

Lifestyle Changes and its Influences on Energy and Water Consumption in China

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1. A Co-Evolution of Production Possibilities and Consumption Pattern

The Economic Miracle

The latter half of the 20th century was a period of the 'economic miracle' for East Asia. Firstly, East Asian countries or regions including Japan, Korea and Taiwan achieved a high annual growth rate of GDP per capita at an average of 8% during the 1960s – 1970s. They achieved industrialization, urbanization, electrification, and motorization in a short timescale of about 20 - 30 years, which took Western countries over two hundred years to achieve. However, at the same time China was engaged in 'socialist movements', especially the ultra leftists of the 'Great Leap Forward' and 'Cultural Revolution', which severely stagnated China's economic development for 20 years.

Since the 'Opening Door Policy', which was implemented in 1978, China has developed with an annual GDP growth rate of almost 9.8% annually, almost three times the world average of 3.3% [James, 1998]. By 2003, China's GDP had reached 6.7 billion US dollars of absolute value, which would put China amongst the seven richest nations or even the second largest economy if counted in purchasing power parity (PPP) [Sun, 2004].

Improving Lifestyle and Structural Economic Changes

The most direct and significant result of China's economic growth is the amazing improvement in quality of life for Chinese people. China's population has experienced a transition from 'poverty' to 'adequate food and clothing'; today growing parts of the population are getting closer to 'well to do' lifestyles. These segments of society have the financial ability and the desire to spend their growing income on luxurious products. They not only want to survive with enough food and clothes, but also like to obtain a quality life of high quality food, comfortable living environments, health care, personal beauties and higher education.

In fact, China's economic development after 1978 has also been characterized by regional disparate development of (economic) - infrastructure and policy inclinations and support, which resulted in the significant differences of income and with it lifestyles between regions¹.

At the same time we could also witness a gradual transformation of China's economic structure from a shifting dominance from agriculture to growing shares of industrial and service sectors. With the availability of a wider range of products the consumption patterns changed. For example, people's diet changed or co-evolved with the development of agricultural sectors with a larger variety of products and a higher extent of food processing; the transformation of housing policies from restricting private ownership to encouragement of a commercial housing sector and private ownership dramatically boosted the construction of new housing developments.

¹ The regional inequality is mainly consisted of urban-rural; coastal-interior differences.

Great Demand for Natural Resources

The change of production and consumption patterns directly relates to the allocation and consumption of natural resources. From the perspective of energy consumption, the per capita consumption grew from 264.3 kgce² in 1965 to 614.4 kgce in 1980, and further increased to 1034 kgce in 2001, to four times the 1965 level [Pan, 2002]. Furthermore, the categories of residential energy consumption has been transforming from cheap but less efficient biomass fuels to more commercial energy (e.g. coal, oil & gas). In fact, China's rapid industrialization was built upon high intensive energy consumption. China is trying to escape from that and to move towards a more efficient energy production and consumption.

Similarly, water resource allocation has been shifting from traditional agricultural irrigation to larger shares for industrial and domestic uses. However, agriculture is still the main consumer in water consumption, although its total consumption fell from 97% to 69% during the last 50 years. Industrial and domestic users raised their shares from 2% to 21% and 1% to 10%, respectively.

Objectives

In this paper, we will give an overview of changing lifestyles influenced by different policies over a 50 years period of China's development. We will then pick a few key areas such as diet, housing, education, water and energy consumption to exemplify these changes and discuss some of their causes. In particular, we will

investigate how changing policy foci directed economic development and resource allocation;

describe lifestyle changes under different stages of economic development with special consideration of urban – rural disparities.

generate historical trends for domestic resource consumption along with lifestyle changes, particularly for energy and water consumption.

2. A Brief Review of Pre –1949: Rich versus Poor: Lavish Lifestyles contrasted by Plain Survival

Before 1949, most parts of China were experiencing unrest and turbulence due to warfare. Over 80% of the total population lived in rural areas. They were engaged in traditional agricultural production, and were hungry and cold.

In rural China, 91% of villagers (peasants) were forced to live on rented land from the 9% of rural residents (feudal lords) [Yang, 1986]. More than half of the surplus products produced was used to pay extremely high rent and loan interests to the landlords [Gabriel, 1998]. Therefore, there were two completely different lifestyles in rural China. Peasants worked hard for the whole year and produced the agricultural outputs, but they were living under dire poverty and struggling to feed themselves. The daily diet structure for peasants was coarse bran with cheap vegetables, and meat consumption for peasants was of unreachable demand. In contrast, the feudal lords obtained a large income without much work. The lifestyle of them was extremely lavish because most of them were enthusiastic to show off their wealth

In urban areas, the first industrialization took place in 1842 after the Opium War when Western capitalists encroached the land to build factories and drove the original small economy bankrupt [Lu, 2003]. As a result, urban workers had to be employed in capitalist

² Kgce: kilogram coal equivalent

enterprises, for which they received little wages but worked over 12 hours per day. Although the self-exploiting artisans could work independently, the products could only be sold to the large-scale merchants who had enough market power to be more accurately described as price makers [Gabriel, 1998]. Consequently, they also received unfair payments. For most urban residents, their lifestyles were as plain as for the rural peasants. Table 1 clearly describes the ‘starvation’ throughout China demonstrating that the majority of income was spent on staple food and clothing simply for survival.

Table 1: The Consumption Pattern of Chinese people prior to 1949 (in %)

Food	Clothing	Rent for house	Fuel & light	Miscellaneous	Total
64.9	14.0	5.3	7.5	9.3	100

Source: Yang, 1986. Research on Chinese Consumption Structure (p. 186)

Generally speaking, people’s demands on natural resources were very basic. However, the category of resource consumption was much different. The rural landlords and urban capitalists were living in luxury houses with heating supplied by burning coal and firewood; some even had electricity for lighting, however, this was only available for a very small part of the total population. Most Chinese just acquired free or cheap resources for their livelihoods; water was only for drinking and cooking, stalks were the main source for heating and cooking, and kerosene was the only commercial energy for lighting.

3. An Effective Beginning (1949-1957): Recovery of the Economy and Improving Lifestyles

The premier task after the New China was established was to recover from the damage done during the war and to generate new economic development. Due to geopolitical reasons, China created a Soviet-style ‘Socialist Planning System’ giving priority to heavy industry development in cities.

Planning Economy and Stimulating Productivity

Under the socialist planning system, the central government planned the quantities of output command and allocated resources and materials. Public ownership of “Means of Production” is a significant characteristic of this kind of planning economics. The huge income disparities of the feudal era were drastically reduced during this time period.

In rural China, the redistribution of land³ effectively stimulated China’s agricultural aggregate output that increased by 25% in real terms from 1952 to 1957, and with it grew the income and the consumption of peasants [CSB, 1981].

In cities, the central government redistributed the unequal regional development from coastal to interior areas which were closer in proximity to raw materials and energy resources. This stimulated industrial productivity and worker’s motivations to produce increasing outputs. Even though industry made remarkable efforts on urban constructions, the industrial sector only contributed 7% of annual GDP on average as compared to the primary sector, which produced 74% of GDP [Demurger, 2001]. However, 90% of China’s capital was concentrated in the urban industrialization, which foreshadowed the significant economic developments in cities.

³ Land Reform of 1950 was implemented throughout China’s rural areas, which demolished the old rural landlord system and replaced by a self-exploiting direct production system, which was completed in 1952[Gabriel, 1998]

Steady Improvement of People’s Living Situation

The effective economic development conducted to the growth of people’s net income level. As Figure 1 shows people’s income increased by 3.2% in countryside and 2.3% in cities respectively. Those increases did not have a significant effect on poverty reduction. By the end of the 1950s, still 64.4% of total population was affected by poverty⁴ [Hu, 2003]. From the perspective of people’s consumption pattern during the first *Five Year Plan (FYP)*, food and cloth still dominated the majority of people’s income both in urban and rural areas (as shown in Figure 2).

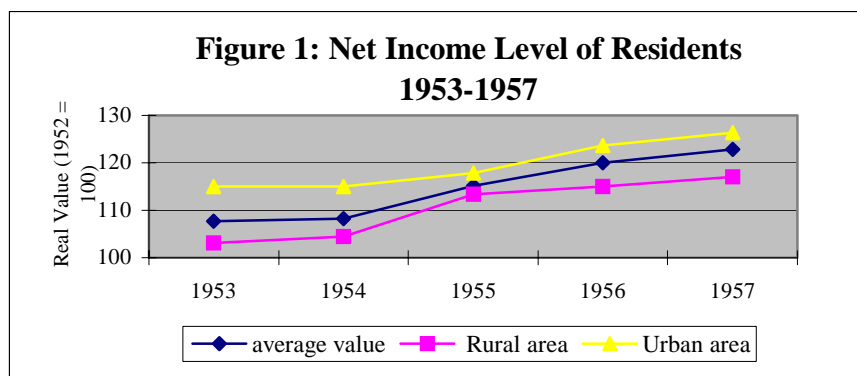
From the view of food consumption, people’s dietary structure changed from surviving to consuming high quality diverse food items such as pork, fruits, milk products and eggs; the total calorie intake and material consumption also grew rapidly, for example, grain consumption increased by more than three times and cloth consumption more than doubled (as shown in Table 2).

Housing established another important difference between urban and rural lifestyles. Although the types of houses were similar (bungalows), urban residents enjoyed their houses, as ‘welfare benefits’⁵ while rural peasants had to pay for the houses by themselves [Taylor, 2001].

Table 2: Selected Goods of per capita Consumption

	Grain (kg)	Pork (kg)	Fresh Eggs (kg)	Cloth
Pro-1949 ⁶	61	1.98	0.15	3.23
1957	203	5.08	1.26	6.82

Source: Yang, 1986. Research on Chinese Consumption Structure (p. 186)

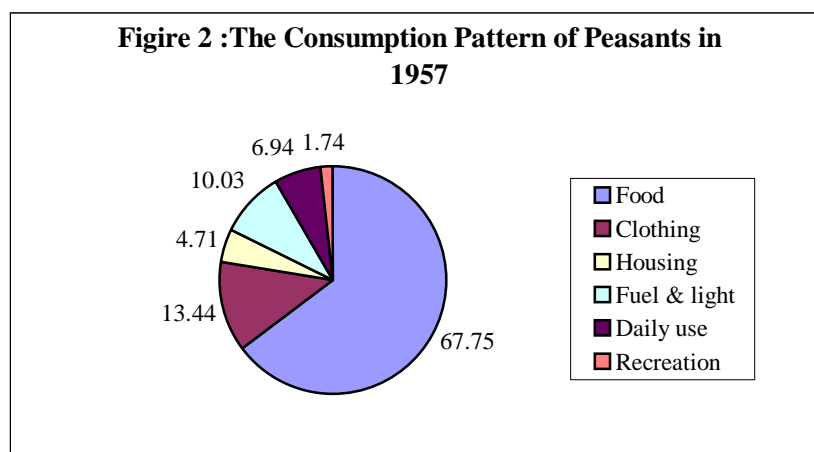


Data source: China Statistics Yearbook, 1986

⁴ The figure was 71.9% prior to 1950 [Hu, 2003].

⁵ Housing commercialization was restricted at that time. The houses were provided by government or State-owned employer and come as a part their jobs [Zhang H, 2003].

⁶ The data of pro-1949 was estimated by Yang, 1986



Data source: Yang, 1986. Research on Chinese Consumption Structure (p. 190)

Biomass for Villagers, Coal for City Dwellers

There was a substantial difference in residential energy consumption pattern between urban and rural household. Urban residential energy was more commercial energy based, while biomass fuels dominated energy consumption in villages, accounted 86% of the total household energy usage [CSB, 1981]. For example, coal and firewood were purchased for cooking and heating in cities, in contrast crop residues and stalks were used in rural cooking and heating because this was free and convenient to acquire. In addition, about 90% of Chinese cities had been provided with electricity for residential lighting by the end of 1950s [Luo, 1998], while most rural people still kept the traditional way for lighting by using candles and kerosene⁷.

Queuing for Wells

China's water withdrawals were mainly used for agricultural irrigations, which occupied 97.09% of the total consumption in 1949. The absolute amount of industry water use increased four times from 2.4 in 1949 to 9.6 billion m³ in 1957 (as showed in Table 3) [MWR, 2000], because of the large-scale industrial development during the first FYP. Meanwhile, per capita residential water usage for urban households slowly increased from 28.5 to 38.4 litres per day⁸. The main reason was that most people still got their water from a source near their home for daily drinking, cooking and washing, both in urban and rural China. The water consumption for showering or bathing was rare activities for Chinese people at that time. However in cities, the infrastructure of the water supply system was quickly expanded in order to ensure the industrial output during the first FYP. The urban water supply system only covered 60 cities prior to 1949, and expanded to more than 150 cities by the end of 1950s [Zhang R, 2003], which created the gap of residential water usage between urban and rural China.

Table 3: Water Use in China 1949 – 1957 (in billion m³)

	1949		1957	
Agriculture	100.1	97.09%	193.8	94.63%
Industry	2.4	2.33%	9.6	4.69%
Domestic	0.6	0.58%	14	0.68%
Total	103.1	100%	204.8	100%

⁷ The governmental provided 1kg kerosene for each rural household per year for lighting [Zheng, 2002].

⁸ The figures were calculated based on the dataset of MWR 1999 by author.

Source: Ministry of Water Resources 1999 & 2000 "The Water Resources Bulletin in 1999

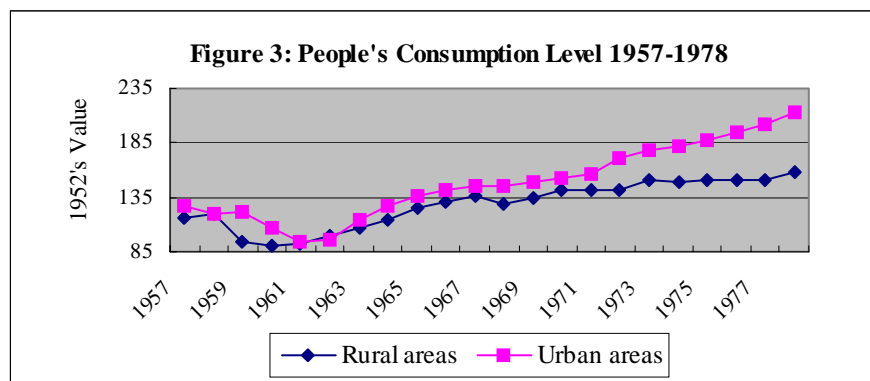
4. A Tumultuous Period: Political Conflicts and Economic Stagnation, 1958-1978

Economic recovery stopped in the following years. Instead, the radical left took possession of governmental politics and quickly spread to areas of social and economic life.

A Crash Industrialization Program - 'Great Leap Forward' (1958 – 1960)

In early 1958, Mao called on China to 'walk on two legs', which further emphasized the importance of heavy industry, especially iron and steel productions [Lu, 2003]. Thousands of small steel-making furnaces were set up in rural China⁹ throughout the country in response to Mao's call of 'steel as the key link'. Ironically, 90% of these types of steel products could not be utilized and had to be re-smelted which obviously resulted in low energy efficiency¹⁰. As a significant number of peasants switched to industrial production, particularly to steel production, and natural disasters resulted in the dramatic decreases of agricultural output causing serious starvation for large parts of the population in the early 1960s.

The decline in GDP directly influenced people's livelihood. As shown in Figure 3, the average value of consumption level decreased from 125 Yuan in 1958 to 104 Yuan in 1962, the value reached the lowest point of 99.4 Yuan in 1961, which completely negated the economic efforts during the first FYP [CSB, 1986].



Data source: China's Statistics Yearbook, 1981, 1986

Economic Disaster – "Cultural Revolution" (1966 – 1976)

Although the failure of the Great Leap Forward was disastrous, Mao still believed leftist politics could be used to achieve a circumstance of equalitarianism in China's society. By contrast, Liu Shaoqi and Deng Xiaoping believed that socialist society had to be built based on economic support; efficient economic development necessarily resulted in income inequality; in the case of China, the inequality should be reduced to acceptable levels, not to be minimized or annihilated. Due to the inconsistency in political opinions, Mao launched the 'Cultural Revolution' against any kind of western or capitalist ideology. The government concentrated all their energy in large-scale political movements; China's economy reached the brink of collapse at the end of the 1960s. The annual growth rate of GDP per capita rate declined for two years by -5.7% in 1967 and -4.1% in 1968 respectively [CSB, 1986].

The radical movement almost ended in 1972. Chinese government returned to normal and started to re-construct the national economy under the national work plan of 'increasing equipment imports and enlarging economic exchange' [Lu, 2003], which resulted in a

⁹ The household registration system was implemented to ensure the control of steel outputs. Households were the basic unit of producer communities.

¹⁰ The annual growth rate of energy consumption was 26.7% during the Great Leap Forward period, but the annual average change of GDP growth was -2.0% [Lang, 2001].

2.7% annual growth rate of GDP per capita from 1970 – 1978. During these 20 years, China’s population grew by 50% from 660 million in 1958 to 963 million in 1978 [CSB, 1999] putting further strain on the already limited resources. The average annual growth rate of GDP per capita was 3.2% over the two decades while other Asian countries (i.e. Japan) were developing fast at about 8% of GDP growth rate.

Basic Livelihood and Traditional Lifestyle

The devious economic development during this period resulted in a stagnation of improvements in people’s livelihoods. During the Great Leap Forward, people’s consumption levels significantly declined both in urban and rural China. Therefore, China had to use the next three years (1961 – 1964) to restore people’s consumption standard to previous levels. Since then, the consumption level started to grow again; during these 20 years overall income growth rates were 2.9% in cities and only 1.37% in rural (in real terms). Table 4 investigates the consumption pattern of Chinese peasants; food and cloth still dominated the majority of people’s consumption expenditures. It also did not find any notable changes in other consumption categories, which at least demonstrated that peasant’s lifestyles were the same as usual. Meanwhile, many urban residents escaped from poverty and shifted to fairly ‘adequate food and clothing’ [Lu, 1998].

During these 20 years, the policies were designed to fight against everything that could be related to the western- or capitalist- links. The government prohibited western influences from flowing into China. Therefore, people had no opportunity to realize how huge the differences were between themselves and western people. Many Chinese thought their lifestyles had been dramatically improved compared to the standard prior to 1949. Moreover, they were not motivated to further change because all the other people had the same.

Table 4: Peasants’ Expenditure Categories (1957 – 1978) (in %)

Years	Food	Clothing	Fuel	Daily use	Recreation	Housing	Total expenses
1957	67.75	13.44	10.03	6.94	1.74	2.10	100
1963	63.30	11.21	9.32	8.79	2.67	4.71	100
1965	68.46	10.51	8.31	7.18	2.71	2.83	100
1978	67.71	12.70	7.11	6.57	2.71	3.16	100

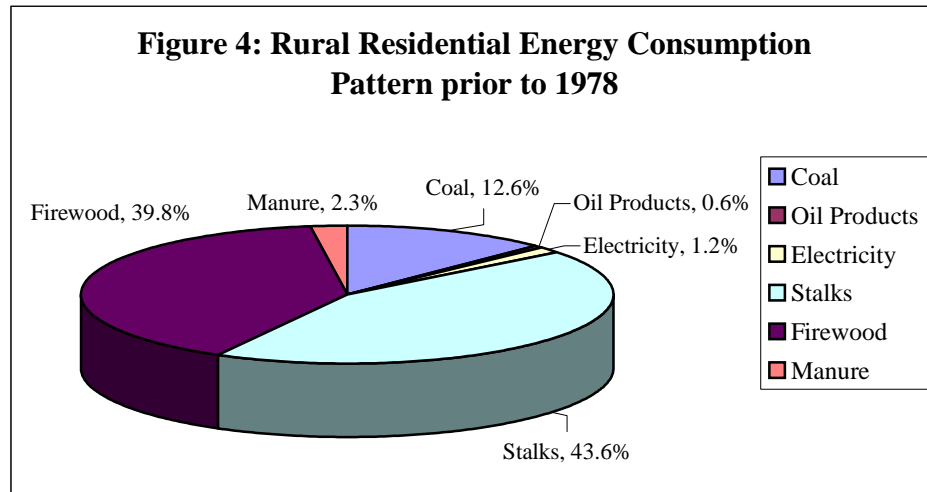
Source: Yang, 1986. Research on Chinese Consumption Structure (p. 186)

Less Biomass in Rural China, More Coal in Cities,

The near stagnation of lifestyle changes resulted in little increases of the absolute amount of per capita residential energy consumption. However, the consumption switched towards more commercial energy sources.

Before 1970s, peasants had to seek energy sources for their residential use by themselves because rural energy infrastructure constructions were excluded from the national plan. Until 1975, the government allowed small local coalmines to be developed to meet peasants’ increasing residential energy demands, which resulted in rapid increase of coal consumption in rural areas, from 9.73 in 1965 to 95 million tons in 1978 [Zheng, 2002]. However, many peasants were still struggling against poverty, and preferred to save for better food and clothes rather than buy fuel (e.g. coal). Therefore, biomass fuels still occupied 85% of total rural energy consumption, but some commercial energy started to be consumed as shown in Figure 4.

Cities were granted favourable policies in energy construction. Prioritising all resources to cities provided sufficient energy to industries and also to cities dwellers. Each urban resident consumed 774 kgce¹¹ commercial energy per year (70% was coal for heating and cooking), which was about 6 times more than peasants did [Pan, 2002]. Until 1978, electricity became a popularised source of energy in 90% of urban households' daily lighting while many peasants were still using kerosene lights.



Data source: China's Rural Statistics Yearbook, 2000

Wells in Rural China but Tap Water in Urban China

Again, the development of water infrastructure did not happen in rural China. People had to acquire their living water from wells, which did not allow for significant increases in household's water consumption.

By contrast, per capita residential water consumption in cities grew at an outstanding rate of 4.7% annually during those 20 years due to the tap water system being established for almost 90% of the cities. By 1980, the per capita residential water usage for urban households was 97.3 litres per day [MWR, 1999]. The figure not only included the daily usage (e.g. cooking, drinking and washing), but also regular activities, such as horticultures and showering and bathing in public bathing places.

5 A Stirring Period: New Policies, Booming Economy and Diversifying Lifestyles since 1980

In 1978, Deng launched the economic reforms and established the 'open-door policy' at the Third Plenum of the Eleventh Party Congress. Since then, China's economic system has fundamentally changed from a central planning economy to a mixed system with elements of central planning and market mechanisms. By following that, China succeeded in achieving an annual growth rate of GDP per capita as 8.6% in real terms¹² for more than 20 years. People's living standard rapidly improved and their lifestyles diversified.

Policy Innovation with income increases

In rural China, the government decided to change rural agricultural policies in 1978 to guarantee higher levels of agricultural output. The 'Household Responsibility System' was therefore established throughout the country. Under this system, peasants could

¹¹ kgce: kilogram coal equivalent

¹² The GDP per capita is calculated at 1995 constant prices. Tibet and Hainan was not included due to missing data for GDP components.

independently arrange, produce and sell their products, which effectively stimulated peasants' motivations and responsibility and was enthusiastically accepted [Lu, 2000]. As a result, agricultural outputs grew to almost four times the pre-reform level by 1997 while productivity increased 1.5 times during the same period [Fan, 2002].

Another important government activity in rural China was the opening up of the rural economy. The rural enterprises have been therefore dramatically developed during the past two decades. In the early 1980s, employment in the agricultural sector accounted for 97% of total rural labour, but this figure declined to 68% in 2001 [CSB, 2002], which is still a considerable share. The new rural economic structure led to a growth in peasants' net income from 133 Yuan in 1978 to 2330 Yuan in 2001; the annual growth rate was 7.8% in real terms [CSB, 2002].

In cities, the real reform did not actually start until the end of 1984. The central government granted more autonomy to local authorities, which formed the domestic competition between provinces. The direct consequence from this competitive mechanism was an increase in industrial productivity, resulting in rapid GDP growth. In addition, China started to intensively attract foreign trade and investment since the beginning of 1990, which not only made a significant contribution in China's economic growth but also brought advanced technology and management systems to Chinese enterprises [Fan, 2002]. Consequently, city dwellers' net income increased as an annual growth rate of 10.1%. By 2001, the average income for each urban resident was 6859 Yuan in 2001, three times more than peasant's level [CSB, 2002]. People did not only settle for sufficient food any more; and started to purchase high-quality goods and adopted more diverse lifestyles.

Rapid Consumption Growth

Table 6 and 7 investigates the changes of consumption pattern from 1978 to 2001. The proportion of expenditures on food and cloth steadily decreased while the proportion of other items' increased. The figures for food, housing, education expenditures, and water and energy expenditures significantly changed; therefore we use them as indicators to reveal people's lifestyle changes since 1978.

Table 6: Rural Consumption Expenditure Pattern

Rural China	Expenditures		Food & Cloth		Transport		Housing		Household appliances		Education & Recreation	
	Yuan	%	Yuan	%	Yuan	%	Yuan	%	Yuan	%	Yuan	%
1978	116	100	94	82	11	9	12	10	8	7	3	3
1985	317	100	214	78	5	2	58	18	16	5	12	4
1990	584	100	388	75	8	1	101	17	31	5	31	5
2001	1741	100	930	53	110	6	279	16	192	11	248	14

Data source: China Statistics Yearbook, 1996, 2002

Table 7: Urban Consumption Expenditure Pattern

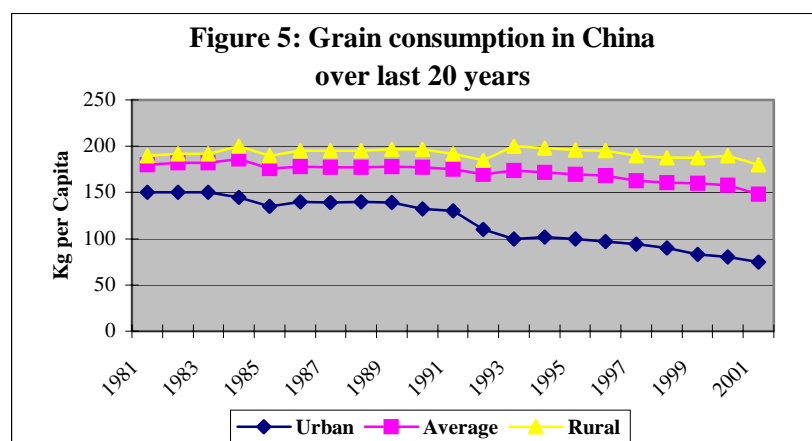
Urban China	Expenditures		Food & Cloth		Transport		Housing		Household appliances		Education & Recreation		Medical Care	
	Yuan	%	Yuan	%	Yuan	%	Yuan	%	Yuan	%	Yuan	%	Yuan	%
	1985	673	100	449	67	14	2	32	5	58	9	55	8	17
1990	1279	100	865	67	40	1	61	7	108	10	112	9	26	2
1995	3538	100	2245	64	171	5	250	7	297	8	312	9	110	3
2001	5309	100	2547	48	457	9	547	10	395	8	974	12	343	7

Data source: China Statistics Yearbook, 1996, 2002

Diet change:

Although food and cloth still dominated people's expenditure both in urban and rural areas, the share has been progressively decreasing since 1978 (Table 6&7). From the perspective of food structure, people's diet contains more meat and health food, but less cereal products. Figure 5 illustrates the decline of grain consumption in both rural but mainly in urban China. The decline of grain consumption does not mean the total calorie intake decreased, but rather that we can observe a switch to more diverse diets with higher share of meat, fish, fruits, etc.

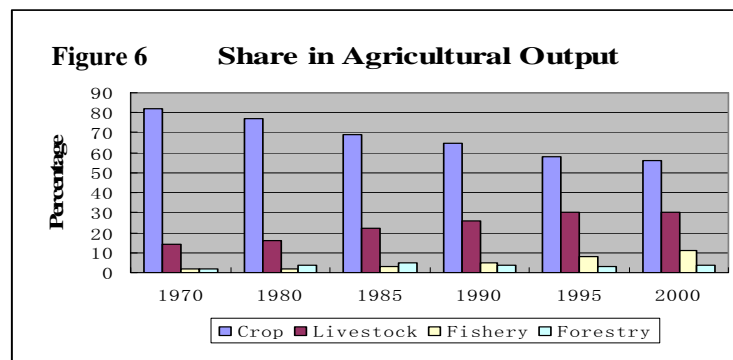
In fact, there is a substantial gap in the consumption patterns of urban and rural consumers due to the inequality of income levels. For example, per capita grain consumption by rural households (178 kg) was more than double that by urban households (80). Meanwhile, urban per capita consumption of pork, red meat, poultry, eggs and aquatic products were much greater than rural consumption. But the saturation of the pork market in urban China is narrowing this gap between urban and rural pork consumption [Wu, 2003].



Data source: China's Rural Statistics Yearbook, 2000

The significant increase of availability of meat and other dairy products boosted the development of livestock production, and other agricultural productions [Hubacek and Sun, 2001]. As a result, diversified agriculture emerged in rural China, many peasants shifted from the traditional agriculture of crop cultivation to more commercial agricultures. As Figure 6 shows, the share of livestock output almost doubled from 16% to 30% in 1970 – 2000. The fishery production even grew at a higher rate. One of the outstanding features in

the changes of agricultural structure is that the share of grain drastically declined from 78% to 50% [Gale, 2002]. Along with the emergence of diversified food and changing demand, the industry of food processing and manufacturing has been flourishing since the reform.



Data source: China's Statistics Yearbook, 2001

Housing and household appliances:

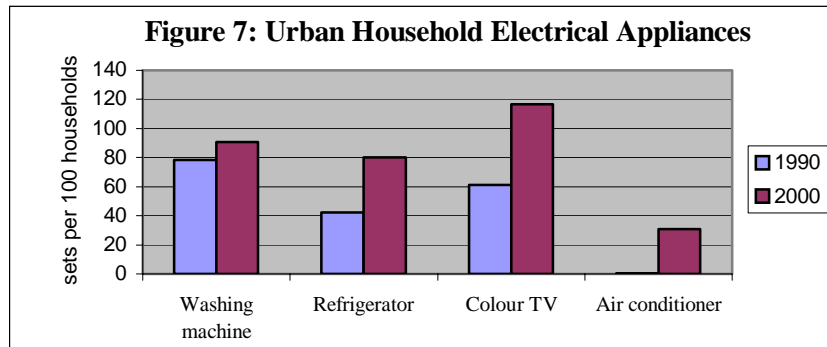
The outstanding increase of expenditure on housing during the time period from 1978 to 1990 both for rural and urban households (as showed in Table 6&7) could reveal people's willingness to improve their living conditions. Many rural households rebuilt and extended their bungalows by using building materials of concrete bricks and tiles instead of marl and woods. At the same time, per capita living space expanded from 8.1 m² to 24.2 m², and the lifespan of houses extended by more than 20 years [CSB, 2002].

In urban China, the problem of housing shortage was much more serious than in rural areas. The per capita net living space for urban residents was only 3.6 m² prior to 1978, mainly because of restrictions on private house ownership. Cities dwellers urged the development of housing. Until 1981, the commercialization of the housing sector brought about with the Housing Reform Policy had been introduced to solve the problems of urban housing shortages and poor housing conditions [Zhang H, 2003]. This policy encouraged private ownership and people buying their own apartments. Meanwhile, the government, state owned enterprises, individuals and oversea developers invested significant funds into the urban housing development. Lin (1991) estimated that the total housing investment between 1979 and 1990 was 6.74% of total GDP. As a result, city dwellers started to move from previously tiny bungalows or apartments to new Multi-stories apartment blocks or even high-rise buildings, and per capita net living space increased to an average of 15.5 m² in 2001 [CBS, 2002].

People settled down in more spacious living places that allowed them to shift their attention to household appliances and other durable goods. For example, since the 1980s, urban residents spent increasing amounts on large durable furniture (e.g. wardrobes, beds and sofa etc). Household appliances have kept a constant share of urban household expenditures for investment since 1985 (shown in Table 8), while the categories of household appliances have been changed. This development was also enabled by an increasing rate of household electrification since 1990. Therefore, household electrical appliances purchased by people quickly increased in both quantity and category during the past ten years (as showed in Figure 7). For example, purchase of refrigerator and colour TV in urban areas has both doubled in 2000 compared with 1990. Colour TVs have already covered over half of rural China, and other categories of electric appliances have been rapidly spreading through China.

Another example is air conditioners, previously a sign of the wealthy, increased significantly to about 30 sets per 100 households [CSB, 2001]. The popularisation of household electrification dramatically boosted the household appliance production. The

electronic industry has become the largest industry in China, which contributed about 8-10% of GDP, and 30% of export profits [People Daily, 28/02/02].



Data source: China's Statistics Yearbook, 2001

Education:

With the unfolding of the reforms and liberalisation, more and more peasants have realized that increased education would make them more productive and employable. Therefore, they are willing to pay more for education, especially for their children. Rural residents view schooling as a means to migrate to an urban job; the people with the highest level of education and skill are the most likely to enter nonagricultural work, leaving the less skilled in farming [Gale, 2002]. As a result, almost 60% of youth population in rural China could complete the nine years compulsory education, and 15% of them could be sent to colleges for further studies by 2001 [China Education and Research Network]. Meanwhile, almost 20% adult peasants joined part-time courses to learn about and acquire new agricultural technology. Although the above figures are not outstanding, it is pleasing to see the transformation of turning peasants into modern peasants, which speeds up the commercialization and modernization in rural China.

In cities, people's ideology is progressively opening up to the west as they admit and try to reduce the disparity between themselves and western lifestyles. It not only embodies in spending on general living conditions, but also the gradually increasing investment in education and medical care. 'Go abroad to study or work' for youth generation (age: 19-36)¹³ became a popular topic in urban China today. The total number of overseas people dramatically increased in the past a couple of years. For example in 1978, only 50 people sponsored by government went to abroad to study and work, the figure leaped to 39 thousand in 2000, and doubled again in 2001. By 2002, the total amount reached 125 thousand, 93% of them financed by themselves [Science Daily, 26/08/03]. Although 'Go abroad' could not happen to everyone; it accelerates the process of people's realization to the west, and stimulates the urban households to further transform to health and knowledgeable lifestyles after the affluent livelihoods.

Diverse Energy Sources in Villages and Cleaner Energy in Cities

Adequate energy support is the basis of China's rapid economic development and household modernization.

So far, non-commercial energy like biomass still dominates rural residential energy consumption patterns. For example, stalks, firewood and other non-commercial energy sources contributed approximate 85% of residential energy in 1980 [Zhou, 1999]. The

¹³ Due to the cultural reason, most people less than 25 years old have to be paid by their family for study in abroad.

overuse of biomass energy caused such problems as the cultivated land degradation and destroyed forest resources. Since the policy of biomass energy conservation and forestation were established in the middle of 1990, the absolute amount of biomass energy consumption has fallen from 250 Mtce¹⁴ in 1995 to around 200 Mtce in 2000. However, the total amount of residential energy is continuously growing, with major increases from commercial sources. The total amount of commercial energy consumption grew remarkably by 3.6 times, from 41 Mtce in 1980 to 149 Mtce in 2000 [Pan, 2002]. Therefore, it is interesting to point out that the commercial energy for rural residential uses will gradually replace biomass energy and become the major energy source in the future. Coal consumption shows a descending tendency after 1988, which demonstrates that coal is no longer the favourite source for rural household daily use. In addition, the government encouraged people to use fuel-saving stoves to replace the traditional ones since 1986, and the fuel-saving stoves could increase the thermal efficiency to 25% - 30% [Zheng, 1998], which also led to the reduction of coal consumption. By the end of 1997, the fuel-saving stoves had been installed in 180 million rural households, which accounts for 89% of total rural households [Wang, 1998].

The improvement of urban people's living conditions significantly changed urban residential energy consumption pattern. In terms of heating, most urban areas still keep the traditional way of heating by burning coal¹⁵. The increase of per capita net living space is likely to result in more coal being consumed. However, the previous type of individual heating has been switched to large-scale central heating as people moved from bungalows to apartment blocks, which effectively enhanced energy efficiency. Furthermore, many rich cities (e.g. Beijing) have been installed the 'consumer control system' of heat supply to allow heat supply to best match demand [World Bank, 2001]. On the other hand, the government provides LPG (liquefied petroleum gas) or gas pipelines for people's daily cooking instead of traditional cooking by burning coal, to reduce urban coal consumption. Per capita coal consumption for urban residential use rapidly declined from 348.5kg/year in 1985 to 88.2kg/year in 1999. As the outstanding growth of household electrical appliances for urban households, the per capita residential electricity consumption increased more than four times during 1985-1999. Electricity became the dominant fuel in all Chinese cities, accounting for 59% of the whole household energy consumption [CSB, 2000].

Water reform in villages, potential scarcity in cities

Also residential demand for water has significantly grown since 1978, although it remains a relatively small share of total water consumption, which is 3.8% in cities and 6.8% in countryside [Zhang H, 2003].

The per capita water consumption in rural households was 89 liters per day by 2000. Compare to 244 liters daily use in urban China, many peasants would have great potential ability to consume more, which is due to poor water infrastructure in rural China. According to the 1997 census of agriculture, only 17% of rural households had access to tap water [USDA, 2000]. With the increase of peasant's net income level an increasing demand for water related household appliances such as kitchen sinks, washing machines, and shower heads (standard urban amenities) is evident but hard to achieve due to the poor water supply situation. Therefore, the demand for improving rural water infrastructure progressively increases in recent years. Chinese government invested 4 billion Yuan in 2000 in order to construct water tap supply systems in rural China, which has already covered 41% of the whole countryside by the end of 2002 [Wang, 2003].

¹⁴ Mtce: Million tons coal equivalent

¹⁵ Household heating mainly happens to the north China.

More and more efforts have been made on improving housing conditions in cities. If we compare the present housing design standard with previous ones, now, over 70% of the new apartments have flush toilets, kitchen sinks, and shower head and other basic facilities, but only 34% of households had flush toilets prior to 1980 [Zhang H, 2003]. Furthermore, many city dwellers with outstanding growth of income are switching their lifestyles towards western standard in order to achieve a comfortable, healthy and hygienic livelihood. Many household appliances such as washing machines, dishwashers, refrigerators and water heaters which were novelties in the beginning of the early 1980's are now popular among urban households. For each 100 families, 92 have washing machines, 52 had water heaters by 2001 [CSB, 2002]. All those housing improvements contributed in the increase of per capita daily household water consumption from less than 100 liters in 1980 to 244 liters in 2000, with the expectation to be further increased to 280 liters per day by 2010. However, compared with American daily use with some 400 liters per capita, one can see enormous potential increases of residential water demand as lifestyles change.

6. Conclusion

China's case is an interesting example of how consumption patterns have changed in relatively short period of time. A large share of the population (almost 70%) is still living in rural China with the associated lifestyles. Often times there is no adequate infrastructure to provide for electricity and water, people have to gather their own energy sources and collect their water from wells. For them as for many other Chinese before them changing their lifestyles is dependent on the opportunities provided by income and the availability of products and resources. The story of changes in lifestyles in china is still mainly a story of economic development and of catching up with the rest of the world. People mainly in urban areas are closer to a "Western Ideal" in terms of consumption of products and services. Sustainability in consumption is not quite a widespread issue yet. The first goal is to achieve a certain standard before thinking about the environmental side effects. Environmental destruction in China has reached enormous scales already, increasing awareness and pressure on policy makers and production facilities. China has proven to quickly develop from a developing country to an important economic player. Maybe in terms of sustainability we can hope for a similar quick development. Given the size of the economy and China's population one would hope so.

7. Reference

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