

Development on the Urban Fringe: Recent Chinese Experience

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The challenge of developing on the urban fringe takes on new dimensions in the changing economic climate of China. This article explores the difficulties planners face in trying to balance China's desire for increased industrial growth on the fringe with the political goal of Chinese cities to maintain a self-sufficient agricultural base.

Introduction

In recent years, Western media reports have emphasized the dramatic reforms which have been sweeping contemporary China, transforming a rigid, bureaucratic socialist system into a burgeoning market economy. True, important advances have been made in China since 1978 when Deng Xiaoping consolidated his power-base. But as many foreign firms, lured to China by the prospect of one billion consumers have discovered to their cost, China is far from being a market economy.

The reality of economic reform in China is a picture of uneven and patchy development. The official planning system—despite some relaxations—still controls the production and supply of the most important goods and commodities, and in many ways remains as unwieldy now as it was under the Maoists. It is in this context—a system in a state of upheaval—that current developments on the urban fringe must be placed.

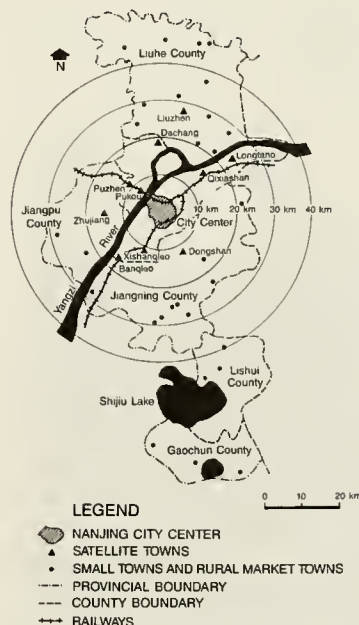
Nanjing: the setting

One common location of relative prosperity in the current phase of development is on the urban fringe. The extent and depth of development will vary from city to city, but belts of significant rural wealth are to be found on the outskirts of most Chinese cities.

Throughout history Nanjing has been one of China's most important cities. First settled in 472 B.C., Nanjing has at various times been China's capital. Situated on a plain in southwestern Jiangsu province, eastern China, Nanjing is surrounded by a terrain of low hills and rivers, most notably the Yangzi.

The urban core is surrounded by suburban city districts of mixed land use—Dachang, Qixia, Yuhuatai and Pukou. Beyond the suburban districts are the five city-administered rural counties—Jiangpu, Jiangning, Liuhe, Lishui and Gaochun—with 198,000 hectares (ha) of cultivable land (see Figure 1). The periphery also contains a diversity of mineral wealth including deposits of iron, gypsum, lead, zinc and manganese as well as limestone and sandstone. Agriculture and rural industry are both well developed.

Figure 1. Nanjing Municipality



Source: unpublished Japanese military maps.



Table 1 illustrates the growth of Nanjing in this century:

Table 1. Nanjing*. Population. Spatial Growth. Various Years.

	Population (millions)		Area (km ²)		Population Densities (persons/km ²)**
	City	Municipality	City	Municipality	City
1922	0.3	n/a	n/a	n/a	n/a
1931	0.63	n/a	n/a	n/a	n/a
1937	1.01	n/a	840	n/a	1202
1949	1.14	n/a	840	n/a	1357
1960	1.65	n/a	840	n/a	1964
1970	1.58	n/a	840	n/a	1880
1973	1.3	2.4	840	3190	1547
1977	1.7	3.2	840	4500	2023
1979	1.95	n/a	840	n/a	n/a
1981	2.08	3.65	867	4718	2399
1982	2.13	3.74	867	4718	2456
1983	2.17	4.56	867	6516	2502
1984	2.2	4.6	867	6516	2537

The rapid increase in population in the 1920s was a result of Nanjing becoming China's capital once again. Nanjing suffered badly during the Japanese occupation but grew significantly in the 1950s, a period of rural-urban migration. Population growth was stalled in the late 1960s and early 1970s (the period of the Cultural Revolution) by a policy of rustification, in which significant numbers of city dwellers were forcibly moved to the countryside. However, by the end of the 1970s, with the return of those sent down to the countryside during the rustification movement, the city population continued to grow. Population densities within the city also grew steadily.

This growing pressure upon available space and infrastructure is one of the key problems currently facing Nanjing planners. There is a clear need to deflect further growth from an already over-crowded urban core and in particular to manage future industrial growth. This is an urban planning problem true for cities throughout the world. Another key concern is how to feed the expanding city. This is a rural planning problem, unique to the Third World and to China in particular, with its goal of urban self-sufficiency in foodstuffs. This article examines two problems.

*Nanjing is the municipality consisting of the urban core and the suburban districts (city) and the 5 city-administered counties.

**All figures deduced.

Industrial Growth and Satellite Towns

The expansion of industrial activity within the city center has long been a problem for Nanjing planners. In the 1930s Nanjing had little in the way of an industrial base, its size and stature reflecting its role as capital city with all the administrative and bureaucratic organs which accompany such a position.² However, after Liberation in 1949, industrial growth in Nanjing was rapid:

Table 2. Nanjing. Industrial Growth. Various Years.

	Number of Enterprises		Gross Industrial Output Value* (\$Billions)		Industrial Employment (1000s)
	City	Rural Counties	City	Rural Counties	Municipality
1930s	n/a	n/a	n/a	n/a	16
1949		881	n/a	n/a	10
1952		1302	n/a	n/a	n/a
1979	n/a	n/a	n/a	n/a	350
1981	1236	876	2.4	0.13	570
1982	1250	974	2.3	0.2	n/a
1983	1261	1572	2.56	0.29	n/a
1984	1351	1524	2.91	0.33	n/a

*1981 Gross Industrial Output Value at 1970 constant prices; 1982ff. values at 1980 constant prices.

Compiled from materials in note 3.

The first expansion of industry was predominantly within the urban core. By the late 1950s, expansion of industrial activity was so extensive that shortages of housing, public utilities and other support services were becoming increasingly evident. In the 1960s, enterprises began to locate in the suburban districts to accommodate further industrial growth. Small townships such as Dachang, Longtan, Banqiao and Xishanqiao developed into significant industrial zones. However, development was somewhat mismanaged, with industrial development often conducted at the expense of the most productive farmland—surrounding the urban core—a major source of vegetables for urban consumption.

By the 1970s, industrial space in the urban core was all but saturated. Further growth, even if physically possible, would only exacerbate urban overcrowding, pollution and waste disposal problems. Thus, Nanjing planners continued the established trend of developing the industrial zone in the suburbs. By this time, the diversity of industrial concerns in the city center and suburbs was considerable. Activities included mining, metallurgy, telecommunications, machine-building, petrochemicals, trucks, and chemical fibres.

Currently, the suburbs themselves are becoming over-

crowded. Industrial growth is expanding through the suburbs into the city-administered rural counties. In an effort to effectively control this expansion, planners have tried to channel growth into designated satellite towns, such as the rural townships of Liuzhen, Zhujiang and Dongshan. The suburban townships of Dachang, Longtan, Banqiao and Xishanqiao, *de facto* satellite towns for a number of years, were included in this group.

The concept of satellite towns was first put forward by Chinese planners in the early 1950s. Ideally, such towns would range in size from 50,000 to 200,000 people. While access to the nearby city was considered important, it was perceived that satellite towns would be independent urban entities and the location of a significant number of urban-based employment opportunities, and adequate urban facilities.

Satellite towns were intended to relieve the pressures on China's overcrowded cities. Industrial enterprises realized that expansion was limited by several factors: a lack of space; increasing traffic congestion; housing shortages, a situation made worse by the significant in-migration to Chinese cities in the 1950s; and increasing levels of pollution—industrial and domestic—exacerbated by growing overcrowding.

However, the experience of satellite towns in Nanjing reveals a sharp divergence between planning theory and practical achievement. First, satellite town development has failed to match industrial growth with the construction of adequate urban infrastructure. Living conditions are poor, while living costs are high. Transportation and communications links, even to the city center, are weak. Education and sanitary standards are low.

Furthermore, much-needed capital investment funds are largely unavailable. While Kirkby reports that since 1982 some improvements in this situation are being made in the suburban satellite towns, the situation in the rural

Farming for urban consumption.



satellites remains bleak.⁴ Compare, for example, the figures in Table 3. Although not directly correlated to service provision in satellite towns, Table 3 gives a clear indication of the discrepancy in capital availability and service provision between the urban and suburban districts (City), and the remainder of the municipality.

Table 3. Nanjing. Investment. Service Provision.
Various indicators. 1981-1984. (\$ percapita)

	1981		1982		1983		1984	
	City	Rural Cos.	City	Rural Cos.	City	Rural Cos.	City	Rural Cos.
Gross investment in capital construction by State-owned units	78.9	4.4	116.1	6.4	90.5	1.7	133.1	2.7
Of which:								
1. Non-productive construction	38.2	1.4	56	2.9	45	1.3	51.7	1.7
2. Culture, education, health and research	13.3	0.4	n/a	n/a	n/a	n/a	n/a	n/a
3. Civil public utilities	7.5	0.2	n/a	n/a	n/a	n/a	n/a	n/a
Secondary schools:								
1. Total number	169	155	170	162	n/a	n/a	n/a	n/a
2. Schools : students	1:769	1:451	1:759	1:451	n/a	n/a	n/a	n/a
3. Teachers : students	1:13	1:18	1:12	1:19	1:12	1:20	1:12	1:21
Primary schools:								
1. Total number	456	1225	456	1184	n/a	n/a	n/a	n/a
2. Schools : students	1:394	1:163	1:367	1:152	n/a	n/a	n/a	n/a
3. Teachers : students	1:20	1:24	1:18	1:23	1:19	1:25	1:21	1:25
Hospital beds:								
1. Total number	11219	3770	8802	2382	9068	3936	9245	4051
2. Beds : population	1:185	1:416	1:242	1:676	1:239	1:607	1:238	1:592

Some figures deduced.

Compiled from materials in note 5.

Satellite towns also suffer from poor management. All too often land use planning is weak, resulting in the siting of incompatible uses (e.g., chemical plants located next to hospitals and schools). The weakness of planning measures is also well illustrated by reports both of misuse and waste of valuable cultivable land around satellite towns.⁶

Currently the illegal use of land for housing construction around the rural satellites is of particular concern. In 1984 all but 3.4 percent of residential building space under construction by state and collective units was located in the city center and suburbs.⁷ For the most part, individuals in the rural satellites are responsible for housing construction. In many cases this has resulted in housing being built on land designated for other purposes. Liu Zhongchun reports that between 1976 and 1981, 1,000 ha of cultivable land were lost in the municipality to housing construc-

tion as well as brickworks, factories and commercial enterprises.⁸ However, the official figures for cultivable land availability in Table 4 do not reflect this—an indication that the official statistics must be treated with care. (More accurate information is unavailable, and most likely does not exist.)

In the suburban satellites, the issue now is not so much illegal use of land, but an absolute lack of land. The rate of construction is increasing, with ten-story residential buildings becoming more common. Population densities are rising, putting a severe strain on the already overburdened infrastructure.

Clearly, in both the suburban and rural satellite towns, much capital investment in infrastructure is needed. Too much of what little capital investment does take place serves only to create further pressure on the already weak existing infrastructure. This is a difficult situation with no easy solutions.

Another concern is that the industrial base which has been developed in the satellite towns, ostensibly providing the foundation for autonomous urban development, is weak. A distinction must be drawn here between the industry of suburban satellites, and that of the more recently-established rural satellites. The industrial base of the suburbs appears to be solid. As Table 2 indicates, virtually all of Nanjing's gross industrial output value is derived from the urban core and suburbs. While numerically the rural industrial base is large, it actually consists of small-scale undertakings using obsolete equipment with inferior technical levels.

Lack of capital is a distinguishing factor here. Poor planning is another. Supply of certain key raw materials is limited, and the planning system remains unable to meet the increasing demands for these materials from the wide range of enterprises which require them, leading to frustration and economic hardship.⁹ Zhang Fubao notes that the industrial base of Zhujiang for example, faces competition from more efficient, well-established factories for both markets and raw materials. In the current economic climate, in which industrial wage levels are linked to productivity and performance in the marketplace, there is little room for sentiment among competing factories. In this environment, fledgling industrial enterprises in the rural satellites will continue to find competition intense and growth difficult.

In Nanjing, the burden of deflecting future growth away from the urban core lies principally with the rural satellite towns. The suburban satellite towns have, in many respects, done as much as possible to reduce pressure on the urban center. Their future role in this regard is limited. Given this fact, the relatively severe difficulties currently experienced by rural satellite towns must be of critical concern to planners.

At this time, the rural satellite towns have only a weak industrial base from which to develop a wide range of urban-based employment. Their urban infrastructure is even less developed. Currently, their population growth owes more to peasants moving in from the countryside than any movement out from the city center. Furthermore, unless living conditions improve markedly, it is unlikely that any such movement from the city center would occur without a great deal of pressure from the authorities. While these towns may be promoting some localized wealth in the countryside around them, these benefits do little to ease the burden of overcrowding in the urban core.

For the moment, improvements remain unlikely. Investment capital is limited, and much of what is available continues to be used to shore up longstanding problems within the urban and suburban districts. It is difficult to see a way out of this situation. Significant inputs of capital and strict controls over current growth in the city center, suburbs, and rural counties are needed. Neither seems to be forthcoming.

Feeding the City

It has long been a planning goal that Chinese cities should, as much as possible, be self-sufficient in providing foodstuffs. To attain this goal, cities have included neighboring rural counties within their municipal boundaries. Self-sufficiency as a planning goal is politically important in that it gives a city a significant element of independence from the state planning system. It is also a reflection of economic reality because it is important that cities avoid long distance interprovincial trade and transfers of foodstuffs. Such movements inevitably involve high transportation costs, excessive amounts of spoilage and waste, and place a heavy burden upon an already fragile transportation and commercial system.

In pursuit of self-sufficiency, Nanjing planners have established two distinct production zones within the municipality. The first, cultivable land in the suburban districts, is a zone of predominantly vegetable production; the second, the rural counties, is a zone where grain is the major crop.

The establishment of a periurban vegetable production zone has numerous advantages. Vegetable producers have easy access to urban markets for sales to consumers, as well as to vegetable processing plants. This proximity minimizes spoilage and wastage losses incurred during shipment, as well as transport costs. There is also a plentiful water supply and the availability of night soil collected daily from the urban core. Pig breeding is strongly associated with vegetable production, and in Nanjing, periurban pig production is an important part of the city's meat supply (see Table 4).

Table 4. Nanjing. Agricultural Base. 1981-1984.

	1981	1982	1983	1984
Cultivable land (1000 ha):				
1. City	22.7	22.7	22.7	n/a
2. Rural Counties	135.3	135.3	198	n/a
Commercial vegetable-growing base: (1000 ha)				
1. City	4.7	n/a	n/a	n/a
2. Rural Counties	0.5	n/a	n/a	n/a
Output of major agricultural products: (1000 metric tons)				
1. Grain				
— City	108.8	115.2	110.5	120.5
— Rural Counties	857.8	993.4	1640.5	1737.8
2. Vegetables				
— City	283.4	297.3	261.8	303.8
— Rural Counties	59.7	67.9	206.6	383.9
3. Fruit				
— City	n/a	n/a	2.4	2.6
— Rural Counties	n/a	n/a	3.4	4.1
4. Hogs (1000)				
— City	160	172	145	n/a
— Rural Counties	460	443	769	n/a

Some figures deduced.

Compiled from materials in note 10.

In Nanjing, this zone of vegetable production was formally established in 1959. Production is highly specialized and intensive, with heavy inputs of both labor and fertilizer. Production is also mechanized to a significant degree. This zone has produced and continues to produce substantial quantities of vegetables for the city (see Table 4). The exception to this occurred during the early 1970s when, like much of China, Nanjing's vegetable base was cut to allow increased grain production.

Beyond this zone, significant amounts of vegetables are produced in the rural counties, as Table 4 illustrates. In the rural counties, however, grain is still the dominant crop, with vegetable production playing a subsidiary role.

Even for a city the size of Nanjing, with its fertile agricultural resource base, achieving a goal of self-sufficiency is not easy. As noted above for instance, there is still continuing pressure on periurban cultivable land for use in building projects.

Of greater significance are difficulties in grain production. Throughout history, producing sufficient grain to feed a huge population has been a yardstick by which regimes in China have been judged. This problem is especially severe around major cities, areas with large non-productive populations.



Despite the reemergence of free markets, foodstuffs in urban areas are in short supply.

Since the 1978 agricultural reforms, state planners have attempted to give peasants the incentive to improve agricultural outputs, particularly that of grain, by allowing them to sell privately or to the state, any produce beyond allotted production quotas. Peasants have been encouraged to diversify crop production (again after the fulfillment of allotted quotas) as well as to develop non-agrarian undertakings such as local industry, service occupations and animal husbandry.

These policies have undoubtedly stimulated grain production within the municipality. However, pressure remains to increase grain output further. A key variable here is the official price of grain. Production quotas require the supply of a stated amount of grain at an official market price. This price, despite recent increases, is low relative to other crops, and also to the use-value of grain. Grain production is thus unpopular with the peasants, and production beyond personal need and the allotted grain quota is discouraged.

However, the bare fulfillment of production quotas alone does not satisfy urban grain demands. Thus, Nanjing planners are faced with the problem of how to increase grain output even further. Raising grain output quotas is not something that would be readily tolerated in the rural counties. In essence, the extent to which peasants can prosper is determined by their ability to generate wealth, through agrarian or other occupations, once allotted grain quotas have been met. Given that current quota levels represent significant inputs of land, labor and capital, raising grain quotas would have an immediate impact on peasant income levels, making it more difficult

to engage in anything but grain farming, and severely limiting their enthusiasm for agricultural production. (An emphasis upon grain production in the Cultural Revolution, for instance, was a key explanation for poor agricultural performance during that period.)

The alternatives to higher grain quotas are limited. In recent years, Nanjing has attempted to bolster its grain production by incorporating additional rural counties within the municipality. In 1974 Liuhe county was incorporated, followed in 1983, by Lishui and Gaochun counties. The effect of these latter additions upon agricultural output was marked (see Table 4); however, this impact was a one-time addition to production and is not in itself an answer to Nanjing's future increasing demands for agricultural produce.

Future sources of extra grain will be sought from increases in the per-unit yields of existing grain fields. There are two elements to this increase. The first element is the improvement of yields of farmers who produce the bare minimum of grain allowed by their quotas. This would facilitate increases in the quota without necessarily increasing inputs of land, although this will mean increases in labor and capital inputs. Second, the yields of farmers who specialize almost exclusively in grain production must be increased.

To implement the first element, agricultural production within the Nanjing countryside is demonstrating a growing sophistication. Liu Daochun et al. report that a growing number of peasant households are moving away from agricultural production itself to provide a variety of skilled agricultural production services to other peasants.¹¹ In this way, skills in such diverse areas as seedling cultivation, seed-strain development, disease and pest control and fertilizer application are becoming available to a wider range of peasants and it is hoped that per-unit yields will rise accordingly. However, for this to occur, planners need to ensure that supplies of chemical fertilizer, pesticides and other key farming inputs are available so that peasants can take advantage of the skills being offered to them. There have been reports that these supplies are both insufficient and irregular.¹²

Given what has been said about the poor returns for grain production, it may be surprising to discover that any producers are willing to specialize in grain production. Farmers are required to devote significantly higher inputs of land, labor and capital to grain production and subsequently they supply higher rates of commodity grain to the state than most producers. The key to this development is the amount of subsidy offered to these grain specialists. These subsidies may involve cheap and guaranteed supplies of fertilizer and pesticides, as well as direct

income subsidies, matching the incomes of grain specialists to those earned by peasants who diversify beyond grain. Such subsidies are expensive to the local authorities within the municipalities who administer them, but are justified by reports of both high per-unit yields and total output by the grain specialists.¹³ It is unclear, however, if this initial success can be maintained and developed to satisfy all of the city's grain demands.

Failure to increase grain output will certainly leave planners with hard choices about future developments in Nanjing. Increases in the non-productive population without concomitant increases in grain production will be difficult to accept. Furthermore, it is already clear that significant tensions exist within the rural counties as a result of the current direction of rural development within the municipality.

There are tensions, for instance, caused by the relative concentration of vegetable production, a source of high producer incomes, in the suburban districts. Table 4 indicates that since the addition of Lishui and Gaochun counties in 1983, the rural counties have a much bigger share of the vegetable market, but it is unlikely that this increase has done more than temporarily ease the tension.

Similarly, tensions are found within the rural counties as some producers prosper more than others. The further geographically removed peasants are from urban markets, the more difficult it becomes to take advantage of the current freedoms within the rural production system. Commercial and transport links to the city center from the periphery, only a distance of perhaps 50 to 60 km, are extremely weak. This is especially true to the north and west of the city beyond the Yangzi, and in the extreme south of the new city-administered counties of Lishui and Gaochun. Thus, on the periphery, income and employment opportunities are increasingly limited to the arable. Commodity production is likewise limited, which restricts the potential of the peripheral authorities to subsidize grain specialists, limiting the extent to which other peasants are able to diversify beyond grain and local development in general. This situation contrasts sharply with the prosperity exhibited by the rural communities more proximate to the city and suburbs.

Finally, as noted above, recent growth in rural satellites owes more to an influx of peasants from the countryside than to migration of urban dwellers from the city center and suburbs. While living conditions in the rural satellites may not appeal to existing city dwellers, they are attractive to peasants in the surrounding countryside, seeking more urban-based employment. Because the work has traditionally been seen as less rewarding, and certainly much harder than urban-based employment, it is difficult to maintain peasant enthusiasm for agricultural production.

Though planners are eager to develop rural satellites to relieve pressure on the city center and suburbs, the same development creates further difficulties for those planners seeking to encourage agricultural production in order to attain self-sufficiency.

Conclusion

Theoretical prescriptions for the development of the urban fringe of Nanjing have been quite readily made, but the reality of the economic environment in which these prescriptions have been implemented has produced only partial success. In Nanjing, the suburban satellite towns did much to relieve early pressure on the city center, but they tended to be developed without the necessary investment in urban infrastructure, a deficiency which is only now being rectified. Given the limited capital available, planners will find it difficult to effectively develop rural satellite towns and prevent them from falling into the same trap.

Furthermore, while the current economic environment in China has certainly proved successful in generating growth (albeit perhaps only in the short run), policies of increasing competitiveness pose problems for planners and their development goals. Industrial growth in the rural satellites is subject to fierce competition, hindering planning objectives for the strength of their industrial base. The opening up of urban markets to rural producers, combined with the low price of grain, has resulted in grain acreage being reduced in favor of more remunerative cash crops, making self-sufficiency more difficult to achieve.

This changed economic environment has created new problems and opportunities for planners, and has accentuated long-standing difficulties. The way in which planners react to this changing environment will largely be determined by the measure of flexibility they are given to solve problems and the resources that are made available to them. It will also depend on how much they themselves can adapt to planning in a system which if not governed by the market, certainly needs to respond to market forces. This represents a real challenge after planning in a rigid, socialist system. It is unclear from the material presented for Nanjing if they will have sufficient resolve or resources. □

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Land shortage on the urban fringe encourages peasants to use all available land.

NOTES

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