-related land-use structures in the settlement and the agricultural land of Xincún. This joint field research was conducted from September to November 2007.

The results are intended to answer the following questions: What are the central urban restructuring processes at the micro-level of households and neighbourhoods that affect people's lives in an urban quarter? How do different population groups react to the risks and

chances they are exposed to by urban development plans and projects, settlement and housing restructuring determined by authorities and new legal institutions imposed on their neighbourhood? Why do people cope in different ways with the changes they are exposed to? Do we find any regular patterns that determine these different coping strategies? And what are the consequences for the future of city quarters like Xincún if inhabitants and/or central agents react in specific ways to risks and new agency options?

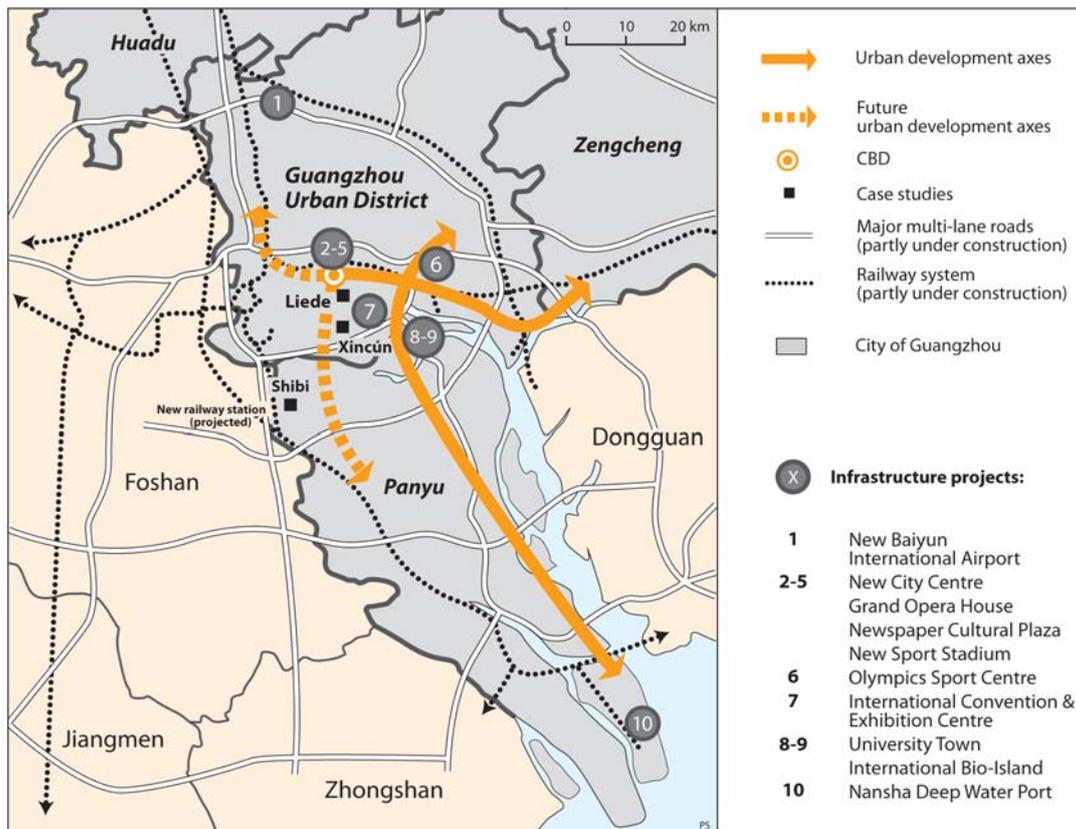


Fig. 1 Urban development axes and large development projects in Guangzhou (source: adapted from Wehrhahn and Bercht 2008; data basis: Guangzhou Urban Planning Bureau 2005) / *Städtische Entwicklungsachsen und Großprojekte in Guangzhou (Quelle: verändert nach Wehrhahn und Bercht 2008; Datengrundlage: Guangzhou Urban Planning Bureau 2005)*

3. Context: Megaurbanisation in Guangzhou and the Urban Village of Xincún

Before going into detail about the village of Xincún, it is necessary to contextualise the quarter in terms of the urban restructuring processes of Guangzhou. Guangzhou is the central megacity in the Pearl River Delta. It has a registered population of 7.6 million (9.8 million total population in 2006), the highest income per person in Guangdong province (followed by Shenzhen and Dongguan) and the second highest gross domestic product per person after Shenzhen (Guangdong Statistical Yearbook 2007; cf. *Wehrhahn and Bercht* 2008). Even if the dynamic of Guangzhou has decreased slightly in comparison to the booming new metropolises and modern industrial clusters like Shenzhen and Dongguan (*Xu and Yeh* 2005, *Yang* 2007), the restructuring process remains tremendous: Gross domestic product, for example, grew by 146 % from 2000 to 2006, and the population is increasing by some hundred thousand people every year (Guangdong Statistical Yearbook, various years).

The main focuses of urban spatial development in the future will be directed to the east and south, as planning strategies in the master plan of Guangzhou show (Guangzhou Urban Planning Bureau 2005; *Xu and Yeh* 2003 and 2005, *Wu et al.* 2007). The eastern axis has already existed for a couple of years, whereas the southern axis was developed for the latest master plan (Guangzhou Government 2004, Guangzhou Urban Planning Bureau 2005). *Figure 1* shows the main urban development projects of this decade. Xincún is situated on the main southwards axis, and is thus one of the targets of a real estate market looking for new areas suitable for the construction of housing and/or commercial infrastructure in Guangzhou. The example of the quarter of Liede, situated two kilometres north of Xincún,

reveals one of the possible futures of all the old city quarters lying on the central development axes: demolition of old buildings and construction of new high quality housing estates (cf. *Wehrhahn and Bercht* 2008). *Wu et al.* (2007: 241) calculated that in Shanghai alone 70,000 to 100,000 households were relocated each year between 1975 and 2003 as a result of this kind of urban redevelopment.

Urban villages – or “villages in the city” to directly translate the Chinese term – are urban entities that are particularly affected by urban transformation processes. They are residential settlements with a previously rural population that became part of the urban area as the city rapidly expanded in recent years. According to Chinese law, urban land belongs to the state and rural land-use rights to the collective of the villagers. The government is therefore not entitled to take over the villagers’ land, encouraging an insularity of settlement structure (*Yan and Wei* 2004: 60). Thus even though the urban villages are located in the inner city, they retain some characteristics of their rural origin. Low-rise and dense building structures and sometimes agricultural land are surrounded by urban high-rise buildings and modern infrastructure facilities. By 2000, there were 139 urban villages within the urban built-up area of Guangzhou, with a total area amounting to 80.6 km²; comprising 26.2 % of the urban built-up area (*Yan and Wei* 2004: 66).

The urban villages that have so far survived the urban renewal find themselves in a difficult process of transition. Although they are part of Guangzhou’s urban area, their social and economic development has not been integrated into the city’s planning and development due to China’s dualistic urban-rural management systems. This has four key aspects: firstly, the household registration system (*hukou*) that differs between urban and rural residents; secondly, the social security sys-



Photo 1 Residential buildings and agricultural land-use in the urban village of Xincún (source: authors 2007) / *Wohngebäude und landwirtschaftliche Bodennutzung im „urban village“ Xincún (Quelle: Autoren 2007)*

tem which is implemented only in cities; thirdly, the governmental structure: while municipal governments are in charge of city administration, villages are run by a village committee; and fourthly, the two systems of land ownership explained above.

Xincún (*Photo 1*) is one of the Guangzhou urban villages, located in the Haizhu District in the eastern part of the city. The criss-crossing alleys of the old village and the predominately small-scale structures are clearly identifiable on the map, distinctly differing

from the surrounding grid-pattern of wider streets of the new residential and business areas. With a historical background of about 2100 years, Xincún used to be a traditional agricultural community. However, since the 1980s when Guangzhou's urbanisation accelerated as a result of globalisation, reform and open-door policy and economic growth, Xincún has been experiencing rapid development and tremendous changes in terms of economic restructuring, spatial reconfiguration, water resource management and social reorientation and repositioning.

4. Settlement Restructuring and Vulnerability in Xincún

4.1 Population dynamics and settlement restructuring

4.1.1 Change of population structure

The analysis of urbanisation processes in the urban village of Xincún as well as in the surrounding areas shows that Xincún is characterised by a permeable system with a high grade of interchange. Population figures have risen significantly since the 1980s, the total population, including immigrants, reached about 8,400

in 2007. While the native population has decreased over the last two decades, the non-native population has continuously increased, making up 50 % of all inhabitants in 1993/94 and 83 % in 2007 (interview with the village committee leader of Xincún, November 2007).

A particular phenomenon in rapidly growing Chinese cities is the so-called “floating population”, rural labourers migrating to the cities in order to make a living and to experience the supposed comforts of modernity. The increase of foreign investments in coastal areas and the subsequent rapid urbanisation and expansion of industry and construction in cities like Guangzhou have led to sig-



Photo 2 Old and newly built four- to five-storey houses in Xincún (source: authors 2007)
Alte und neu gebaute 4- bis 5-geschossige Häuser in Xincún (Quelle: Autoren 2007)

nificant migration of large numbers of rural workers. Leaving a life of poverty in inland provinces migrants flock to growth areas to work in factories, on construction sites and in the formal and informal service sector. Yet in spite of their important contribution to urban development, the migrants are still treated as second-class citizens. Not considered as official urban residents, they are excluded from the benefits enjoyed by permanent urban residents (e.g. housing, medical care, schooling for children, unemployment benefits). Usually they have only limited access to basic livelihood assets, indicating a high level of vulnerability compared to residents with urban *hukou* (see above).

The spatial and social structure of Xincún is evidently changing from a traditional village to a village that is more and more influenced by the effects of urbanisation. Because of the comparatively cheap housing available in urban villages, a great number of migrant workers locate there. As the demand for housing grew with the increase of migration, villagers began to make money by taking advantage of the tight supply situation. In the early 1990s they started to build new four- to five-storey houses for rental (*Photo 2*) on their agricultural land. For the ma-

jority of the villagers the fast-growing real estate business (the so-called “house-renting industry”) has thus become the main income base. Most of them have moved outside Xincún and live mainly off earnings from rental housing. Only 17 % of the native population stayed in the village, they generally occupy the top storey of their houses and rent the rest to migrants. The ground floor is usually used for commercial purposes. A school and a community centre for senior citizens from Haizhu District will be built in 2008.

All in all, Xincún is characterised by a population of high density, a high degree of heterogeneity (migrants with different cultural backgrounds and villagers) and the diffusion of new lifestyles (e. g. a great number of mobile phone shops, net bars, satellite television).

4.1.2 Change of land-use structure

The morphology of urban structure and the land-use regime in the surrounding areas and in Xincún itself have changed profoundly in the last 15 years. Areas surrounding Xincún that used to be occupied by agriculture and related urban villages (“village in the town”) are now characterised by

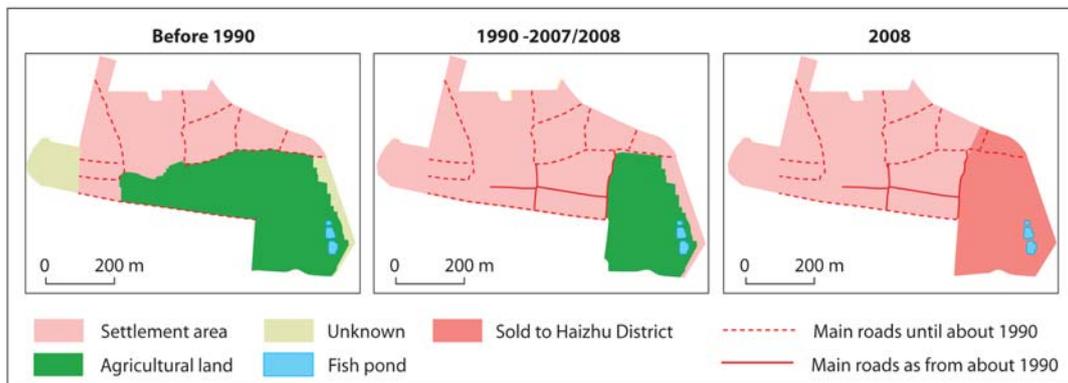


Fig. 2 Land-use change in Xincún, 1990-2007 / Veränderung der Landnutzung in Xincún 1990-2007

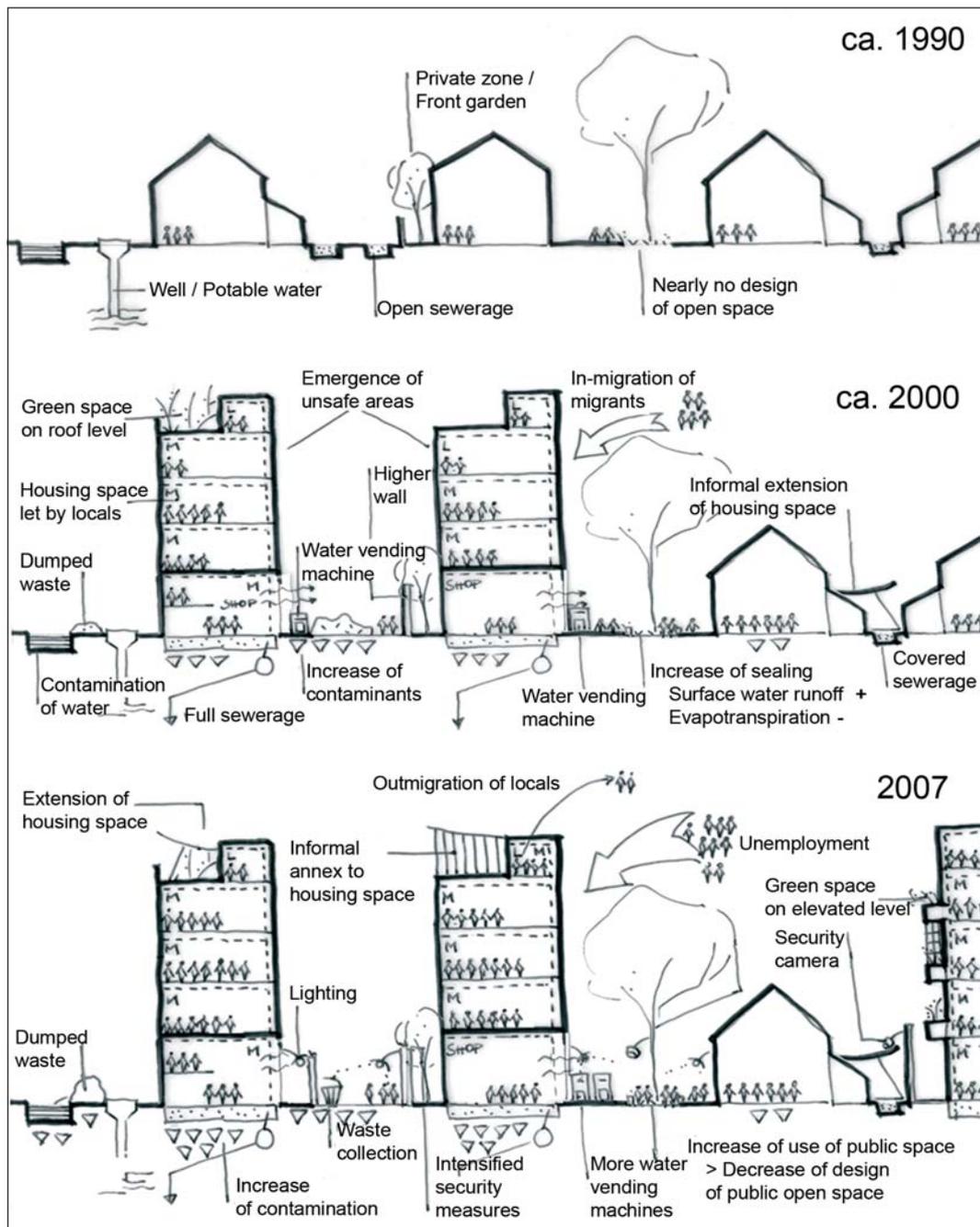


Fig. 3 Transformation of built and open space in Xincún at the beginning and at the end of the 1990s and in 2007 / Transformation von bebauten Flächen und Freiflächen in Xincún am Beginn und am Ende der 1990er Jahre sowie 2007

high-rise buildings for the new middle class, four- to seven-storey buildings for lower- and middle-income groups, some commercial and leisure areas, and extensive traffic infrastructure. These changes have to be seen as a direct consequence of the implementation of development axes heading southwards from the new city centre in Tianhe.

Xincún withstood these urban restructuring processes for a while, but now the change of population and land use is obviously irreversible. As the importance of agriculture is dwindling and the value of land for urban expansion is greatly increasing, the village committee sold the last remaining agricultural land in the eastern part of Xincún to the Haizhu District in 2007 (*Fig. 2*).

A detailed analysis of the spatial restructuring of Xincún reveals that development can be divided into three time sequences. Within the first time period (*Fig. 3*), at the beginning of the 1990s, Xincún appeared as a homogeneous urban agglomeration with one- to two-storey houses built (according to traditional architectural practice) in brick with ridged roofs. The houses were arranged mainly in courtyard structures with adjacent vegetation. Most of them had either porches, including serving functions as kitchen or bathroom, or open pre-areas as private entrance zones, defined by walls. Private and public spaces were on the same level. The vegetative areas used for agriculture or husbandry were integrated into the settlement. The number of facilities for daily demand (e.g. shops and other service providers) was very low, synchronous with a high rate of agricultural and housing use.

The proportion between built and open space created an open settlement structure with many unsealed areas. Streets were thus sunny and ventilated. Open space was characterised by its well-kept appearance, indicating a high degree of identification by the local inhabitants, who were the main users of the public space. Nevertheless, this traditional building structure offered low housing

standards as far as living space and technical infrastructure were concerned. Outside open sewage systems as well as uneven unlit paths, a lack of waste systems and unstructured green spaces were typical characteristics of the open space.

At the end of the 1990s the image of Xincún changed (*Fig. 3*). Immigration led to rapid population growth, which had evident consequences for the built and open space. Extension into neighbouring areas was not possible, therefore a strong redensification of Xincún itself started. Some of the old buildings were supplemented by informal superstructures and annexes, their form depending on the amount of space. Many of the old buildings were demolished and substituted by new five- to six-storey buildings with flat roofs. Since the existing property boundaries were preserved, a regular, but very dense building structure developed.

The proportion of the open space consequently declined drastically: More inhabitants had to share less open space which consists of small, unlinked areas and corridors. Furthermore, the character of the open space changed dramatically: Higher buildings negatively impacted on ventilation and light, maintenance declined, and pollution increased because the migrants as the new main users of the space did not identify with it, this in turn produced insecure areas with potential for increased crime rates.

Most of the private zones in front of the houses have been replaced by new shops on the ground floor. To compensate, the residents created new green spaces with a private atmosphere on the roofs and balconies. In order to separate the remaining private zones at ground level from the public areas, walls and fences have been built (*Fig. 4*). Changes in public space can thus be seen to have triggered different types of spatial separation, becoming more radical through the three time phases. The measures range from light barriers such as movable objects to rigid ones like high walls with integrated cullets. Due to the continued increase in the number of

migrants, redensification in Xincún is still in progress (Fig. 3). The great growth in demand for living space and use of built and open space intensify the processes of change. Lack of living space leads to various compensatory measures: Old buildings with a structure that makes their extension impossible are demolished and substituted by new buildings. The existing five- to six-storey-houses are extended by the addition of various informal annexes (Fig. 4) like balconies, roof gardens, additional rooms or roofed terraces.

4.2 Social vulnerability, resilience and coping strategies

Global change and the opening of China to the world economy have had a profound impact on socio-economic, political, ecological and cultural processes and on living conditions in general, peo-

ple attempt to adapt to these changes by using different livelihood strategies. The development of Xincún in the last twenty years has involved rapid change in spatial structures that must be included in these coping strategies. Intense redensification reduces the amount of open space and impacts significantly on population and environment. On the one hand the declining level of identification with the urban village and its public space causes problems like waste, deterioration of green areas, lack of maintenance and a growing crime rate. On the other hand a new consciousness of private open space has been generated.

Migrants show resilience in the way that they actively influence their context of vulnerability by leaving the countryside (with poor living conditions, insufficient infrastructure, negligible income from agriculture) and moving to booming cities. All migrants interviewed in Xincún confirmed that

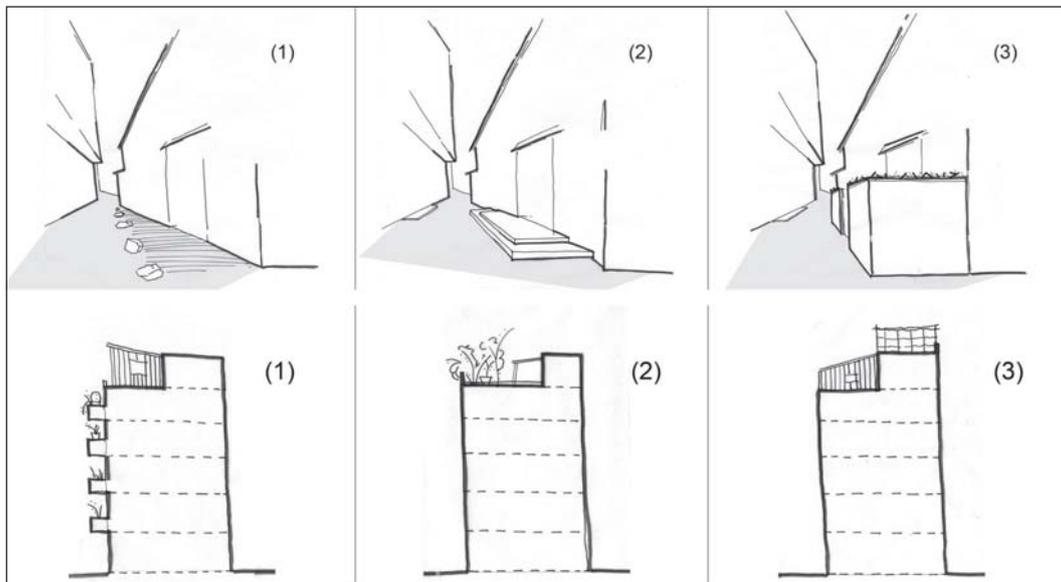


Fig. 4 Different types of self-regulating measures used to divide private and public open space, also at roof level (research: Florian Kluge and Katharina Wiethoff 2008) / Verschiedene Typen selbstregulierender Maßnahmen zur Abtrennung von privatem und öffentlichem Freiraum, auch auf Dachhöhe (Untersuchungen: Florian Kluge und Katharina Wiethoff 2008)

the main reason for coming to Guangzhou was to find a job and to improve their financial situation. Most migrants believed that living conditions in Xincún were much better than those in their home region. For instance, they have access to running water and sanitary facilities, streets are less dirty and polluted, and small shops guarantee supplies of staple foods and basic household equipment. The reason for settling down in Xincún and not in another village is mainly related to existing social networks. Relatives and friends who moved to Xincún earlier provide initial help and assist with finding accommodation or a job.

In response to and in order to cope with high-speed urbanisation and decreasing income from agriculture, most villagers build new houses and rent them to migrants. They cease to be traditional villagers but become comparatively wealthy landlords. With enough money for a more comfortable lifestyle than in the past, there appears to be little incentive for employment. Due to the shrinking amount of agricultural land and the recent sale of the last remaining plots to Haizhu District, traditional sources of income in the primary sector have been lost. Many villagers who still live in Xincún seem to hang around with little to do. According to various interviews, illegal gambling, crime and drug abuse have obviously increased in recent years. As a result 16 observation cameras were set up all over in Xincún in October 2007.

Not only employment opportunities, but also traditional values and social structures among the native population have gradually changed. A villager in his late forties reported on the decline of the rural way of life of the past in Xincún. "The old temple and ancestor hall belong to my family clan but only a few members of my family still live here (in Xincún). Old people come to the temple to meet and to gamble but that is the only use" (interview, October 2007). He presented an old wooden dragon boat that is stored in the inside of the temple and explained that when he was a

child, family clans from different villages used to promote dragon boat races once a year. "Now you can't find any traditions like that any more. Life has become hectic and less ordered because too many people live in Xincún" (interview, October 2007). This villager lives off income from rental housing and – as he admitted – he has no daily routine. He once came into conflict with the law and was sent to prison. The main reason for staying in Xincún was his social networks, he argued. Evidently he is not totally resistant to the various changes taking place in the village but a familiar and well-known neighbourhood gives him a supportive background.

The 'rental economy' and new housing construction within Xincún have led to various forms of segregation. While the majority of the native population moved out of the village, old people and villagers who cannot afford to move mostly stayed in old houses that are in poor condition. However, villagers who became landlords and prefer life in Xincún for different reasons usually live on the top floor with a roof garden and more space. A process has thus been set in motion in which the native population is split into different social groups who live separately – either inside or outside Xincún (macro-level perspective) or within different areas of Xincún (micro-level perspective, horizontal and vertical segregation). A parallel development is the socio-spatial segregation of the non-native population and the villagers. Most of the migrants who come from the Hunan, Sichuan, Hubei and Jiangxi provinces do not speak Cantonese and have different cultural backgrounds. They usually keep to themselves and only interact with villagers for issues of tenancy or work.

In some of the interviews both villagers and migrants spoke about conflicts between the native and non-native population. Migrants, for instance, complained about money-grabbing behaviour and avarice on the part of the villagers. "If I am not able to pay the rent on time I'll have to

leave. There is no question of paying a few days later. Villagers are very selfish and worry only about money” (interview, November 2007). Other migrants stated that the security team of Xincún discriminates against them. “They only offer security to the villagers. A few weeks ago a villager destroyed the sign of my hairdresser’s and I called the security. They came but didn’t give me any support. Their opinion was that I had to bear the costs. But if I had destroyed a villager’s sign I would have had to pay for the damage for sure. That is unfair” (interview, November 2007). These statements indicate that a lot of migrants feel arbitrariness and inequality but also that it is at this time difficult for them to defend themselves. If

they do not submit to the informal or formal regulations implemented by villagers (request for payment, rent increase) or the security team, they presumably have to leave Xincún.

Some of the villagers interviewed see themselves as being in a dilemma as well. On the one hand, they derive financial benefit from the immigration of the rural non-native population. On the other hand, some villagers, especially the elderly, regret the increasing foreign infiltration and the loss of their traditional rural way of life (interviews, November 2007). Both the relative wealth of a great number of the villagers and the immigration of workers from other provinces have brought a



Photo 3 Migrant working in the informal sector (source: authors 2007)
Im informellen Sektor arbeitende Migrantin (Quelle: Autoren 2007)

new lifestyle into the village. It seems as though there is a symbiotic relationship between the two social groups who live close together and depend on each other in various ways. Without adjustment to the effects of regional and city development, which have a great impact on macro- and micro-level structures – e. g. disparities between inland and coastal provinces and between different living areas within Guangzhou –, both groups would have faced a more vulnerable living context.

Nevertheless, the non-native population with rural *hukou* is in general less privileged than the urban residents. They are not entitled to welfare as citizens, the rate of unemployment among migrants is high and, as their education level is usually low, well-paid employment is hard to find. The average income of migrants living in Xincún is about 800 to 1000 Yuan (= 80 to 100 Euros) per month (for comparison many villagers earn at least triple the amount). Generally migrants work in the informal sector (*Photo 3*) and – depending on the flexible demand for employment – they change jobs quite often, resulting in an irregular income. None of the migrants interviewed has a contract of employment or pays taxes. They work on construction sites, as rubbish collectors, cobblers, seamstresses or cleaning ladies. Some run small shops rented from villagers and offer services as hairdressers, dentists or pharmacists, although they are seldom trained in these professions. Especially women who work as hairdressers or masseuses often prostitute themselves. Most of the migrants interviewed – although working up to 12 hours every day – have no chance of saving money and are thus unable to remit any to family members in their home region (interviews, November 2007). It is often the case that migrants have two or more children who are entrusted to a grandparent's care back home. A female migrant reported that she had a bad conscience because she could not take care of her children but that the only way out of unemployment and hopelessness was to move to

Guangzhou (interview, October 2007). Migrants, however, who have their children with them are disadvantaged due to limited access to public schools. Only if public schools have places left over are the children of migrant workers accepted, even then they have to pay much higher school fees than children with urban *hukou*. Private schools are even more expensive.

Although a great number of migrants in Xincún are confronted with various difficulties and discrimination, most of them work hard and do their best to improve their standard of living and to decrease their vulnerability in many ways. In a lot of interviews it became apparent that investment in children's education was considered the most auspicious strategy to build up resilience. "My biggest dream is that my children can go to university one day. I want them to have a better life than I have" (interview with a young mother of two children, November 2007).

4.3 Water and vulnerability in Xincún

Population change and settlement restructuring under conditions of an often precarious and informal agency framework have serious consequences not only for social conditions but also for the local environment with knock-on impacts on people and health. Deficient access to safe drinking water and sanitation, poor drainage with open sewers (*Photo 4*), large amounts of uncollected waste adjacent to agricultural land and fish ponds – these are the variables we investigated with respect to the vulnerability of villagers and migrants in Xincún.

The overall water system consisting of natural and technical water systems is strongly influenced by the natural environment (*Goldscheider 2003, Neukum et al. 2007*), the users (inhabitants and other economic users), the built environment and open space structures. Groundwater from karst aquifers of the Huadu Basin in Guangzhou has



Photo 4 Open sewer next to the pavement in Xincún (source: authors 2007)
Offener Abwasserkanal neben dem Bürgersteig in Xincún (Quelle: Autoren 2007)

been extensively used for domestic, agricultural and industrial purposes since 1970. All in all, 0.35 billion tons of groundwater are used in the Pearl River Delta per year. In Guangzhou the contaminant load of the water mainly results from untreated domestic and agricultural sewage disposal directly led into receiving water-courses. A survey by the State Environmental Protection Administration (SEPA) of China suggested that between 1995 and 2004 all monitored sections in the urban area of Guangzhou on the Pearl River had a water quality of around grade V (Shao et al. 2006: 356). This is the worst Chinese water quality standard applied to surface water.

The interviews revealed that the number of households being supplied with tap water has increased in recent years. Thus it is estimated that today all inhabitants of Xincún have access to tap water by central water supply conducts made of PVC rigid pipes or of an unknown kind of metal. The presence of water supply pipes lying outside the buildings in the older part of the village suggests that these buildings have been upgraded in recent years.

Water demand is increasing because of rising living standards and the growing population. Using the daily per capita consumption of tap water of 456.88 litres for residential use in

Guangzhou (Guangzhou Statistical Yearbook, 2007: 256) as a basis, the daily water consumption of Xincún was calculated by the hydrogeologists. Without migrants the daily water consumption is 699,026.4 litres, whereas water consumption including migrants is 3,412,893.6 litres a day. However, although water supply itself can be taken for granted, the interviews revealed that the tap water in Xincún can not be consumed due to its unacceptable taste. The local residents recognise the problem and thus either buy bottled water (1.5 litres cost approx. 2 Yuan) or boil the tap water before consumption. First samples of water confirmed the statements of the residents: the tap water in Xincún was contaminated with total coliforms of up to 2 MPN/100 ml (water samples analysis, 2007).

The problem of contaminated drinking water is currently increasing as some residents use groundwater from private wells as part of their daily diet. Because of the allegedly better taste of the groundwater they sometimes consume it without even previously boiling the water. However, in Xincún the samples of groundwater showed significant contamination with total coliforms of $1.7 \cdot 10^4$ - $3.3 \cdot 10^4$ MPN/100ml and pollution with ammonium of 0.116 - 8.34 mg/l (analysis by hydrogeology working group, 2007). The detection of ammonium indicates impurities from domestic and/or industrial effluent. As a result, there are health risks like gastro-intestinal diseases.

The availability of public water vending machines (Photo 5) shows that the problem of insufficient water quality and the necessity of an alternative water supply have been recognised. According to the companies which site and operate these machines, the sales market can be taken for granted in urban villages and old residential areas, where water pollution is caused by poor quality pipes, where the living standard is low, the transport routes are short and the houses usually only have a few floors so that bottled water can easily be carried home (interviews 2007). One of the

companies reported that they actuate about 500 to 600 machines in Guangzhou. In the densely populated urban village of Xincún many water vending machines have been set up, predominantly on hubs (Fig. 5). Because of the low cost (5 litres for 1 Yuan; 20 litres for 4 Yuan) these vending machines can be deemed to be an alternative water supply even for the urban poor.

Companies interested in setting up water vending machines must be licensed by the Health Office of Guangdong Province and must seek permission from the local committee. After passing through the traditional tap water network, water is filtered and cleaned through reverse osmosis and can then be bottled and consumed. An au-



Photo 5 Public water vending machine in Xincún (source: authors 2007) / Öffentlicher Wasserautomat in Xincún (Quelle: Autoren 2007)

tomatic mechanism for monitoring is supposed to guarantee the water quality.

Strongly linked to an excessive increase in water consumption is the high increase in mainly domestic waste water which drains directly and untreated into the adjacent brook (Fig. 5). In Xincún one can find different zones of sewage disposal: In the older part of Xincún there is a combination of open waste water gutters with a medial width of 20-35 cm and canalisation. However, the newer part of Xincún (agricultural land until approximately 1990) is completely canalised. In any case all sewers lead into a main sewage ditch at the eastern border of Xincún that then discharges untreated waste water into the brook.

It is obvious that the section of the brook in Xincún is heavily polluted with human excreta as well as solid waste from agriculture and trade in the adjacent areas. In fact, samples of surface water, brooks as well as ponds and feeder,

showed extreme water contamination with faecal coliforms of $1.3 \cdot 10^5 - 1.1 \cdot 10^7$ MPN/100ml and ammonium of up to 55 mg/l. This fails to meet the Chinese water quality grades relevant to total coliforms. These and other harmful substances (e.g. fertilizer and pesticides) contaminate surface water as well as groundwater when passing through the overlying strata and thereby pose a considerable risk to the environment and to humans. The health risks become obvious when taking into account that the contaminated ponds are intensively used for fish farming and that cultivated vegetables are irrigated with the water of the polluted circumfluent feeders. However, the tenant of the fishponds is aware of the bad water quality and 'solves' the problem by breeding a resistant fish species.

Another aspect of water analysis relates to land-use structures within the settlement area of Xincún and concerns open spaces. In the older as well as in the newer parts of the village, the

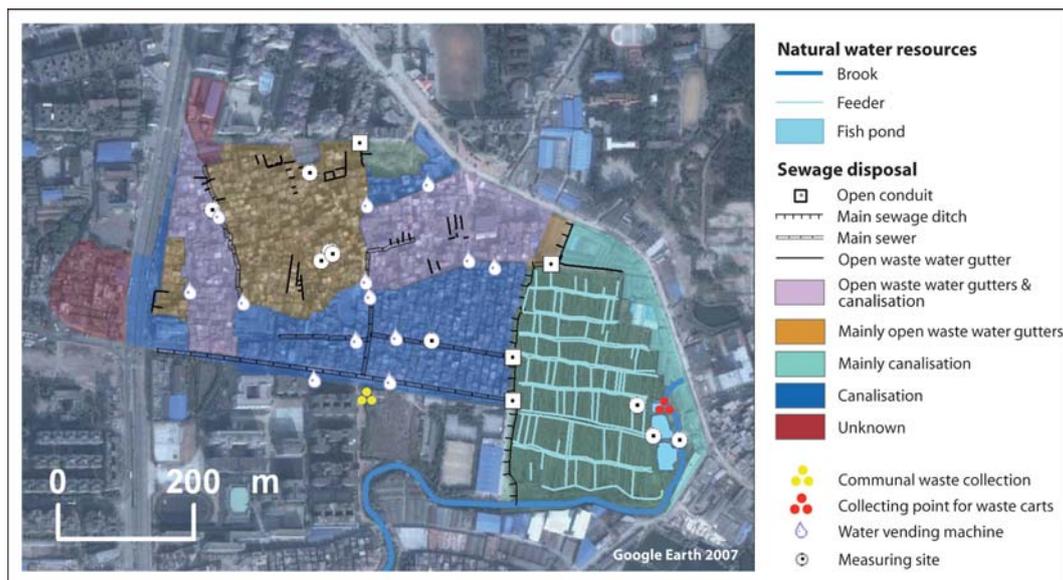


Fig. 5 Natural and technical water systems in Xincún 2007 (research: Ramona Strohschön)
Natürliche und künstliche Wassersysteme in Xincún 2007 (Untersuchungen: Ramona Strohschön)

surface is highly sealed. Against the background of an annual precipitation of about 1938 mm, conditions already mentioned lead to a high grade of run-off in the rainy season between April and September. Since there are at best few and in some parts of the village no street drains, puddles are often generated making it difficult for people to walk on the roads. In addition, further transformation of agricultural land into settlement areas leads to a shift in the water balance. Because of sealing of the surface less or no infiltration will be possible in the future, natural groundwater recharge is thus further diminished in the area of Xincún. In addition, these public utilities will have to be given access to water supply and sewage disposal. The latter will pass into the southern brook with the effluent of Xincún, and the deterioration of water quality will further increase.

5. Conclusions

Urban restructuring in Chinese megacities impacts severely on people's living conditions and on natural and technical water systems. Restructuring processes on the micro-level are driven by macro-level and meso-level processes: on the macro-level China as a transforming economy and society under the influence of globalisation, and on the meso-level Guangzhou as a dynamic megacity and an emerging global city in competition with other Chinese metropolises. Within this structural framework, supplemented by institutional settings such as legal, policy and planning regulations, city quarters like Xincún experience processes of restructuring that lead to almost complete population exchanges, the transformation of built environments, and profound impacts on ecological systems.

The analysis of vulnerability components such as the resilience and coping strategies of local inhabitants or risk for groundwater systems vis-à-vis socio-demographic change, densification, surface sealing and pollution reveals different capaci-

ties and different modes of reaction. Migrants are usually more affected by urban renovation projects than other social groups. They lack important institutional capital factors, related to the *hukou*. Their rights with respect to housing, work and social and health security are precarious and they are always disadvantaged in comparison to urban villagers. Migrants are not homeowners and consequently do not get any compensation for demolished houses. They lack security for rental issues which is very important since many intra-urban urban villages like Xincún are extremely attractive for real estate companies, as shown in Liede, north of Xincún (*Wehrhahn and Bercht 2008*). Such urban villages in Chinese megacities have usually become migrant enclaves (*Schoon 2007*), and thus have a high proportion of inhabitants with little legal power. Consequently, rural migrants – in Guangzhou alone between 2 and 3 million people (official data and expert estimates respectively) – are socially the most vulnerable population group in Chinese mega-cities. Their only coping strategy – well known from other labour migration studies worldwide – is to work hard and to live away from their families in the countryside as long as possible in order to save money before bringing the relatives to the city or going back to their region of origin. But in contrast to migrants in other countries, the status of rural migrants in China is precarious. This begs comparison with irregular migrants in foreign countries. Both groups suffer from institutional uncertainty, responsible for a chain of disadvantages like difficulties to claim civil rights, adequate housing and access to affordable education and health systems.

On the other hand, the villagers as landlords – more exactly the villagers' committee – can decide upon the future use of the territory of the villages. We have seen that they have successively used their rights to profit from economic development in Guangzhou. Urban villages located on the main development axes gain even more from socio-

economic transformation, using macroeconomic progress (including the real estate market boom, accelerated by foreign/Hong Kong investments) and regional/city economic development and official planning opportunities. Strategies for coping with these opportunities are easily discovered by local actors and often result in a sort of rent capitalism. Villagers continuously enlarge their houses vertically either to have more apartments for rent and thus more rental income available for a life without work, or to buy a new apartment outside the village to which they then move. Those who stay in the village often cope with extreme densification, scarce open space and deficient green areas by modifying and greening roofs and balconies or incorporating former public space into their private plot.

One of the most pressing issues of fast-growing megacities is the interaction between urban dynamics and water resources, which can also be studied in the densified and – to a very high degree – sealed urban villages. Ecological stress and risks, e.g. for surface and groundwater as well as for the health of the inhabitants, and here again for the socially most vulnerable group of migrants, have been considered in detail. To summarise, there are three main problems: limited access to safe drinking water, severe surface water pollution as a result of untreated domestic, agricultural and industrial sewage disposal directly draining into water courses, and fluctuations of groundwater level and severe groundwater pollution. In Xincún as in two other areas researched by the authors' team a direct dependency between high-speed population growth, urban expansion and land-use change on the one hand and severe water-related problems on the other hand can be found. In many cases unplanned disposal of waste water is accompanied by unplanned provision of water supply. Thus, human activities in urbanised areas threaten groundwater by the diffuse loading from the urban recharge system and by contamination from landfill leakage, industrial spillages etc. To cope

with these problems, urban dwellers have to use financial resources to reduce health risks (e.g. boil water, buy drinking water) and they have to give up traditional activities like fishing in the (now) intra-urban areas or to buy or breed pollution-resistant fish species. Both ecological and social vulnerabilities rise significantly, with reciprocal impacts on one other.

6. References

- Albinet, M. et J. Margat* 1970: Cartographie de la vulnérabilité à la pollution des nappes d'eau souterraines. – Bulletin du Bureau de Recherches Géologiques et Minières, 2ème série, **4**: 13-22
- Alexander, D.E.* 2006: Crisis Intervention and Risk Reduction. – In: *Ammann, W.J., S. Dannemann and L. Vulliet* (eds.): Risk 21 – Coping with Risks due to Natural Hazards in the 21st Century. – London: 51-56
- Beck, U.* 1986: Risikogesellschaft. Auf dem Weg in eine andere Moderne. – Frankfurt
- Beck, U.* 2007: Weltrisikogesellschaft: Auf der Suche nach der verlorenen Sicherheit. – Frankfurt
- Blaikie, P.T., I.D. Cannon and B. Wisner* 1994: At Risk: Natural Hazards, People's Vulnerability, and Disasters. – London
- Bohle, H.-G.* 2001: Vulnerability and Criticality. Perspectives from Social Geography. – IHDP Newsletter, Update **2**: 1-5
- Bohle, H.-G. und T. Glade* 2008: Vulnerabilitätskonzepte in Sozial- und Naturwissenschaften. – In: *Felgentreff, C. und T. Glade* (Hrsg.): Naturrisiken und Sozialkatastrophen. – Heidelberg: 99-119
- Chambers, R.* 1989: Editorial Introduction: Vulnerability, Coping and Policy. – Institute of Development Studies (IDS) Bulletin **20** (2): 1-7
- Ehlers, E.* 2006: Stadtgeographie und Megastadt-forschung. – In: *Gans, P., A. Priebis und R. Wehrhahn* (Hrsg.): Kulturgeographie der Stadt. – Kieler Geographischen Schriften **111**: 51-62
- Gogu, R.C. and A. Dassargues* 2000: Current Trends and Future Challenges in Groundwater Vulnerability Assessment Using Overlay and Index Methods. – Environmental Geology **39** (6): 549-559

- Freedheim, D.K., I.B. Weine, W.F. Velicer, J.A. Schinka and R.M. Lerner* 2003: Handbook of Psychology. – New York
- Goldscheider, N.* 2005: Karst Groundwater Vulnerability Mapping: Application of a New Method in the Swabian Alb, Germany. – *Hydrogeology Journal* **13** (4): 555-564
- Guangzhou Government (ed.) 2004: Five Plans Unveiled for New GZ Railway Station – http://www.guangzhou.gov.cn/node_420/node_683/2004-09/109474913855322.shtml. – 20/10/2008
- Guangzhou Urban Planning Bureau (ed.) 2005: A Collection of Guangzhou Urban Planning and Design Services (UPDS). – Guangzhou
- International Geosphere-Biosphere Programme (IGBP) (ed.) 2002: Integration. Natural Sciences, Social Sciences: Integration or Summation? – IGBP Newsletter **49**: 20-26
- Lazarus, R.S. and S. Folkman* 1984: Stress, Appraisal, and Coping. – New York
- Li, P.* 2002: The End of Chinese Villages. A Study of the Villages Located in Southern Urban China. – <http://www.sociology.cass.cn/English/PAPERS/PO20050201243900150155.pdf>. – 05/01/2008
- Li, S.-M., D. Wang and F.Y.-T. Law* 2005: Residential Mobility in a Changing Housing System. Guangzhou, China, 1980-2001. – *Urban Geography* **26** (7): 627-639
- Neukum, C., H. Hötzl and T. Himmelsbach* 2007: Validation of Vulnerability Mapping Methods by Field Investigations and Numerical Modelling. – *Hydrogeological Journal* **16** (4): 641-658
- Lu, L. and Y.D. Wei* 2007: Domesticating Globalisation, New Economic Spaces and Regional Polarisation in Guangdong Province, China. – *Tijdschrift voor Economische en Sociale Geografie (TESG)* **98** (2): 225-244
- Obrist, B.* 2006: Risiko, Vulnerabilität und Resilienz in einer afrikanischen Stadt: alltägliches Gesundheitshandeln in Dar es Salaam, Tansania. – In: *Eeuwijk, P.v. und B. Obrist* (Hrsg.): *Vulnerabilität, Migration und Altern*. – Zürich: 97-118
- Putra, D.P.E.* 2007: The Impact of Urbanization on Groundwater Quality. A Case Study in Yogyakarta City, Indonesia. – Aachen
- Schoon, S.* 2007: Shanghai XXL: Alltag und Identitätsfindung im Spannungsfeld extremer Urbanisierung. Dissertation. – Bielefeld
- Shao, M., X. Tang, Y. Zhang and W. Li* 2006: City Clusters in China: Air and Surface Water Pollution. – *Frontiers in Ecology and the Environment* **4**(7): 353-361
- Shen, J, Z. Feng and K.-Y. Wong* 2006: Dual-Track Urbanization in a Transitional Economy: The Case of Pearl River Delta in South China. – *Habitat International* **30**: 690-705
- Tang, W.-S and H. Chung* 2002: Rural-Urban Transition in China: Illegal Land Use and Construction. – *Asia Pacific Viewpoint* **43** (1): 43-62
- Turner, B.L. et al.* 2003: A Framework for Vulnerability Analysis in Sustainable Science. – Proceedings of the National Academy of Sciences of the United States of America (PNAS) **100** (14): 8074-8079
- Vrba, J. and A. Zaporozec* (eds.) 1994: Guidebook on Mapping Groundwater Vulnerability. – International Association of Hydrologists. – International Contributions to Hydrogeology **16**. – Hannover
- Wehrhahn, R. und A.L. Bercht* 2008: Konsequenzen der Weltmarktintegration für die mega-urbane Entwicklung in China. Das Beispiel Guangzhou/Perlfussdelta. – *Geographie und Schule* **30** (173): 18-27
- Wu, F.* 1998: Polycentric Urban Development and Land-Use Change in a Transitional Economy: The Case of Guangzhou. – *Environment and Planning A* **30** (6): 1077-1100
- Wu, F. and S.J. He* 2005: Changes in Traditional Urban Areas and Impacts of Urban Redevelopment: A Case Study of Three Neighbourhoods in Nanjing, China. – *Tijdschrift voor Economische en Sociale Geografie (TESG)* **96** (1): 75-95
- Wu, F. and A.G.O. Yeh* 1999: Urban Spatial Structure in a Transitional Economy. The Case of Guangzhou, China. – *Journal of the American Planning Association* **65** (4): 377-394
- Wu, F., J. Xu and A.G.O. Yeh* 2007: Urban Development in Post-Reform China. State, Market, and Space. – London
- Xu, J. and A.G.O. Yeh* 2003: City Profile: Guangzhou – *Cities* **20** (5): 361-374
- Xu, J. and A.G.O. Yeh* 2005: City Repositioning and Competitiveness Building in Regional Development: New Development Strategies in Guangzhou, Chi-

na.– International Journal of Urban and Regional Research **29** (2): 283-308

Yan, X. and L. Wei 2004: The Persistence or Transformation of Urban Villages in Urban China in the Context of the Socio-Economic Transition and Globalization. – Petermanns Geographische Mitteilungen **148** (5): 60-67

Yang, C. 2006: Cross-Boundary Integration of the Pearl River Delta and Hong Kong. An Emerging Global City-Region in China. – In: Wu, F (ed.): Globalization and the Chinese City. – New York: 125-146

Summary: Urban Restructuring and Social and Water-Related Vulnerability in Megacities – the Example of the Urban Village of Xincún, Guangzhou (China)

In China reform policies and economic growth have led to the development of dynamic and highly complex megaurban agglomerations. The megacity of Guangzhou serves as an example through which the far-reaching restructuring processes and their consequences are investigated, both at the scale of the entire city and using a residential area as a case study to illustrate the micro-level. The focus of the investigation is on the analysis of social and water-related vulnerability in Xincún, an urban village that is particularly affected by the continued urban expansion as it lies on a main development axis. The resulting transformation impinges on built form and socio-economic, cultural and ecological processes. The main aim of the article is to deepen understanding of the vulnerability and coping strategies of urban residents who find themselves caught up in the development of a mega-city. The conceptual framework of the multidisciplinary investigation is provided by theories of social and ecological vulnerability, tying in internal and external factors at both institutional and actors' scales. Results are drawn from in-depth interviews, mapping and analyses of water and reveal the existence of various forms and degrees of vulnerability. Particular differences are found between migrants and natives in terms of the extent to which they are affected by processes of transformation, their perception of those processes, and their coping strategies.

Urbaner Strukturwandel und soziale und wasserbezogene Vulnerabilität in Megastädten – das Beispiel des Urban Village Xincún, Guangzhou (China)

Reformpolitik und wirtschaftliches Wachstum haben in China zur Entstehung sehr dynamischer und hochkomplexer mega-urbaner Agglomerationen geführt. Am Beispiel der Megastadt Guangzhou werden die tief greifenden Umstrukturierungsprozesse und deren Folgen auf der Ebene der Gesamtstadt sowie in einem Fallstudiengebiet auf der Mikroebene der Quartiersbewohner untersucht. Im Vordergrund steht die Analyse sozialer und wasserbezogener Vulnerabilität in Xincún, einem Urban Village, das aufgrund der fortschreitenden Expansion der zentralen städtischen Entwicklungsachsen in besonderem Maße von baulichen, sozioökonomischen, kulturellen und ökologischen Transformationsprozessen betroffen ist. Allgemeines Ziel des Beitrages ist es, das Verständnis von Vulnerabilität und Bewältigungsstrategien betroffener Stadtbewohner im Kontext der Megastadtentwicklung zu vertiefen. Als konzeptionelle Grundlage für die Untersuchungen der interdisziplinären Arbeitsgruppe dient der Ansatz sozialer und ökologischer Vulnerabilität, wobei hier externe und interne Faktoren sowohl auf institutioneller als auch auf Akteursebene verknüpft werden. Die Ergebnisse – gewonnen auf der Basis von Tiefeninterviews, Kartierungen und Wasseranalysen – zeigen, dass unterschiedliche Formen und Grade der Vulnerabilität vorliegen. Insbesondere unterscheiden sich Migranten und Einheimische in ihrer Betroffenheit und deren Wahrnehmung sowie in ihren Bewältigungsmöglichkeiten.

Evolution des structures urbaines et vulnérabilité sociale et en rapport avec l'eau dans les mégapoles – l'exemple du village urbain Xincún, Guangzhou (Chine)

La politique de réforme et la croissance économique ont entraîné la formation d'agglomérations méga-urbaines fortement dynamiques et haute-

ment complexes. En prenant comme exemple la mégapole de Guangzhou, les processus profonds de restructuration et leurs implications au niveau de la ville entière seront analysés et une étude de cas au niveau des habitants d'un quartier y sera ajoutée. Au premier plan, on trouvera l'analyse de la vulnérabilité sociale et en rapport avec l'eau à Xincún, un village urbain qui est particulièrement soumis à de forts processus de transformation sur les plans architectural, socio-économique, culturel et écologique en raison de l'expansion grandissante des principaux axes d'urbanisme. L'objectif de cet article est d'approfondir la compréhension de la vulnérabilité des habitants concernés et de leurs stratégies pour en maîtriser les problèmes dans le contexte du développement des mégapoles. L'approche de cette étude effectuée par un groupe de travail interdisciplinaire est basée sur le concept de la vulnérabilité sociale et écologique tout en considérant les liens entre les facteurs externes et les facteurs internes aussi bien à l'échelle institutionnelle qu'à celle des acteurs concernés. Les résultats qui ont été obtenus à partir d'interviews approfondies, de relevés cartographiques et d'analyses des eaux, montrent qu'il existe différentes formes et degrés de vulnérabilité. On remarquera tout particulièrement que les immigrants se sentent concernés par ce problème de manière différente à celle de la population autochtone et que les deux groupes ne disposent ni de la même perception de

la situation, ni des mêmes possibilités pour surmonter les difficultés qu'engendre la vulnérabilité sociale et en rapport avec l'eau.

Prof. Dr. Rainer Wehrhahn, Dipl.-Geogr. in Anna Lena Bercht, Department of Geography, University of Kiel, Ludwig-Meyn-Str. 14, 24098 Kiel, Germany, wehrhahn@geographie.uni-kiel.de, bercht@geographie.uni-kiel.de

Prof. Dr. Christian L. Krause, Florian Kluge, Katharina Wiethoff, Department of Landscape Ecology and Landscape Planning, RWTH Aachen University, Lochnerstr. 4-20, 52056 Aachen, Germany, krause@la.rwth-aachen.de, kluge@la.rwth-aachen.de, wiethoff@la.rwth-aachen.de

Prof. Dr. Rafiq Azzam, Dr. Klaus Baier, Ramona Strohschön, Department of Engineering Geology and Hydrogeology, RWTH Aachen University, Lochnerstr. 4-20, 52056 Aachen, Germany, azzam@lih.rwth-aachen.de, baier@lih.rwth-aachen.de, strohschoen@lih.rwth-aachen.de

Manuskripteingang: 09.04.08

Annahme zum Druck: 02.08.2008

Buchbesprechungen

Lampugnani, Vittorio Magnago und Matthias Noell (Hrsg.): Handbuch zum Stadtrand. Gestaltungsstrategien für den suburbanen Raum. – Basel et al.: Birkhäuser 2007. – 318 S., 94 Farbb., 68 Schwarzweißabb. und 14 Strichzeichnungen. – ISBN 978-3-7643-8396-5. – €49,90

Vorweg: Ein schönes Buch! Das bezieht sich sowohl auf die ästhetisch hervorragende, leicht verspielte grafische Gestaltung als auch auf Breite und Tiefe des Inhalts, der nicht am ausschließlich Archi-

tektonischen kleben bleibt und die Attitüde der gegenwärtig tonangebenden Architektengeneration diskret im Hintergrund lässt, neben dem Baulich-Gestalterischen zugleich alles Stadtplanerische im Griff zu haben. Dem widerspricht nicht der Verweis auf städtebauliche Handbücher aus der Feder von Architekten – Manuale, die schon ab Ende des 19. Jh. erschienen und die nie „die objektiven Instrumente, die sie oft zu sein vorgaben“, waren (S. 17). „Das vorliegende Handbuch will mit der Vorstellung einer möglichen methodischen Handlungsweise an Ge-