

19th International Conference Enterprise and Competitive Environment 2016, ECE 2016, 10–11  
March 2016, Brno, Czech Republic

## Developing Service Industry to Solve Environment Conflict: A Case of Yuyang District, China

Rong Kang<sup>a,\*</sup>, Chen Feng<sup>a</sup>

<sup>a</sup>*School of Economics & Management, Northwest University, Xi'an 710127, China*

---

### Abstract

This paper is to explain the mode of developing service industry to fight against environmental conflicts. Yuyang District of Yulin City, Shaanxi Province is chosen as a case, which faces both economic development task and environment protection task. Based on literature review, field studies have been done in Yuyang, focusing on how to develop modern service industry. Obvious problems are identified in terms of applying service industry to help solve environmental conflict. It is found that service industry, both industrial service sector and consumption service sector can help Yuyang out of problems of environment pollution at the same time of economic growth.

© 2016 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of ECE 2016

*Keywords:* service industry; environmental conflict; Yuyang District

---

### 1. Introduction

Shaanxi Province ranks first in China in terms of the potential economic value of mineral resources. In developing economy, exploitation of natural resource is an indispensable way. According provincial development project, certain industries such as coal, chemical, and electricity should be emphasized and developed. Yuyang District is in the frontier of coal and chemical industry. The development faces environmental conflicts, both naturally-oriented and human activity-driven. At the same time, both the national growth plan and local community call for building environment-friendly economy. How to develop economy and protect the environment together becomes a vital issue.

---

\* Corresponding author.

*E-mail address:* [1057816418@qq.com](mailto:1057816418@qq.com)

Based on literature review and field study, environmental conflict Yuyang District is facing is analyzed; by studying the structure of the primary, secondary and tertiary industry of Yuyang, it is put forward that developing service industry can help regions of environmental vulnerability in solving environmental conflicts; specific measures are pointed out for Yuyang District.

## 2. Where is Yuyang?

Yuyang District is an administrative district of Yulin City of Shaanxi Province. It is located in the northern part of Shaanxi Province, covering an area of about 7000 square kilometers. It is situated in the middle of Wuding River, footing on Maowusu Desert and the Loess Plateau. The Great Wall built in Ming Dynasty (1368–1644 AD.) separates the district into two parts in terms of topographic feature: to its north, it is sandy marsh; and to its south, it is hill and gully. The yellow dot in the following map is Yuyang District.

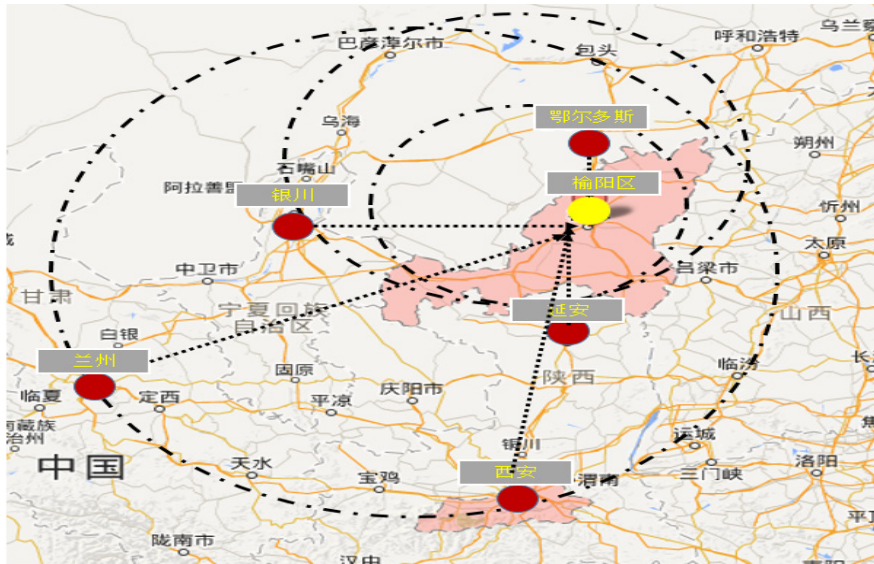


Fig. 1. Map of Yuyang District

## 3. Methodology

In this study, literature review is the base and sufficient field investigations have been done from the last quarter of 2014 to the first quarter of 2015.

The literature review includes two parts. The first type is academic research. The relation between industrial structure and economic growth has been emphasized, because rational industrial structure can promote the economy grow to higher level, while the irrational structure can hinder the growth of economy. Hoffman (1931) proposed that with the process of industrialization, the ratio of the net revenue of consumption resource to the capital resource decreases continuously. Kuznets (1966) studied 50 countries and showed the relationship between industrial structure and economic growth, mentioned the industrial structure of an economy is decided by its production method. Scholars have also showed that promoting the industrial structure and regional industrial harmony depends on the design and execution of industry policy. Yiyang Li (2011) studied Gansu Province in terms of the correlation between industrial structure and economic growth, drawing the conclusion that the top phase of industrial structure development is the one in which service industry takes the dominant role, followed by the secondary industry.

The second type of literature include policy and related statistical reports, including “National economy and social development statistics bulletin of Yulin City”, “National economy and social development statistics bulletin

of Yuyang District”, “Overall planning of Yulin City”, “Planning for 6 key towns and 6 industrial parks of Yuyang District”, “Suggestions to support Yulin City to realize sustainable development” and “Suggestions of Shaanxi Province to promote service industry” and “National Direction of State Council to speed up productive service industry to promote the adjustment and upgrade of industrial structure”.

#### 4. The Environmental Conflict of Yuyang District

##### 4.1. Nature oriented conflicts

The two types of topography. The sandy marsh in the north of the Great Wall: it is relatively flat terrain, sand dunes, marsh, and small lakes spread over. Most part are covered by deep eolian loess; the depth ranges from dozens to over a hundred meters, belonging to Maowusu Desert. The hill and gully to the south of the Great Wall: it is featured by over 3000 ridges. Since it is severely deficient in water resource, it has long been the key area of soil and water conservation.

The climate of Yuyang. Yuyang District is situated in the east of Erdos Platform, belonging to semi-arid and desert regions, featured by the typical continental monsoon climate, four seasons are clearly cut. The annual average rainfall is 365.7mm, the average annual temperature is 8.3 degree centigrade. In winter, it is under the controlled by Siberia strong cold air. In spring and summer, it is prone to happen cold, frost and wind dust weather. The rainfall is uneven, mainly concentrated in summer, often accompanied by high winds, dust storms and hail weather, the drought and hail happen with various frequency.

Water resource. The water resource within Yuyang District is 913.5 million m<sup>3</sup>, and that per capita is 1833 m<sup>3</sup>, which is only one quarter of the average in Shaanxi Province, and one sixth of the national average. Yuyang District lacks water severely. The development of industries and agriculture increase the demand of water resource, further deepening the conflict of water scarcity.

The Temperature Sudden Change in recent 62 Years. Juan Lv and Juan Gao have studied the climate change character of Yuyang District within past 30 years based on the data between 1981 and 2010 on daily average temperature, precipitation, and sunshine hours of the National Basic Meteorological Stations. It shows that in the recent 30 years, the annual average temperature shows a rising trend. Among the studied 30 years, the first 20 years saw a slow rising trend while the last 10 witnessed a fast increasing temperature, to be exact, the annual average temperature between 2001 to 2010 is 9.4°C, higher than the studied 30 year average by 0.6°C. In terms of extreme temperature, the highest extreme daily temperature was on June 22, 2005 (39°C); the lowest was on December 23, 1984 (-29.7°C). Boyu Zhang and Xuejiao Gao have studied the Temperature Sudden Change in recent 62 Years of Yuyang District based on basic data on average temperature, monthly average highest and lowest temperature. The yearly average temperature, the yearly average highest and lowest temperature all show rising trends; among which, the lowest temperature shows an obvious rising trend, with a 0.3°C/10 a. The yearly average temperature sudden change took place in 1993, changing from being cold to being warmer. Since 21st century, the temperature shows obvious uprising trend, comparatively, the highest temperature sudden change happened earlier than the lowest one.

##### 4.2. The human activity driven conflicts

In recent years, the economy of Yuyang District has developed very fast. The industrial structure has changed a lot, in which industrial economy grows continuously, moving the urbanization and improving the living condition. However, the traditional mode of economic growth also brings about many conflicts and problems. The economic growth depends more and more on coal, petroleum and natural gas resource exploitation, so the sustainable development of it has to face severe challenges in terms of environment protection.

Yuyang District is located in the resource rich area of northern part of Shaanxi Province, which has one of the seven important coal mining areas in the world, and it also has rich reserve of oil, gas, rock salt, etc. In 1988, the National Commission of Development and Reform officially initiated the project of Northern Shaanxi Energy and Chemical Base. In 2003, the construction started in large scale.

The development of energy industry and chemical base has to face two challenges in terms of environmental conflicts. On one hand, the project is located in loess hilly region and sandy marsh region along the Great Wall, which face the most serious soil erosion and sand storm hazard. It is very fragile ecological environment. On another, the project is situated in one of the poorest places in western China. Of the 25 counties covered by the project, 16 are national poverty support key counties, hence the conflict of energy development, poverty and fragile ecological environment is very dominant.

According to the series of Rural Poverty Monitoring Report of China, over a half of absolute poor population live in mountain areas, featured by lacking of resources, being remote and poor environment condition.

The industrial development of the studied region. From 1978, China started the Opening and Reform Policy, the industrial structure in Northern Shaanxi Province has a clear trend of changing. The primary industry has decreased, while the secondary industry increased, but the tertiary industry has not changed significantly. Among the fast developing secondary industry, energy and chemical business is the major section, much more important than the light industry. Most of the enterprises are in mining industry and related fields, such as petroleum engineering, coke, electricity, chemical raw material, and chemistry companies.

The coal industry and environmental conflict. The coal industry has been the core of the industrial growth, but it has caused a series of environmental conflict. Firstly, the re-exploitation rate of mines are low. According to the “Technical norm of coal industry” in China, the re-exploitation rate of coal mines should be more than 75%, but the mines of Yuyang District can only reach 45%, which means a lot of waste of resources. Secondly, the recycle economy has not been developed well, and the resources do not realize high comprehensive usage. Currently, the coal mines focus on exploitation and sales of raw coal, the application and further usage of coal resources is poor, so the industrial chain is short, the value added of products is low. For example, the comprehensive resource usage is no more than 40%, gangue is less than 20%, fly ash is 48%, and the byproduct of coke enterprises has very low recovery. Thirdly, the geological disasters happen more because of goaf caving. In the 9 mines of all the 17 mines of Yuyang District, caving has been taken place more than a dozen of time, covering an area of 500 thousand square meters, which further lead to the damage to houses, farmlands and roads. The underground pervious accidents have brought production stop and severe loss. It has also caused the fall of water level in the area around the mines, and serious impact to general water usage, such as the leak of wellspring roots and plants die. According to the research report of Urban Construction and Planning of Yulin City, coal mining has made the underground water in Yulin City and surrounding area fell from 5m–7m in the past to the current 16m. Near the goaf, few underground water can be found, forming serious “funnel”. Fourthly, the environmental pollution around the coal mines has been an outstanding problem. On one hand, some coal mines directly emit wastes; on the other hand, some mines purposefully close the environmental protection equipment in order to save cost.

Overstocking and irrational digging and picking of traditional herbs. The west part of China, including Xinjiang, Guangxi, Ningxia, and Inner Mongolia have all faced the problem of overstocking, which caused grassland and forests over used. Yuyang also face this problem. The grassland covers an area of 290 thousand hm<sup>2</sup>, among which 20.67hm<sup>2</sup> is the natural grassland. On one hand, the natural grasslands are occupied, so the storage facilities set by government cannot last long; on the other hand, although the aerial seeding has offered another way, the upgrade of the grass has not followed. At the same time, a lot of natural grasslands have been changed usage, and become the input for agriculture and industry, such grasslands and forests cannot grow naturally any more, making the desert trend more severe. Another reason causing the expansion of desert near Yuyang is the irrational digging and picking of traditional Chinese herbs and special plants. The big scale of digging of hair weeds (the pronunciation of the Chinese words of hair weeds refers to “making money”), and herbs of licorice (for curing cough) have caused the damage of grassland.

## **5. Developing Service Industry Can Help**

### *5.1. The structure of industries: comparison between Yuyang and Shaanxi Province*

Since the Opening and Reform Policy in 1978, the economy of Shaanxi Province has developed significantly, together with the living condition of people. The GNP of Shaanxi Province has increased by 8.107 billion RMB in 1978 to 1445.368 billion RMB. In this process, three phases can be identified. In the first phase (1978–1987), what

is dominant is fundamental industry and agriculture, the service industry just started to grow, the ratio of the three industries was 30.79:45.49:23.72. In the second phase (1988–2001), the industry has become the absolute dominant sector, the core changed to industrial service, and the ratio was 18.65:42.79:38.66. In the third phase (after 2002), energy industry has become the focus, service has gradually taken the dominant role, the economic structure has upgraded and bettered, and the ratio was 10.12:52.95:36.93. Overall, the industrial structure of Shaanxi Province has changed from “secondary-primary-tertiary” to “secondary-tertiary-primary”, which is a fundamental transformation.

Table 1. GNP of Yuyang District (2000–2013) and industrial structure

	Unit: 000 thousand Yuan													
year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GNP	23.30	26.34	32.06	38.35	44.56	77.92	95.50	106.17	140.92	183.31	249.00	325.02	401.09	461.26
Primary	3.03	2.69	2.97	3.29	3.98	4.75	5.11	7.80	11.01	11.20	13.82	19.44	21.17	23.21
Secondary	6.79	8.64	11.84	14.29	16.80	26.86	40.35	42.65	61.10	92.26	137.15	189.57	246.62	270.43
Tertiary	13.49	15.01	17.26	20.78	23.77	46.31	50.05	55.72	68.81	79.86	98.03	116.01	133.30	167.62

Resource: National economy and social development statistics bulletin of Yuyang District (2014)

From Table 1, it can be seen, in recent years, the economy of Yuyang District has developed very fast. In terms of the contribution of the three industries to GNP, the secondary industry has been the top, the tertiary industry always follow, with an unstable, even decreasing trend. The industrial structure has changed a lot, in which industrial economy grows continuously, moving the urbanization and improving the living condition. Service industry has also developed in terms of scale, for example, in the years of “the eleventh Five-year Plan”, the value added of service industry increased by three times. However, “Plan Outline of ‘the Twelfth Five-year’ of Yuyang District, Yulin City” has set the 45% goal, that is, the percentage of service industry in GNP, so compared with the goal, Yuyang District’s service industry is not developed as expected and designed.

## 5.2. How can Service Industry Help

Yuyang District faces double challenges in its sustainable development. One is the ecological fragility decided by its geological condition; the other is the environment problems owing to the activities of human being. The fast economic growth recently make Yuyang outstanding in attracting population because of better infrastructure and other social, educational, and cultural conditions. At the same time, the local government has proposed a long-term goal to build Yuyang a district with 1 million population, so in its future development strategic choice must be considered.

Modern service industry helps agriculture. Service can help agriculture by different modes, for example, the logistics can help farmers get better fertilizer and deliver their produces more efficiently; technology can be applied to promote the condition of soil and water saving; better financial service can help rural communities and farmers organize production and after production process; rural tourism can also be initiated to attract potential consumers.

Modern service industry helps aerial seeding. The current problem of aerial seeding is the limited types of seeds, the ecological environment is not stable, and cannot reach high quality, so the economic efficiency is not sound. Through long-term planning, researchers can find the most suitable seed types, the efficiency of seeding can be studied, especially small, spread aerial seeding can be designed, database can be set up and financial service can promote its further development.

Because of the unique natural scenery and historical culture, the tourist industry has good potential.

## 6. Suggestions

Although it can be seen service industry is a rational choice to develop economy in Yuyang from theoretical analysis, some suggestions should be emphasized based on our field study.

### 6.1. To overcome the traditional ideology

In the long process of development, the idea of “production is most important and should be focused; service is not important” should be clearly identified, especially its impact to the long-run economic growth mode of Yuyang. A lot of specific cases have shown that service industry can not only create value to the economy, but also support current industrial sectors to realize better value more effectively and efficiently. For Yuyang, both the productive and consumption type of service should be developed further.

### 6.2. To better the internal structure of service industry

Among the current service industry, traditional sectors take the major percentage, such as transportation, storing, post and telecommunication, wholesale, retail, food and catering, education, entertainment, radio, film and TV, etc. Hence the service industry should develop in terms of scale, standardization, especially the structure should be bettered. The most critical service sectors include finance, trade-related service and distribution-connected service. Only with the support of these sectors, the high value-added, technology-oriented services can develop and bring great change to the sustainable development of Yuyang.

### 6.3. To prepare personnel for the sustainable development

The tertiary industry has been fallen behind for long in Yuyang, hence the fundamental condition to develop high-technology, high-knowledge, high-personnel, and high-labor value-added is poor. Not only the transformation of current industry, but also developing modern service, all call for a lot of skilled personnel. The current university and professional training system cannot meet the demand of personnel, it is important for Yuyang to make good use of new technology to prepare the proficient personnel pool.

### 6.4. To design a reasonable development route

Owing to the remote location, poor infrastructure and insufficient investment, the service industry has not been fully developed.

A reasonable route of developing service industry focusing on both economic growth and environment protection should be designed. Based on our field study, a logic route is put forward, shown in Table 2. Some service sectors should be the priority to develop in near future to support other manufacturing sectors, at the same time, key sectors should be invested and get policy support, in well-structured development phase, the service industry not only change its role in local economic growth, but also form the base for the sustainable development, which is ideal phase of the sustainable development of Yuyang District.

Table 2. The route of development of service industry in Yuyang District

Service industry	Current situation	The thirteen Five-year	The fourteen Five-year	The fifteen Five-year
Transportation, logistics, post	poor	key	well-structured	comprehensive
Information, computer, software	poor	Priority	key	well-structured
Wholesale and retail	Poor	key	well-structured	comprehensive
Food and catering	Poor		Priority	key
Finance	Poor	key	well-structured	comprehensive
Real estate	Poor	Priority	key	well-structured
Rental and trade service	Poor	key	well-structured	comprehensive
Scientific research, technology service, geological exploitation	Poor	Priority	key	well-structured



Environmental management	Poor		Priority	key
Civil service	Poor		Priority	key
Education	Poor	key	well-structured	comprehensive
Social security	Poor	key	well-structured	comprehensive
Culture, sports, entertainment	Poor	key	well-structured	comprehensive
Public administration and social organization	Poor		Priority	key

## 7. Conclusions

This paper has tried to introduce the two types of environmental challenges Yuyang District is facing. Based on the study on the environment conflicts, and the service industry itself, it is put forward that developing service industry should the way to solve the environment conflicts of Yuyang District.

## Reference

- Grossman G. M. & Krueger A. B. Environmental Impacts of a North American Free Trade Agreement [A]. National Bureau of Economic Research. Working Paper 3914, NBER[C]. Cambridge MA, 1991.
- Zhang, B.Y., Gao, X.J., The Temperature Sudden Change in recent 62 Years of Yuyang District[J]. Journal of Shaanxi Meteorology, 2014, 06:25–27.
- Chen, Y; Yang, G.H., (The Current Situation of Water Resources and the demand-supply Analysis of Yuyang District, Yulin)[J]. Yellow River, 2006, 08:38–39+75.
- Wang, Y.B, Wang, F., Zhao F.Q., The Forestry Development and Countermeasures of Yuyang District, Yulin[J]. Journal of Guangxi Normal University for Nationalities, 2010, 05:16–19
- Dang, J.J., Fu, S.P., Effects of the Grain for Green Project in the Development of Rural Area in the Northern Shaanxi Province [J]. Research of Soil and Water Conservation, 2010, 06:275–277+282.
- Su, G.P. Study on the Management and Rational Distribution of Water Resources of Yuyang District[J]. Yulin Science & Technology, 2012, 01:15–20.
- Lv, J., Gao, J., The Climate Change Character in last 30 Years of Yuyang District, Yulin[J]. Yulin Science & Technology, 2014, 03:20–21.
- Hou, X., Liu Z.Z., Bai, Z.H., The Recalling and Perspectives of Arael Seeding (Stabilization of Sand)[J]. Anhui Agricultural Science Bulletin, 2011, 09:168–170+172.
- Wang, C.L., Cao, M.M., Study on Soil erosion in Yuyang[J]. Ground Water, 2012, 02:183–185.
- Zhang, B.Y., Gao, X.J., The Temperature Sudden Change in recent 62 Years of Yuyang District[J]. Journal of Shaanxi Meteorology, 2014, 06:25–27.