Developing Smart and Green Rural Settlements for the Rapid Urbanizing China: Experience Learnt From England

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Abstract: As a part of the modernization process, China's cities and towns have been growing unprecedentedly both in quantity and size. While the efforts of planning and design are largely focused on the urban domain, the country's vast rural settlements are given insufficient guidance on land use, construction management and socio-economic transformation. Consequently the development in many rural communities suffers from a range of problems, such as the lack of basic infrastructure, poor sanitation, environmental contamination, chaotic building form and substandard building quality. In some richer areas, there is also a growing trend to modernize the countryside by the simple application of urban planning methods resulting in the loss of idyllic landscape and rustication. Both of the development patterns lead to a low quality of life and unsustainable rural form. As China accelerates its economic growth, it is imperative to explore how to develop more smart and green rural settlements. In this comparative study, references are drawn from the practice in England where countryside symbolizes high quality of life and traditional value. The development control techniques that have reshaped English villages could inspire the development of the Chinese counterpart for today. However Physical transformation must be in line with a broader pageant of socio-economic change if it is to bring a sustainable future to rural settlements.

Keywords: Chinese rural settlements, English village, sustainable development
1. Introduction

Measured by the built-up area and urban population, China’s cities and towns have been growing unprecedentedly since the late-20th century. The number of ‘cities’ (defined by the government as an urban settlement with more than 0.5 million population and yielding more than US$ 64 Million of annual GDP) is increased from 193 in 1978 to 663 in 2012. But the same statistics shows that the number of registered rural settlement (known as a ‘natural village’ - naturally formed village similar to a hamlet in England) is decreased from 3.6 million to 2.5 million during the same period due to unbridled urban expansion\(^1\). This equals to the rate at which 80-100 rural villages are getting demolished everyday. In line with the rapid urbanization process, China’s spatial planning system has been largely focused on the management of urban districts and suburban areas, leaving the remaining (yet still vast) rural land less planned and under-developed for decades.

Until the end of 2014 China still has 618 million people living in the countryside, accounting for 45.23% of the overall population. The rural communities are organized in approximately 0.62 million village-level divisions which is the lowest tier of the five de facto levels of governmental jurisdictions similar to a civil parish in England\(^2\). A village-level division in China is normally made up of a number of natural villages with population ranging from a few hundred to more than ten thousand\(^3\). As of 2014, only less than 30% of these village divisions have been given detailed and implementable plans or framework to guide the development in social, environmental and economic dimensions. As the result, the development in many Chinese rural communities often displays three problematic patterns.

The first pattern involves decaying villages where population is decreased over time and new development is very limited. In these villages dwellings are commonly lack of proper maintenance and in dilapidated conditions; basic services are frequently missing or overstretched. Many dwellings are even abandoned due to rural-urban migration. The second pattern features uncontrolled construction where housing and basic infrastructure are built by the cheapest methods available and often with substandard quality. Villages in the first two scenarios often suffer from poor sanitation and environmental contamination. The third pattern is likely seen in richer areas where there is a growing trend to ‘modernize’ the countryside simply by introducing urban elements such as stereotyped concrete blocks and broad asphalted thoroughfares. This easily results in the loss of idyllic landscape and rustication. Both of these development patterns lead to a low quality of life, environmental degradation and tasteless spaces. In some places, the three development patterns are interlaced with each other, contributing to a neither smart nor sustainable rural form.

This paper arises out of an ongoing comparative research that looks at how experience may be learnt from those earlier industrialized societies in Europe and North America. References are particularly drawn from the practice in modern English countryside where modern lifestyle is well incorporated with traditional built environment and an image of rural harmony. Part two of this article briefly explains the rationale of this comparative study and discusses the characteristic of the rural settlement development both in China and in England. Part three of the study analyzes the English experience and draws a conclusion on what strategy China may learn to develop a smart countryside in the current rapid urbanizing era.
2. Development towards modern rural communities: the practice in England and China

2.1. Rationale of the comparative study

As the birthplace of the Industrial Revolution, Great Britain is the world’s first country that saw the historic shift of rural-urban population ratio. In England, the urban population jumped from 17% in 1801 to 73% in 1891 and became stable until the modern day – the 2011 census suggests that 79.6% of the contemporary English population is living in an urbanized area. This rate is actually not in its peak due to the planned dispersion of London’s population and business in the 20th century and the counter-urbanization movement. China, as a comparison, has remained as an agriculture-dependent country until the recent decades. China’s urban population ratio reached 51% only in 2011, a level of 1851 England. A 160 years gap means a huge difference in the global socio-economic context. The lifestyle, expectation and means of technical intervention of human society are also dramatically changed. Some may also argue that China’s highly centralized spatial planning regime shares little common language with the Anglo-American tradition. Is contemporary China comparable to England in the past? The rationale of the study lies on the general laws that govern the development of humanity. The reciprocal relationship between the index of industrialization and the level of urbanization and modernization has been largely unchanged over the last century. China (and perhaps other new economies) is more or less following the same development track of the industrialized world. The process and the driving forces behind China’s rural-urban transformation are similar to those historically influenced English countryside. Therefore the practice and experience of England in rural development could be useful and inspire the rejuvenation of the Chinese counterpart for today.

2.2. Rural settlement development in China: to build a “New Socialist Countryside”

For thousands of years farming and rural community have played a significant role in shaping China’s socio-economic tradition. Many Western researchers believe that in feudal China there was not such a rigid difference between cities and the countryside from economic or cultural point of view. The idea that cities represent either a distinct style or a higher level of civilization than the countryside is a cliché of Western cultural traditions. However, with the economic growth and modernism prevailing, the urban-rural relationship in China has also been changed since the 20th century. After the 1950s China’s urban system was heavily influenced by the Soviet ideology in transforming cities into ‘productive’ rather than ‘consumptive’ space. As the result, major Chinese cities were given a huge rural adjunct under their jurisdiction as an effort to combine agriculture with industry, rural living with urban living, mental labor with manual labor, and most importantly to maintain a high level of self-sufficiency of cities in terms of food supply.

The division between cities and their rural adjuncts also creates two forms of land ownership: state ownership of land (in cities) and collective ownership of land (in the countryside). This binary system of land management is largely intact until today despite of the country’s political-economic reform in the 1980s. According to law, the usage rights of the state-owned land can be transacted on the property market while those of the rural land cannot. This gives an effective protection to farmers and the land owned by agricultural cooperative from land speculation and acquisition. Yet it also creates a barrier to the development and investment in the countryside. Consequently the socio-economic gap between
urban and rural community is getting bigger in the recent decades. In 2014, for example, the average annual income of an urban and a rural resident is US$ 4651 and US$1691 respectively, which has almost 3 times of disparity\textsuperscript{6}. In China’s poorer agricultural heartland, the gap is even bigger. Economic stagnation, poverty and surplus labor in agriculture stimulate lasting rural-to-urban migration, just like many other developing countries do. But what being unique in China is that due to the restrictive \textit{hukou} (household registration) system most rural migrants are unlikely to be genuinely integrated into urban communities. Being marginalized from the basic social welfare and education resources, many migrant workers retain the links with their home village in case they have to return from the cities in the future. Some choose to leave their young kids at rural home to be cared by the grandparents (Left-behind children phenomenon) while many others choose to keep their allocated residential plot in the village despite their dwellings have been empty for years and in severe damaged condition (rural hollowing phenomenon)\textsuperscript{7}. Both phenomena suggest a depressed and vigorless countryside.

Of course not all the rural settlements in China are in decaying condition. In the richer east coastal region and particularly in the areas close to cities and towns, many villages establish their own manufacturing enterprises and gain wealth. This is similar to the early period of the English Industrial Revolution when the new sector of textile, iron-making and coalfields were started at a straggle of small industrial hamlets across Yorkshire and the midlands rather than in the cities\textsuperscript{8}. Around 2000, Chinese rural industry has already absorbed one third of the rural labor force and created one fourth of the country’s annual GDP\textsuperscript{9}. But rural industrialization causes obvious setbacks: erosion of farmland by rampant over-construction, pollution and environmental degradation, and inefficient use of energy. Many village enterprises lack essential technology and professional workers and can only produce low quality products. But they create much more contamination troubles than their urban counterpart.

With expanding rural industry but limited rural land, and with concerns over food security and environmental problems at both local and national levels, it is easy to understand how the need for spatial planning of the countryside came to be seen as imperative. In 2003, the central government launched its new policy requiring “coordinated planning of urban and rural development” under the ambitious goal to “build a New Socialist Countryside”\textsuperscript{10}. The push to modernize and reconstruct rural China has been bolstered by the extension of urban planning framework into the countryside: in 2007, the 1990 Urban Planning Act was revised and reissued as the \textit{Urban and Rural Planning Act}. As a result, the principles and practices of urban planning began to be formally applied to rural settlements. One of the far-reaching implications of this instrument is that many village divisions in China were encouraged to commission and implement a 20-year “master plan” for redevelopment\textsuperscript{11}.

Aiming to “transform farmers into urbanites”, the key features of modernist urban planning – functional zoning, concentration of resources, landscaping and even high-rise living – became a commonplace in numerous rural redevelopment projects. Many village planning proposals produced between 2003 and 2013 involved moving dispersed rural population into larger, more compact and well serviced settlements and the rapid provision of essential infrastructure and facilities such as road network, water and electricity supply, communications, sewerage, garbage collection, healthcare, education, cultural and recreational centers, parks, shops, banks and post offices. To achieve this, traditional villages would be demolished and replaced by new modern housing estates with higher building density. However, most of the proposals were extravagant and even utopian, and very difficult to implement. These kinds of unrealistic village plans were questioned in 2013 by the Chinese leaders. In a visit to the
countryside, President Xi Jinping told his CCP cadres that the government “should bear in mind people's nostalgia when planning construction projects in villages” and preserve the pastoral landscape. After the media exposure of his speech the official attitude began to oppose any development proposals involving vast demolition and construction in the countryside.

Rural-to-urban migration, the aspiration of rural transformation, the changing rural planning policy and the development restrictions such as the Hukou system and binary land ownership all play a part in shaping the image of the modern Chinese countryside. This perhaps can be demonstrated by the case of Yangfan Village on the northern margin of the Dabie Mountain in central China. Yangfan Village is fairly a typical of villages in China’s rural heartland. Its built-up area is the home to 3090 inhabitants spread out on 26 naturally formed rural settlements. Despite the village’s history can be dated back to the medieval time, most of the existing dwellings were built after the 19th century. The typical building form is a single-story, pitched roof cottage being set around a small courtyard with a highlighted gatehouse facing an alley. Many traditional buildings survived from the early period were built with sun-dried adobe bricks and timber-framed ceramic tile roof. Most of these mudbrick structures are in poor conditions and cannot provide pleasant living environment in terms of thermal comfort, natural lighting and ventilation (A in Figure 1). In the back lane of the village, quite a number of damaged and abandoned housing can be found, suggesting the existence of the rural hollowing issue (B in Figure 1).

Although Yang-Fan Village has a wealth of traditional dwellings, its main street began to be renewed since the mid-1990s and were gradually occupied by a monotonous type of modernism building. A typical form of its kind is a two-story, flat roofed terrace or semi-detached house featuring large aluminum framed window and creamy ceramic tile cladding (C in Figure 1). While physical living conditions of this kind of modern blocks are improved comparing to those vernacular homes, their form is not in harmony with the village’s idyllic landscape. Lacking details and delicacy, these new dwellings have a trifle austere and stereotyped façade providing almost no aesthetic attractiveness. Nevertheless, because this building type is low cost and easily to build, they have been largely duplicated to everywhere in China’s countryside in recent decades, causing numerous tasteless spaces and wiping off historical memory.

There are other problems demonstrated by Yangfan Village. The signs and advertising of the storefront are poorly designed and lack of harmony with the surroundings. Domestic garbage is discarded randomly causing soil and air contamination. Livestock such as pigs and dogs roam around the village causing hygiene problems (D, E, F in Figure 1). Water supply only relies on shallow wells or ponds which are easily contaminated. Most houses are not equipped with flush toilet and drainage system. Sewage water is discharged without even basic treatment. Most village roads are unpaved and easily become muddy when there is a rain. Besides, there are also other minor issues such as insufficient street lighting, poor street greenery, unorganized vehicle parking and low public transport provision, etc. Since 2010, Yangfan Village has made four versions of masterplan. But none of these plans are able to thoroughly improve Yangfan’s chaotic built environment.

2.3. Rural settlement development in England: to create a modern and fashioned fairyland

For many, the essence of English life is found in villages. Their scale and serenity nature a way of life is envied by those who live in towns and cities. The pattern of English villages dates back some 1500
years, when the Saxons cleared forests and established settlements on the British Isle. Most today’s English villages existed at the time of the *Domesday Book* in 1086, though few actual buildings survive from then. Many old English villages evolved organically around a green, a church or a manor. The buildings and gardens were normally created from local materials. Today, a typical village may contain structures of various dates, from the Middle Ages onward. The church is usually the oldest and the focal point of the village. A large church or a grand manor house in a tiny village indicates a once-prosperous settlement.

**Figure 1.** Jigsaw of Yang-Fan Village (A: vernacular mudbrick dwellings; B: abandoned housing in ruin; C: stereotyped modern houses and tasteless public space; D: store signs and advertising cause visual clutter; E: discarding and burning domestic garbage; F: livestock eating the discarded garbage on the street).

Like in many other countries, agriculture had dominated the English economy for centuries. During the 18th century, after a long period of enclosures, new farming systems created an agricultural revolution that produced larger quantities of food to feed the increasing population. In early 19th-century England, the aristocracy and gentry owned much of the countryside, and their tenants farmed and reared livestock. New tools, fertilizers and harvesting techniques were introduced, resulting in increased productivity and agricultural prosperity. Nevertheless, during the period of intense industrialization the landscape of the English countryside was gradually transformed. Many villages and hamlets became manufacturing or coal-mining towns, or logistic hubs, crowded with substantial factories and warehouses. The rapid expansion of the roads and railway network was able to bring this change to previously remote and isolated areas. But throughout the English history, there were no restrictions over
rural-to-urban migration or land transaction. Rural hollowing phenomenon did not appear in English villages. And the modernist movement, beginning at the turn of the 20th century, had not had a chance to strike the English countryside before the establishment of the Town and Country Planning Act of 1932 – the world’s first planning instrument that extended planning powers to rural territory. Effective conservation and development control enable the vernacular characteristics of the most rural settlements largely survived till the present time.

But the English rural community also faces lots of challenges. The government’s White Paper Our Countryside: The Future: A Fair Deal for Rural England published in 2000 pointed out that “the challenge for rural communities is clear; basic services in rural areas are overstretched; farming has been hit hard by change; development pressures are considerable; the environment has suffered”\textsuperscript{13}. The sustainability of agriculture and the vitality of the rural community are perhaps two major issues of concerns. There is about 20\% of the English population living in the countryside, but most of them have nothing to do with farming and the pastoral sector. In 2011, UK agriculture employed 466,000 people, representing 1.52\% of the workforce, down more than 32\% since the 1990s. UK Agriculture is intensive, highly mechanized, and efficient by European standards. It produces about 60\% of food needs but only contributes 0.7\% of the country’s Gross Value Added (GVA)\textsuperscript{14}. Despite skilled farmers, high technology, fertile soil and subsidies from the European Union, English farm earnings are relatively low comparing to other occupation, mainly due to low prices at the farm gate. With each generation, fewer young people can afford the rising capital cost of entry into farming and more are discouraged by low earnings. The average age of the English farm holder is now 59, suggesting young generation is away from this sector\textsuperscript{15}.

A survey made by Feering Parish Council (Feering is a village in Northeast Essex) in 2012 suggested that among the 57\% respondents who need to work, 17\% travel to London daily, 7\% travel more than 20 miles a day, 13\% travel more than 10 miles, 12\% work locally (1 to 10 miles) and 8\% work at home\textsuperscript{16}. In Feering’s case, motorway and bus links are well connected to nearby towns such as Colchester and Chelmsford. London is reachable within 50 minutes by train. With most people living in the countryside are retired residents, urban commuters or self-employed service sector workers, most easily accessible English villages are actually urban overspills or “colonies”. Some are redeveloped into tourism destination in line with the increasing demands of rural leisure and tourism. As a result, many villages have been fashioned to suit people's image of a traditional rural scene rather than the demands of farming or industry for which they were first established.

England, as other constituent countries of the UK, has a sophisticated planning and development control system governed by a range of planning laws. The current spatial planning framework (being introduced in 2004 but modified in 2010) gives much of the planning power to the local government, particularly district councils or unitary authorities (in the areas of single-tier government). A rural English district (normally non-metropolitan district) typically has a population of 25,000 to 200,000 living in a range of settlements and is broadly equivalent to a township in China. District council is responsible for making Local Development Frameworks (LDFs), which are made up a number of Local Development Documents (LDDs) and Supplementary Planning Documents (SPDs). Local Authorities are also now required to produce Local Development Schemes (LDS), which outline the work the LDDs/SPDs they intend to produce over a three-year period, and Statements of Community Involvement (SCI), which outline how the Council will involve the local community. All LDDs and SPDs also have
to be accompanied by a Sustainability Appraisal (SA) and a Strategic Environmental Assessment (SEA) as required by the EU laws.

**Figure 2.** Development control in English Villages (A: a common green in Lower Slaughter, Cotswolds; B: storefront of Winchcombe’s main street; C: one of the charts in N. Norfolk Design Guide indicating storefront design details; D: one of the charts in N. Norfolk Design Guide for historic building conservation, a note comes with the image read as “Please do not try to turn the historic building on the left into the building on the right!”)

In many occasions a key device of SPDs is a “design guide” produced to support the core strategy of local development. Taking the design guide of North Norfolk District Council (2008 version) as an example, it offers an informative review of local architectural context and traditions, and advises very detailed standards, specifications and design techniques for design and construction to follow. Wide range of subject areas are covered by the 114-page document, from layout and enclosure pattern of a site, to scale, elevation, roof, detailing, material, color and architectural form of a single building, and to curtilage treatment, outbuildings and landscape elements. It also regulates the design and decoration of a storefront in the high street of a service village and important components such as hanging signs, fascia board and illumination of commercial premises to make sure the advertisement pay due regard to their surroundings and be part of the host building. For example, the design guide suggests that “Hanging signs should be restrained in size and not more than 0.9m x 0.6m. They are probably most effective as a simple framed rectangle with its shortest side attached to an iron bracket”17. The local development documents are found effective in promoting high quality modern architecture in towns and villages which is both genuinely innovative and locally distinctive, and which makes a positive contribution to
the overall environment. And they are also useful to integrate new residential developments successfully into established settlements without harming their character or setting. In the areas that have been designated as national parks or “areas of outstanding natural beauty” (24% of the total land in England and Wales), and for the listed historical buildings and local Conservation Areas within the village realm, development control is more strict.

3. Discussions and conclusions

Chinese leaders believe that urbanization holds the key to the country’s ongoing social and economic development. The Chinese government has recently announced an urbanization target of 70% by 2025. This means 200 million more Chinese people will gradually move to cities and towns in ten years’ time. But even though, there will still be around 400 to 500 million people living in the countryside. Rural communities deserve modern and high quality of life as their urban counterparts. Besides, what has been emphasized from the recent policy is that future urbanization would be characterized not by an expansion of megacities, but by growth in rural towns and small cities (so called New Urbanization 新型城镇化).

The CCP is essentially seeking to take the modern life to the rural populace rather than bring the rural populace to the cities. Small rural towns will become an essential part of rural settlements in the future and a bridge between cities and the real countryside.

The overarching question of this study is that what can be learnt from the experience and practice of modern English rural development, and what does it mean to China. Considering the complexity of the question and the scope of the paper, the answer will not be straightforward and may only be made at macro level. A few implications perhaps can be drawn here to deepen the debate.

First of all, a key to England’s early industrial growth was the large pool of available workers forced from rural areas because of land enclosure. Here farmland consolidation is important which not only stimulates labor force movement but also leads English agriculture towards a more efficient and mechanized way of mass production. Today there are around 327,000 agriculture land holdings in the UK, whose average cultivable area is around 54 hectares. Averagely each British farmer can work on 37 hectares of farming land, much larger than those of a Chinese farmer (less than 0.5 hectare per capita). Only agricultural mechanization and farming innovation (such as organic farming, vertical farming and biofuel production) enable farming household get comparable income to urban workers. In 2011, Earnings for English farmer were £30,900 per full-time person, higher than national average\(^1\). A wealthy rural community is important to a stable and vibrant countryside and often has a better taste to the quality and aesthetics of the living environment. That is to say, China should further encourage farmers to amalgamate their farmland into larger farms and release more labors to other sectors.

Secondly, English countryside has a diverse economy which gives high and stable levels of employment. Transportation and business connections with the nearby cities and towns are vital to bring more jobs and opportunities to the rural settlements. China should consider loosening and eventually removing the barriers between its urban and rural societies and improve the liberal flow of people and capital in either way. Investment from the private sector will open a gate for huge development potential to the countryside. The full integration of rural-to-urban migration workers (in socioeconomic and legal terms) means their residential plots in the home village can be sold or taken back by rural cooperatives.
for redevelopment purposes. Of course, essential laws have to be in place to regulate the relevant activity and make sure the interest of rural community is not violated.

Thirdly, a transparent, practical and systematic planning and development control mechanism is very useful to regulate the construction and/or refurbishment in the rural settlements. Particularly planning outputs should mandate detailed design guidelines, technical specification and building code so that rural projects can follow more concrete instructions. Comparing to an English LDF, Chinese village planning documents pay great attention to land management and spatial strategies (including zoning system) but lack detailed explanation, good practice samples and implementation methods. A tangible design guide with distinctive features should be based on a thorough understanding of the local architectural context and craftsmanship, a systematic survey of local construction markets, products and technology, and a bottom-up approach to ensure active public participations.

Finally, the designation of special protected area in England provides the best means of preserving the natural beauty and cultural heritage of countryside. This includes the introduction of national parks, areas of outstanding natural beauty, heritage coasts, national trails and local conservation areas. These areas provide amenity and enjoyment of pastoral landscape to the general public and also valuable habitat for flora and fauna. Currently China has a number of national forest parks or national scenic parks. But they are not national parks equivalent to those in England and normally do not contain rural settlements. A scenic park is more close to a tourist resort and has rather limited influence than a conservation area to rural communities. Again on this regard, the policies and methods adopted by England offers an interesting reference for Chinese decision makers to consider.

As the urbanization accelerates in China, developing a living, working, protected and vibrant countryside has an equal importance. Our aim is to sustain and enhance the distinctive environment, economy and social fabric of the Chinese countryside for the benefit of all. The experience of England may shed the light on the development ahead.

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Conflict of Interest

The authors declare no conflict of interest.

References and Notes

3. The largest village-level division in China is Da-Chang-long Village in Puning city, Guangdong Province. The number of registered residents is 32158 as of 2014.
15. Ibid.

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