



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Survey on Influence of Tourism Development on Ensuring Supply and Increasing Income of Farmers in Nyingchi

Hongmei GONG, Lianjiu SONG*

Department of Plant Science, Agricultural and Animal Husbandry College of Tibet University, Nyingchi 860000, China

Abstract Tourism is an essential industry promoting economic development of Nyingchi and also plays a great role in national economy. Increasing people's income and improving living conditions are starting points of promoting tourism development. This survey indicates that tourism in Nyingchi develops rapidly, growth rate of tourists is slightly lower than growth rate of income, and per capita tourist consumption is also increasing. Comparative analysis indicates that tourist resources, traffic condition, tourism propaganda intensity, development intensity of relevant products, and seasonal factor have significant influence on ensuring supply and increasing income of farmers. Further analysis shows that low educational level, weak basic tourism knowledge, backward tourism sanitation, and lagging tourist service infrastructure are major problems and obstacles. Resource advantages of scenic spots, setting foot on structural adjustment of characteristic industry, developing specialized farmer cooperatives and leading enterprises, and deeply exploring intension of tourist culture are major approaches for ensuring supply and increasing income of farmers. In sum, it is urgent and important to strengthen ability of ensuring supply and increasing income in improving people's living conditions and promoting tourism development.

Key words Nyingchi, Tourism, Ensuring supply and increasing income, Sustainable development

1 Introduction

Nyingchi is a prefecture city in southeast Tibet and middle and down reaches of Yarlung Tsangpo River. Under its jurisdiction, there are 6 counties, 1 district, and 55 towns (townships). It covers an area of 120000 km² and holds permanent population of near 200000, and is an area inhabited by multi-ethnic groups. The terrain is high in north and low in south, with average altitude of 3100 m. Its climate combines tropical, subtropical, temperate and frigid zones. Annual precipitation is 650–2000 mm, and annual sunshine time is more than 2000 hours, it is reputed as South of Yangtze River of Tibet. Rich vegetation and dense forest of Nyingchi make tourists hardly suffer altitude sickness. Excellent environmental condition and convenient traffic condition have made Nyingchi an important transfer station and destination of Tibet tourism. Developing tourism has become an important support for local economic development. In recent decade, average annual growth rate of China's tourism exceeds 10% and tourism has become a most important industry for regional economic development. According to statistics, total tourism revenue in 2014 was 3250 billion yuan, 11% higher than the previous year. In a long period of future, China's tourist consumption will still keep constant growth trend. By 2020, China's total tourists will reach 1.6 billion and tourist income will reach 2000 billion USD. The 21st century will be the golden times of tourism development and will

be the optimum opportunity for development and adjustment of tourism.

2 Current situations of tourism development

2.1 Constant growth of total supply and demand of tourist economy

Since 2008, total supply and demand of tourist economy in Nyingchi is constantly growing. Especially, with Qinghai-Tibet railway and Nyingchi Airport open to traffic, the tourism of Nyingchi develops rapidly, tourists and tourist income annually grow about 54.6% and 73.1% respectively. Total supply and demand of tourist economy rises to the second place in the whole region from the third in 2008. Over 5 years, Nyingchi received tourists up to 7.156 million and realized tourist income of 5.4 billion yuan.

2.2 Increasing improvement of tourist infrastructure construction

Since 2008, the tourist infrastructure construction in Nyingchi is improving. It makes efforts in traffic construction and building convenient, safe and comfortable traffic environment. Now, it has opened round voyages for Nyingchi-Chengdu, Nyingchi-Chongqing, and Nyingchi-Lhasa. Besides, it has built Basum, Yarlung Tsangpo Grand Canyon entrance, Nanyi ravine, and Mirui special highways. It opened the first Yarlung Tsangpo River line and first plateau drift project, built the first self-driving travel camp, built 30 tourist toilets, 205 tourist signboards, 8 belvederes, 6 tourist parking lots along National Highway No. 318. These basically form tourist map of Nyingchi-Lhasa. Tourist charter flight, tourist-dedicated train, and self-driving travel have become new fashion of Nyingchi tourism.

2.3 Rapid expansion of tourist source market

Expansion of tourist source market sticks to the principle of "stabilizing frequent tourists and expanding new tourists". With this principle, there

Received: May 23, 2015 Accepted: July 11, 2015

Supported by Tibet Project of Humanities and Social Science Foundation of Ministry of Education (12XZJC790002); Humanity and Social Science Project of Colleges and Universities in Tibet Autonomous Region (2013ZJRW34).

* Corresponding author. E-mail: 351267449@qq.com

are great changes in tourist service facilities and characteristics of Nyingchi. In order to satisfy increasingly growing demand and improve satisfaction of tourists, Nyingchi makes efforts to make in-depth integration of brand-oriented, international, and information-based tourism and construction of tourist network information service. This is favorable for propaganda and brand-oriented development of Nyingchi tourism. There are many scenic spots in Nyingchi. According to feature and cultural intension, scenic spots can be divided into two types. (i) Natural landscape; mainly including Yarlung Tsangpo Grand Canyon, Nanyi ravine, Lulang Forest, Glacier (Midui and Laigu), Cuogao Lake; (ii) Cultural landscape; mainly including Lama hill temple, Taizhao Ancient Town, Niyang Pavilion, and Milin Lhoba folk village, etc. The above natural and cultural landscapes are areas with highest tourist consumption and most densely concentrated tourists.

In 2014, Nyingchi received 2.8 million tourists, which is 154.5 times the year 2009, realizing tourist income of 2.6 billion yuan, which is 225 times the year 1990. In recent 6 years, annual growth of tourist income is up to 38.47%, and annual growth of tourists reaches 23.47%. These indicate that Nyingchi tourism develops rapidly, growth rate of tourists is slightly lower than the growth rate of income, showing with social and economic development, resident income is increasing and per capita tourist consumption is increasing.

Table 1 Tourism development and tourist income of Nyingchi in 2009-2014

Year	Income		Tourist	
	Amount 10 ⁸ yuan	Growth rate//%	Amount 10 ⁸ yuan	Growth rate//%
2009	8.00	96.00	110.00	36.00
2010	11.10	38.75	152.00	38.18
2011	13.47	21.35	183.40	20.66
2012	18.00	33.63	227.00	23.77
2013	20.00	11.11	260.00	14.54
2014	26.00	30.00	280.00	7.69

3 Analysis on influence of tourism development on ensuring supply and increasing income of farmers

3.1 Strengthening tourist service function relying on resource advantage In 2012–2014, relying on excellent ecology and unique plateau landscape, Nyingchi greatly implemented the brand strategy, "industry construction year", and "industry promotion year". These invigorate economic development of characteristic products in Nyingchi and increase powerful force. With these strategies, farmers of Nyingchi have higher and higher enthusiasm for participating in tourist services. By the end of 2014, there had been 213 family hotels in Nyingchi, bringing jobs to 680 households (2800 people), and realizing per capita income growth up to 4400 yuan. Through exploring self advantages, improving tourist infrastructure, enhancing tourist service function, strengthening tourism propaganda and extending tourism industry chain,

Nyingchi promotes more enterprises to participate in tourism development, attracts more tourists to travel in Nyingchi, and provides platform for farmers participating in development of Nyingchi tourism.

Since 2008, Nyingchi has taken tourism as one of the three pillar industries and has present 10 special tourist lines, 8 scenic spots, and 102 beauty spots, and successfully launched the "two travel and one festival" activity. All cities of Nyingchi also hold various characteristic festival celebration activities to promote tourism development of Nyingchi. Besides, Nyingchi guides and supports farmers to develop family hotels through supporting Tibet, tourism-based poverty alleviation, and has built Lulang Village No. 5, Gongzhong Village, and Cuogao Village family hotels. In addition, farmers sell local and special products, and lease clothes and horses in the World Cypress King Park, Lulang, Cuogao Lake, etc. These increase cash income and stimulate enthusiasm of local farmers in participating tourism. At present, through field survey, more and more Nyingchi farmers participate in tourist service and relevant functional department actively encourages farmers to participate in tourism training to increase income. Relying on local characteristics under-forest products, such as wild matsutake, *Gymnadenia conopsea* (L.) R. Br., wild *gastrodia elata*, and *souvenirs* is the major approach for increasing farmers' income. Farmers in areas surrounding Cuogao Lake have income higher than those in the World Cypress King Park mainly because of traffic advantage. In Cuogao Lake scenic spot, farmers open small stores and restaurants. In high season of tourists, farmers can earn income up to 80000 yuan, while the rest months they also can obtain 40000 yuan. According to statistics, farmers opened 12 farmstays in Basum. Through tourism, they obtain income up to 130000 yuan. Furthermore, commodity exhibition greatly stimulates enthusiasm of local farmers in participating tourism and serving tourists.

3.2 Comparative analysis on survey samples of areas surrounding scenic spots and non scenic spots

Some villages (Zhangmai Village, for instance) not in scenic spots increase their income mainly through planting various under-forest products and horticultural products. Per capita annual income of farmers is up to 60000 yuan, 80% from high season of tourists and 20% from dull season of tourists. Villages (for example, Bajie Village) in areas surrounding scenic spots increase income mainly through natural and cultural landscape and planting local characteristics under-forest products. Comparative analysis indicates that farmers living in areas around scenic spots mainly increase income relying on resources and scenic spot advantages, while those not living in such areas have to earn money through their natural resources, as listed in Table 2.

3.3 Comparative analysis of different scenic spots in ensuring supply and increasing income

Basum scenic spot is situated along National Highway No. 318, the traffic is convenient and reputation is high, thus many tourists go there. In high season of tourists, daily ticket income of Basum is up to 100000 yuan.

Therefore, farmers living in areas around Basum scenic spots actively expand channels of increasing income with the aid of local tourist resources. In recent years, farmers living in areas around Basum scenic spots have greatly promoted effective increase of income through Basum cultural tourist festival, unique Gongbu folk conditions and customs and rich tourist resource characteristics. Various activities such as commodity fair, theatrical festival, clothes performance, and Iron Man's Rock Play also fully manifest unique tourist resources. Unique tourist resources, beautiful natural and ecological environment, and simple local conditions and customs are major aspects attracting tourists. Through field survey, dried yak meat, Tibetan pig, Tibetan chicken, wood carving, Gongbu cheese, and Tibetan medicinal materials are widely favored by tourists. In the 2014 cultural tourist festival, per capita net income of farmers increased about 6000 yuan.

Table 2 Income gap between farmers living in areas surrounding scenic spots in Nyingchi and those not living in such areas

Types	Annual income	Income in high season	Income in dull season
Farmers living in areas surrounding scenic spots	10	7	3
Farmers not living in areas surrounding scenic spots	6	4	2

The World Cypress King Park is situated along National Highway No. 318, but due to simple landscape and small scale, there is still certain gap with Basum. Therefore, income of farmers in Bajie Village is lower than Cuogao Village. In recent years, Bajie Village fully explores brand effect of the World Cypress King Park, strives for funds through many channels, organizes farmers to input labor, and has built ethnic characteristic commercial district. Relevant functional departments support and encourage farmers to participate in tourist services, and sell various local characteristic products to increase their income.

Comparative analysis indicates that traffic factor and tourism propaganda, and development intensity of related products are decisive factors of income of farmers in different scenic spots. And seasonal factor is also an indispensable factor.

Table 3 Comparison between income of farmers in the World Cypress King Park and Basum (Unit: 10^4 yuan)

Types	Annual income	High season of tourists	Dull season of tourists
Farmers living in areas surrounding the World Cypress King Park	10	7	3
Farmers not living in areas surrounding Basum	12	8	4

4 Existing problems in the process of ensuring supply and increasing income

4.1 Backward tourist sanitation idea of farmers In our field survey, some tourists said that they are not willing to stay in family hotels run by farmers, and not willing to make relevant consump-

tion, mainly because of backward sanitation idea of local farmers. At present, main problems in catering of scenic spots in Nyingchi include: (i) poor sanitary condition. Many restaurants lack necessary sterilizing facilities. Sanitation of catering place, food making process and catering service personnel becomes major obstacle of ensuring supply and increasing income of farmers. (ii) dirty, disorderly and bad environmental sanitation of scenic spots and surrounding areas. Relevant service entities (such as restaurants and small stores) pay little attention to surrounding environment and internal sanitation, which exerts negative influence on ensuring supply and increasing income of farmers.

4.2 Lagging in infrastructure development of tourist services Tourist infrastructure is a general name of material facilities built for travel of tourists. It is indispensable foundation for developing tourism and it mainly includes tourist catering, traffic, lodging, and various cultural entertainment, sports, and health care facilities. Now, tourism in Nyingchi is faced with financial difficulty and such situation will not be changed greatly in recent years. In such situation, huge demand of related tourist facilities creates sharp conflict with realities of lack of funds. Therefore, it is practical to expand the scope of opening to the outside world, actively attract and invite tourist service related industries to invest, purchase advanced technologies and facilities, and learn advanced management experience. Only in this way, may it be able to comprehensively improve tourist environment of Nyingchi in a shorter period.

5 Major obstacles in the process of ensuring supply and increasing income

5.1 Lack of professional knowledge of tourism leads to failure to satisfy demand of some tourists Tourist activity is often initial experience of tourist in a strange place. Due to unfamiliar place and language, it is easy to produce feeling of loneliness, loss, and sense of insecurity and panic. Tourists will get reserved and be afraid of violating taboo or being laughed at. In this situation, tourists will be eager to ensure security. Tourist guides or local farmers should make effort to make tourists have sense of liberation and relaxation, and enjoy the travel heartily. In the process of travel, tourists may feel curious about all things that may be common to local people. Therefore, tourist guides or local farmers should learn relevant tourism knowledge to guide tourists, and make vivid explanation to tourists and be patient in answering questions of tourists.

5.2 Weak cultural knowledge of farmers leads to failure to promote their products to tourists in a fast, best and simple manner Due to weak cultural knowledge, local farmers fail to promote and sell their products to tourists. Some tourists are curious about local products, such as special under-forest products, various wild herbal medicines, and local characteristic foods. However, lack of professional knowledge of tourism seriously influences increase of farmers' income.

6 Major approaches of ensuring supply and increasing income of farmers

6.1 Resource advantage of scenic spots Local farmers can increase their income with the aid of natural landscape, cultural landscape, ethnical cultural scenic spots, and providing various services in the sight-seeing, lodging, catering, shopping, and entertainment. Some local farmers can increase income through developing local characteristic farmstays.

6.2 Setting foot on characteristic industries and adjusting industry structure to promote income increase Nyingchi makes reasonable development and utilization of local under-forest resources. This becomes a new approach of increasing farmers' income. Wild matsutake, *Gymnadenia conopsea* (L.) R. Br., and wild gastrodia elata in Nyingchi are deeply favored by tourists. Farmers should develop these characteristic products to increase their income. Through "company + base + farmer household" development model, Nyingchi guides farmers to participate in tourism-related fields. Nyingchi actively promotes construction of "one town one industry" and "one village one product", to manifest characteristic resources and adjust and optimize tourist economy structure, and effectively promote ensuring supply and increasing income of farmers.

6.3 Developing specialized farmers cooperatives and leading enterprises to promote income increase On the principle of "run by farmers, managed by farmers, and benefit farmers", Nyingchi has launched development of specialized farmers cooperatives, and integrated development of tourism with agriculture, trade and business, culture, industry, sports, and performing arts. It is recommended to fully explore and use local cultural resources, develop local characteristic tourist cultural products, and develop local characteristic artistic performance and festival celebration activities. Besides, it is recommended to integrate tourism with primary industry and secondary industry, energetically develop rural tourism, bring into full play advantages of cooperatives and processing and manufacturing industries, and actively guide and develop tourism industrial chain. Also, Nyingchi should increase length and width of tourism industrial chain, effectively consolidate existing farmers cooperatives (such as Tibetan chicken breeding farm and Tibetan pig breeding farm).

6.4 Deeply exploring cultural intension of tourist culture with festival celebration travel It is recommended to take traditional festivals as opportunities, actively launch diverse and colorful festival celebration activities to increase income. Farmers should make distinctive orientation of cultural value of festival celebration tourist resources, and let festival celebration activities satisfy demands of tourists from different perspectives and at different levels, such as artistic performance, arrow shooting, and flower appreciation, so as to further increase their income.

6.5 Integrating ensuring supply and increasing income of farmers with sustainable development of tourism In view of development of tourism, it is recommended to take following measures to realize sustainable development of tourism. (i) Changing

backward ideas, expanding scope of opening, increasing input in tourism education, and cultivating more tourism management personnel. (ii) Fully using economic, legal, and administrative means to strengthen macro regulation of tourist market in Nyingchi. In economy, it should adjust consumption of tourists in high and dull seasons using law of value; in laws, it is required to establish and improve laws and regulations; in administration, it is required to formulate relevant industrial policies to guide coordinated development of tourism in Nyingchi. (iii) Enhancing international exchange and cooperation, and expanding enterprise scale and reducing market risk. Besides, Nyingchi should actively introduce foreign capital and advanced technologies and facilities, improve tourist-related facilities and services, as well as tourist service related industries, including restaurants, hotels, scenic spot facilities, entertainment, traffic, and shopping facilities.

In line with existing problems in tourism development, Nyingchi has taken practical actions and issued series of tourism planning scheme, regulations and policies to avoid problem of destruction. It encourages and guides farmers to increase income relying on ecological, social, economic and atmosphere environment, protect sanitation of scenic spots and observe regulations of scenic spots. In developing concept, it is recommended to guide farmers to participate in development of tourism. Under the guidance of Outlook on Scientific Development and sustainable development, Nyingchi makes efforts to create excellent ecological tourist environment, and constantly improve cultural quality of local farmers to create civilized tourist environment.

In general, with gradual development of economy and tourism, sustainable development becomes increasingly important. At the same time of developing tourism, it is required to attach importance to sustainable development of tourism, and realize organic integration of tourism development and ecological protection. Through protecting ecological environment, it is expected to promote tourism development and increase income, improve ecological environment, and realize joint improvement of economic, social and ecological benefits. Nyingchi should keep tourism development in step with increasing income of farmers, and ultimately promote sustainable development of tourism.

7 Policy recommendations

7.1 Enhancing professional skill training of farmers It is recommended to enhance professional skill training of farmers taking advantage of great opportunity of Guangdong and Fujian supporting Tibet. Tourism related departments should actively strive for implement professional skill training of farmers, bring into full play technical backbone role of farmers, cultivate a good many new farmers with skills, and guide them to engage in actual work of tourism industrial construction. Besides, it is recommended to set up a good many typical advanced personnel, large households lead common farmers, party members support farmers, and encourage farmers to actively participate in tourism development. Furthermore, it is recommended to promote development of more

related industries, establish long term mechanism for stabilizing and increasing farmers' income, so as to further accelerate development of economy and society in farming and pastoral areas.

7.2 Enhancing self development and taking development of leading enterprises as major point

It is recommended to bring into full play subject function of farmers in tourism development, promote coordinated, scientific and great-leap-forward development of ecological tourism, characteristic farming and animal husbandry, Tibetan pharmaceutical industry, water and electric energy industry, and cultural industry, boost farmers to improve skills and enhance skills of getting rich, and expand channels of increasing income of farmers. Leading enterprises should support farmers to move towards tourism industrialized development and make effort to improve farmers' professional technology level. In addition, it is proposed to strengthen propaganda, propagate tourism comprehensively, further enhance confidence of farmers and cadres in accelerating development of tourism, and maximally create the atmosphere of supporting tourism development. It is recommended to take full advantage of great opportunity of Guangdong and Fujian supporting Tibet, and provide training for technical backbone farmers, to solve the problem of low quality and lack of skills of farmers. Besides, it is recommended to bring into full play function of technical backbone farmers, encourage them to pass on experience, cultivate a batch of new farmers, and guide them to actively engage in industrial construction. In addition, it should attach importance to combination of economic, social and ecological benefits, to ensure farmers obtain real benefits from tourism development. For local leading enterprises with high driving power and wide radiation range, it is recommended to provide great support, implement "company + base + farmer household" operating model, expand the scale, enhance the strength, and raise level. It is recommended to encourage and support farmers to actively establish specialized cooperatives on the principle of "run by farmers, managed by farmers, and benefit farmers", to improve organization and market level of tourism development.

7.3 Realizing effective combination of resource advantages and development characteristics

It is recommended to develop tourist products with regional characteristics through focusing on tourism development elements. Besides, Nyingchi should realize close connection of superior ethnic culture, art, entertainment, and catering resources with characteristic tourism development, as well as with urban planning, to realize breakthrough and income increase of overall tourism quality. Characteristic culture of a region is not used for simply visiting and looking back upon, but for letting tourists grasp cultural thread and experience personally. It is recommended to integrate urban and rural development, take key projects as main works of economic and social development, focus on rich resources of Nyingchi, take the road of characteristic development, and enhance cultivation of tourism and characteristic industry, so as to realize sound development of tourist economy.

7.4 Realizing multi-channel capital input and infrastructure construction input of tourism

It is recommended to increase

public finance input in tourist infrastructure, improve ability of Nyingchi in information, water supply, power supply, public transport, and other tourism-related service facilities, improve service functions, and raise service level. Also, Nyingchi should encourage and guide multi-channel capital investment, and encourage the whole society to invest in tourism, so as to gradually establish multiple investor tourist economic system. It is recommended to attract both domestic and foreign large enterprises and groups to participate in development of tourist products, construction of tourist service facilities, expand channels of attracting outside investment, and provide some preferential policies to improve tourist service functions in form of joint venture, cooperation, leasing, contracting, trusteeship, and transfer of operating right, etc.

References

- [1] ZHANG M, LIN LH, QIONG D. The analysis and countermeasures of the eco-tourism development of Linzhi in Tibet[J]. *Ecological Economy*, 2009(7): 114–117. (in Chinese).
- [2] CHEN K. On the development status of tourism globalization and the countermeasures in China[J]. *Blooming Season*, 2013(2). (in Chinese).
- [3] WANG ZY. The potential of tourism development in China and the countermeasures[J]. *Journal of Anyang Institute of Technology*, 2009(3): 45–47. (in Chinese).
- [4] ZHAO Y. The existing problems and countermeasures in tourism marketing [J]. *Journal of Jilin Province Economic Management Cadre College*, 2008, 22(5): 90–93. (in Chinese).
- [5] ZHONG YF. A brief analysis on the problems faced by tourist industry marketing in China and the countermeasures[J]. *Lanzhou Academic Journal*, 2009(3): 181–183. (in Chinese).
- [6] LIN LH. Study on capacity of eco-tourism environment in Nyingchi Prefecture[D]. Tibet: Tibet University, 2009. (in Chinese).
- [7] ZHANG H. Rapidly developing ecological agriculture and ecological tourism and promoting ecological economic development [J]. *Modern Agriculture*, 2009(2): 86–88. (in Chinese).
- [8] QI XT. Research on problems and solution of the tourism in our country at present[J]. *Journal of Social Science of Jiamusi University*, 2004, 22(5): 45–46. (in Chinese).
- [9] WANG WJ. A brief analysis on the development of tourism in China and the matters need attention[J]. *Blooming Season*, 2012(13): 13–16. (in Chinese).
- [10] CHEN H. Discussion on ways of improving the professional quality of tourism employee in China[J]. *Blooming Season*, 2012(13): 346–347. (in Chinese).
- [11] LIAO CC. On indicating system design of tourism city——Taking the case of Venice[J]. *Journal of Suzhou Art & Design Technology Institute*, 2011(4): 17–20. (in Chinese).
- [12] ZHAO SD, GUO XL. Analysis on present situation tourism security's management and countermeasures [J]. *Resource Development & Market*, 2008, 24(8): 760–762. (in Chinese).
- [13] WANG QY. The present conditions, problems and countermeasures of the tourism in our country[J]. *Journal of Anshan Teachers College*, 2005, 7(1): 22–24. (in Chinese).
- [14] ZHANG QM, YU X. A primary investigation on the development strategy of tourism catering industry in Beidaihe[J]. *Big Stage*, 2010(9): 255–256. (in Chinese).
- [15] WANG TS. A brief analysis on the development countermeasure of tourism future in China[J]. *Charming China*, 2010(4): 25–26. (in Chinese).
- [16] SONG WW. Study on the development of Changchun traveling market[D]. Changchun: Northeast Normal University, 2008. (in Chinese).

ment (X_4), public budget revenue (X_5), public budget expenditure (X_6), and total retail sales of social consumer goods (X_7). This factor mainly reflects the financial and capital flow. Principal component has a large load on land area (X_1), permanent population at the end of year (X_2) and import and export (X_8). This factor mainly includes hardware and import and export. The classification derived from two principal components is very similar to the classification derived from R clustering, so based on composite scores, we can evaluate the economic situation of 14 cities in Guangxi.

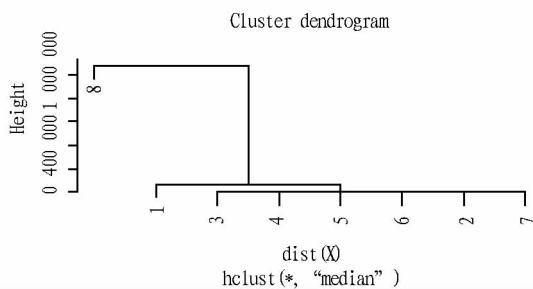


Fig. 2 R clustering

4 Comprehensive evaluation^[5]

The cities with high scores on principal component of liquidity and financial balance (Y_1) include Nanning, Liuzhou, Guilin and Fangchenggang. The absolute value of Nanning is higher than that of other cities, indicating that the regional GDP, social fixed asset investment, public budget revenue and total retail sales of social

consumer goods in Nanning are much higher than in other cities, because Nanning is a provincial capital, a core city of Beibu Gulf Economic Zone, and also a financial and trading center. Similarly, Liuzhou is an industrial city and an old industrial area in Guangxi. Guilin is a tourist city and Fangchenggang is an important port city. These cities have an advantage in finance. The cities with high scores on principal component of hardware, import and export include Hechi, Baise, Fangchenggang and Chongzuo. Baise and Hechi are ranked first in terms of prefecture-level city area, and Fangchenggang is ranked first in terms of import and export. From the composite score, the top three are still Nanning, Liuzhou and Guilin. Although Hechi and Baise have high scores on the second principal component, Y_1 which represents economic strength still affects ranking.

References

- [1] KONG M, BIAN R, ZHANG HC. The application of parallel analysis in exploratory factor analysis[J]. Psychological Science, 2007, 30(4): 924–925. (in Chinese).
- [2] MU SK, GU HG. The comparison of factor retaining methods in exploratory factor analysis[J]. Exploration of Psychology, 2011, 31(5): 477–480. (in Chinese).
- [3] Robert I. Kabacoff. R in action: Data analysis and graphics with R[M]. Beijing: Posts & Telecom Press, 2013.
- [4] JIANG Y. The economic development evaluation of the boroughs of Tianjin [J]. Application of Statistics and Management, 2002, 21(1): 4–9. (in Chinese).
- [5] WANG BH. Multivariate statistical analysis and modeling for R language [M]. Guangzhou: Jinan University Press, 2014. (in Chinese).
- [22] ZHU XQ. On situation and development of tourism infrastructure in Nyingchi[J]. Journal of Xi'an University of Arts and Science (Social Sciences Edition), 2013, 16(5): 65–68. (in Chinese).
- [23] LI LF. Five key problems promoting the development of tourism development[J]. Management Forum, 2009(11): 29–41. (in Chinese).
- [24] LIU YH, ZONG G, YANG T. Study on the influence of Tibet tourism development on the income of urban and rural residents[J]. China Tibetology, 2014(1): 25–30. (in Chinese).
- [25] LIU YH. The contribution of Tibet tourist industry and its regional difference[J]. China Tibetology, 2012(4): 78–84. (in Chinese).
- [26] HU B, QIAO J. An empirical analysis on influence factors and the judgement of regional difference of rural income[J]. Social Science Research, 2005(5): 76–80. (in Chinese).

About KIT

The Royal Tropical Institute (KIT) in Amsterdam is an independent centre of knowledge and expertise in the areas of international and intercultural cooperation, operating at the interface between theory and practice and between policy and implementation. The Institute contributes to sustainable development, poverty alleviation and cultural preservation and exchange.