

# Urban Sprawl in China – Land Use Change at the Transition from Village to Town

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## Abstract

Major transformation processes as ongoing at the periphery of big cities in China need sustainability interventions to contribute to poverty alleviation and ecological improvement. The article analyses tendencies in land use in these changing spaces. The impacts of arable land reduction and loss of ecological and economic productive soil potential are discussed. It assesses chances and risks for agriculture in competition for limited land resources.

As share of farmers will decline, strategies in land use are proposed that preserve arable land and result in land consolidation measures enlarging farming structures to a reasonable size for establishing sustainable peri-urban agriculture.

A well maintained hinterland of cities contributes to a large degree to a balanced dynamic of agglomerations.

## 1 Introduction

China is currently experiencing rapid changes mostly noticeable in big cities in terms of economic growth with effects on social, environmental, infrastructural and political systems there. As a consequence "...China is undergoing the most rapid and largest process of urbanization all over the world" (Paulussen 2003). At present the urban population comes up to about 30 % of the Chinese population and following Paulussen will increase to more than 50 % in the next 20 years. This tendency will deeply impact the social, environmental and economic situation of the whole country.

Analysing the reasons it becomes apparent that rural areas are nearly not affected by the economic boom until now. Poverty alleviation has remained the biggest issue outside the cities where 70 % are still farmers and live somewhat above subsistence level. Land resources in proportion to the large number of farmers are very limited. This is why agriculture is based on very small scale farming (about 0.5 ha/farm) and it is not possible to take advantage of economies of scale.

In other words rural income sources are not yet adequately diversified to stabilize the economic situation mainly in the villages and comprehensive concepts for rural development are an urgent need.

## 2 Background – Urban Sprawl in China

The poor rural situation is one of the reasons why migration to prosperous cities has reached uncontrolled dimensions. “The most rapid growth has been forecasted in medium sized cities of the coastal region with a population of 500,000 up to 1 Mio.: in less than 10 years the urban population will double” (Paulussen 2003). This fact implicates that further expansion of cities leads to urban sprawl. Besides cities do not only spatially grow because of the increasing population but also because of an ever increasing land demand per inhabitant: more living space, more working space, more cars, consequently more space for road traffic but also for new urban facilities – like shopping malls, entertainment facilities, airports etc. (see Figure 1)

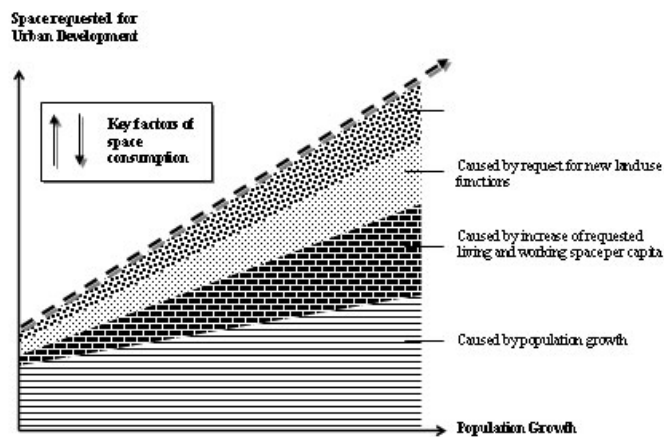


Figure 1: Increase of space occupied by urban functions. (Paulussen 2003)

This shows that urbanisation is a highly dynamic process and leads to accelerated land consumption. “The final spatial result of this process .... is hard to estimate” (Paulussen 2003).

#### Tendencies in land use

Currently changing land use in peri-urban areas in China is subject to different influences. On the one hand land use planning is part of a higher regional planning but on the other hand big national and international investors achieve construction permits very quickly. Peri-urban zones in China have gained economic importance and attract domestic as well as foreign investment. “Simply speaking, peri-urban areas are where the forces of globalization and localization intersect” (Webster 2002). As a consequence agricultural communities are often forced to adjust to an urban or industrial way of life in a very short time. This tendency affects an ever increasing number of villages and amount of land and following Webster the peri-urban zone sometimes extends as far as 150 km from the core city, or as in the Chinese case as far as 300 km.

Moreover informal housing and illegal land captures by migrants lead to uncontrolled construction activities and cause further dissipation of space.

From an economic point of view peri-urban zones in China often end in a stagnating development due to a lack of comprehensive long term strategies. “Because so much land is involved, the strength of drivers of peri-urbanization may decline in some areas and...it appears that a new uneasy equilibrium that is neither totally urban nor suburban will result in many cases” (Webster 2002). Such tendencies may leave rural structures in some parts of the country economically, socially and ecologically imbalanced.

Therefore new strategies should include urban as well as rural development with agricultural concepts in combination with industrialisation plans to complement one another.

### 3 Impacts of Urban Sprawl on Agriculture

Considering the overall land situation of China its limited land resources become quickly obvious. The “productive” land including arable land, forests and grassland currently comes up to about 63 % of the total territory (see Figure 2). In 2005 the per capita arable land just lay at 0.1 ha, which was one third of the world’s average (Liao 2005). These figures already show the tense situation in concerns of food security and China’s ever increasing dependency from food imports.

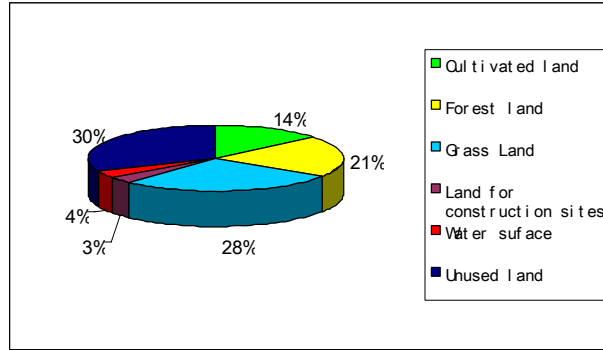


Figure 2: General Land Situation in China (Source: Liao 2005)

#### Effects of arable land reduction:

As China’s population concentrates in the agricultural regions in the east (see Figures 3 and 4) urban sprawl takes primarily place on arable land and causes big losses on fertile soils. “In China, urban sprawl significantly reduced the land area devoted to agriculture. As a result, China lost its independence in food production” (Olson 1996)



Figure 3: Population density in China (Wikipedia 2006)

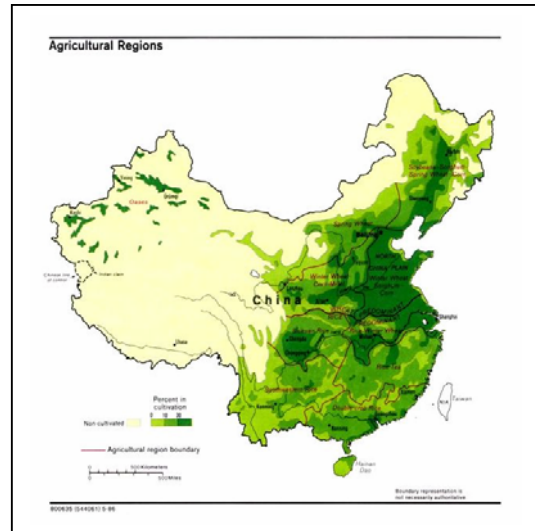


Figure 4: Agricultural Regions in China (Wikipedia 2006)

Consequently the loss of arable land has several dimensions:

- loss of the economic soil potential, primarily for farmers as their basis for subsistence and income, then forced to accept any other job, if available
- further loss of economic soil potential also means for China that food security cannot be guaranteed anymore and leads to dependency from other countries
- loss of the ecological soil potential: once the soil is sealed it is irretrievably lost for cultivation for decades
- loss of the ecological soil potential also includes further reduction of biodiversity, deep impacts on eco-systems and on the appearance of landscape, the change of micro-climatic conditions etc.

Furthermore the absolute loss of arable land is aggravated by erosion and desertification which are major hazards in China and by the tendency of changing nutrition habits towards more land consuming products as meat or milk.

#### Valuation of land and soil potentials

In this context the valuation of land and soil potentials is an interesting question and shows the priorities of a state at the interface of economic soil economy and ecology. The economic land potential in urban and peri-urban areas is much higher than the potential because the ecological soil potential is not yet valued adequately.

#### Priorities and decisions in land use

For a country like China soil and land should not only be considered as economic resource but dimensions as nature, landscape, biodiversity, typical ecosystems etc. should reach higher importance. Regional land use plans integrating these dimensions in appropriate standard can be a useful instrument and contribute to environmental quality.

## 4 The Sustainability Concept of Rural Urban Partnerships

The pressure on arable land resources in China is enormous and this situation needs comprehensive concepts to counteract these tendencies. The sustainability concept can be regarded as long-term concept integrating different aspects in a balancing way.

Sustainable Agriculture is based on:

- organic agriculture: this well established production system aims at preserving natural resources as soil fertility, bio-diversity, water quality and landscape. Soil conservation and water protection as important basis to assure long-term food security
- regional processing of agricultural crops to create additional income and let the regional population benefit from the added value
- regional marketing of crops and processed products thereof strengthens the regional economy, leaves the wealth in the region of origin. Surplus of products supplies near towns. Additionally it contributes to the avoidance of unnecessary long distance transports with all its environmentally negative aspects.
- para-agricultural activities open possibilities for farmers to supplement their income through offering additional services on their farms as e.g. providing beds and food for tourists, ... (Prändl-Zika 2005)

These strategies contribute to a strengthened economic position for farmers. Additionally the rural economy needs more investments and job creation in appropriate rural small and medium scale industries and service companies. Hence, the agricultural sector will be unburdened and further - still illegal - migration into cities shall be avoided.

Under these circumstances land consolidation measures – which is e.g. redistributing of given up farm land, redrawing property lines of agricultural fields to reduce farm fragmentation and to enlarge farming structures – will be reasonable and lead to the facilitation of farming conditions. A very rough calculation which estimates that an average farm size of one ha would lead to an economically stable situation for Chinese farmers shows that at least 50 % of farmers would

have to leave agriculture and find new jobs in other sectors. To prevent these people migrating to cities and causing there further uncontrolled growth and land loss major endeavours have to be undertaken to enable them to stay in their villages and to find another job.

Under spatial concerns sustainable rural urban partnerships should be embedded in a poly-centric network of settlements of different size (see Figure 5) which are oriented along axes of development being the basis for high-capacity public transport. It seems that this concept can be integrated into the already existing Chinese small town strategy (ACCA 21 2005).

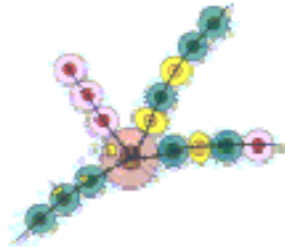


Figure 5: Poly-centric network of settlements (Lung, Skala 2000)

Besides the spatial aspect this poly-centric network contributes to the valorisation of rural areas which is characterised by higher and wider spread investments into the rural infrastructure and economy and by improving access in rural areas to public services as e.g. education, health care and public transport. The villages could stay the places of residence (which is not yet considered in the Chinese small town strategy) with a high quality of life (clean air, calmness, less traffic,...) whereas small towns in the near region could offer new employment, shopping possibilities, schools, social services etc. The regional cooperation of villages, small and medium towns would lead to a strengthened regional economy based on the exchange of rural and urban goods and services. On the one hand fresh regional farmers` products for the near urban markets and a recreation potential for the urban population in the villages and in a well maintained environment, on the other hand different kinds of urban offers to fulfil the daily, weekly and monthly needs of the rural population would reverse migration into cities in the long run.

Furthermore the valorisation of rural regions also includes the explicit appreciation, sustainment and protection of nature and typical cultural landscape as public good. It is an important service by farmers for the whole population and the basis for rural tourism.

Villages in a poly-centric network of settlements will be structurally organised according to the logistic needs of farming activities.

Internal logistic needs: farms and their appending fields are located in a way that internal distances from the farm to the fields are as short as possible. This also contributes to the sustainment of arable land resources as cart-tracks in their dimensions can be minimized. Land consolidation measures should focus on these needs.

External logistic needs: short distances and supply chains in a poly-centric network of settlements with its different markets and consumers facilitate direct marketing for farmers and therefore allow higher profits without intermediaries leading to sustainable rural urban partnerships

## 5 Conclusion

Sustainable urban development is not realisable without sustainable rural involvement. To curb further massive urban sprawl and loss of arable land in China many different measures have to be taken. Two approaches should be combined in land use to achieve sustainable solutions:

The efficiency approach: land sparing types of settlements with high densification and a balanced functional mixture of city life are important strategies. Thus, cities of short distances need less space and lead to sustainable mobility. Further urbanisation of the country should take place along axes so that natural landscape is not too strongly dissected. Besides, these inter-urban connections can be well managed by public transport.

The systems approach: concerns the economic dimension of rural-urban links with its spatial reference. Investments in appropriate rural industries and the development of the rural service sector e.g. tourism should be a prior aim to unburden agriculture micro-economically, to create new jobs and to set up rural-urban networks of production and consumption. In this network agriculture gains higher regional importance as bigger farm sizes can guarantee higher supply security for the food processing industry established in the region but also for urban partners and markets. This kind of rural economy aims firstly to fulfil the needs of the regional population and secondly to set up sustainable rural urban partnerships.

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