

# Spatial Characteristics of Consumption Behavior of Yellow Cattle in Yanbian

Xinwen Yan, Yinhe Li\*

College of Geography and Ocean Sciences, Yanbian University, Hunchun 133300, China.

\*Corresponding Author's Email: [yinhe1105@126.com](mailto:yinhe1105@126.com)

**Abstract:** With the prosperity of tourism in Yanbian area, the consumption demand of yellow beef in Yanbian has increased rapidly in recent years. Through the in-depth investigation of Yanbian area residents' consumption behavior, this paper studies the latest trends of Yanbian residents' consumption behavior space of Yanbian yellow beef from two aspects: the basic situation of Yanbian yellow beef consumption and the factors that affect consumers' purchasing behavior of Yanbian yellow beef. The results show that consumers pay more attention to the quality, price and taste when buying Yanbian yellow beef, and the consumption mode is restricted by economic conditions, and there is a phenomenon of regional consumption imbalance. On this basis, relevant suggestions are put forward to better meet the beef consumption demand of urban and rural residents and promote the sustainable and stable development of Yanbian yellow beef cattle industry.

**Keywords:** Yanbian yellow cattle; Beef consumption; Consumption behavior; Consumers; Yanbian Prefecture

## 1. Introduction

With the rapid development of China's economy and the acceleration of urbanization process, consumer behavior has become one of the important engines to promote economic growth and social development. In this process, as the political, economic and cultural center of Yanbian region, the consumer market of Yanji also presents a trend of diversification and rapid development. The development of consumer behavior is not only driven by the market economy, but also influenced by various factors[1]. Yanbian area is an important border area between China and North Korea, with unique geographical advantages and cultural background. It has a large population and huge market potential, attracting a large number of migrants to live and work. Especially the prosperous development of Yanbian cattle industry economy makes Yanbian Prefecture become an important shopping and consumption center. The special geographical location and cultural background of Yanbian area, as well as the prosperity of Yanbian scalping economy, have a certain impact on the consumption behavior of Yanji city.

Yanbian yellow cattle is the Chinese Korean residents from the beginning of migration from Korea, the introduction of a group of Korean cattle and local cattle breeding local cattle to cross, under the influence of Yanbian's natural, social and economic conditions, coupled with Yanbian people's experience in raising yellow cattle, after careful cultivation, finally formed the Yanbian yellow cattle this unique cattle population. As a special beef catering consumption, Yanbian yellow cattle has certain particularity in its consumption behavior, which also drives the prosperity of the consumption market in Yanji city. However, the study on the spatial characteristics of consumption behaviors of scalpers in Yanbian area has not received sufficient attention. At present, the research on consumption behavior in Yanji city mainly focuses on the overall consumption level and consumption structure of residents, while the research on consumption behavior of scalpers in Yanbian City is relatively few. Therefore, this paper provides scientific basis for the regulation and management of the consumer market in Yanbian area by deeply understanding the characteristics and rules of the consumption behavior of yellow cattle in Yanbian.

## 2. Literature review and research hypothesis

### 2.1 Local consumption behavior

In the 1960s, western cities entered the consumer society, and consumption gradually became an important driving force for urban economic development, spatial change, functional transformation and urban cultural transformation[2]. The study of consumption by Western scholars has gradually expanded from economics to other disciplines. In the field of geography, the study of spatial consumption takes geographical space as a unique perspective, mainly focusing on two aspects: the study of consumption space and the study of consumption behavior. The study of consumption originated from the study of urban commerce. With the rapid economic development and the transformation of urban main functions, urban commerce and retail industry have become important pillars of urban economy[3]. With the process of urbanization and changes in consumption concepts, spatial consumption plays an increasingly important role in the construction and functional transformation of urban

space. Scholars also pay more and more attention to the impact of consumption on commercial space, so the study of spatial consumption becomes more and more important[4].

H1: The consumption behavior of yellow cattle in Yanbian has certain local characteristics.

## 2.2 Consumer identification

Consumption, as a social activity, is a specific way of creating identity. Social consumers are defined based on the concept of consumption identity, that is, people express the identity or difference between themselves and others or social groups through consumption patterns, and they belong to a specific social group, so as to socially position and classify themselves[5]. When consumers carry out social consumption activities, they will carry out social consumption activities according to a series of factors such as their consumption identity, reference group and social identity. Nowadays, consumers' consumption behavior has been widely concerned by many scholars such as social economics and economic geography. Daily consumption of consumers will also produce different purchasing methods according to different consumers' different cognition of products, and consumer goods based on self-concept to meet their own needs.

H2: Consumers agree with the consumption behavior of Yanbian scalpers.

## 2.3 Cultural identity of consumers

With the continuous development of cities, regional differences gradually evolve into regional cultural differences, which are created by different regional cultures. The continuous development of today's economic level and the boom of tourism after the epidemic have also led to the integration of different regional cultures, and the continuous cross-integration of different cultural groups has produced a deeper cultural identity. Cultural identity is based on the recognition of the common culture between groups or between individuals and groups. Cultural identity is not only the blending of cultures, but also a process of transforming "I" into "we" [6]. Compared with other types of identity behavior, cultural identity is more relatively variable, and the group living in a specific area can choose to consume according to culture. The formation of consumers' cultural identity is rooted in the joint efforts of consumers in a specific range to form a certain value or culture[7].

H3: Cultural identity has a positive effect on the consumption intention of Yanbian yellow beef.

## 3. Survey methods and data sources

### 3.1 Questionnaire survey method

For the design of the questionnaire, it is divided into five parts: The first part of the questionnaire focuses on the personal information of consumers, the second part is a survey of consumers' taste experience of Yanbian yellow beef, the third part is a survey of consumers' consumption experience of Yanbian yellow beef, the fourth part is a survey of consumers' consumption habits of Yanbian yellow beef, and the fifth part is a survey of consumers' identification with Yanbian characteristic yellow beef. The above measurement levels are from "strongly disagree" to "strongly agree". Data are verified, input and classified. Finally, SPSS software is used to integrate and analyze all questionnaires.

### 3.2 GIS Analysis Method

In this paper, spatial interpolation method is used to analyze the spatial correlation of cattle consumption behavior, including the calculation and display of spatial autocorrelation, spatial aggregation and other indicators, to further reveal the consumption interaction and mutual influence between different regions. Spatial interpolation refers to the process of using the values of known points to estimate the values of other points, so that the data can be displayed as a three-digit surface or isoline map, and can be used for spatial analysis and modeling. According to the results of data analysis, the interpretation and demonstration of the results are carried out, and the spatial characteristics of consumption behavior of Yanbian yellow cattle in Yanji City are further discussed, so as to provide scientific basis for relevant departments and enterprises. The general Kriging method is used in this paper. The general Kriging method mainly considers the spatially related factors and interpolates directly with the fitted semi-variation. The general equation for estimating the z value of a measuring point is:

$$Z_0 = \frac{1}{s} \sum_{i=1}^s Z_x W_x$$

Where,  $Z_0$  is the estimated value and  $Z_x$  is the known value of  $x$ ;  $W_x$  is the weight of point  $x$ ;  $s$  is the number of sample points used for estimation. The weights can be obtained by solving a set of simultaneous equations. For example, to estimate the value of an unknown point (0) from three known points (1,2,3), combine the following three equations:

$$W1\gamma(h11)+W2\gamma(h12)+W3\gamma(h13)+\lambda=\gamma(h10)$$

$$W1\gamma(h21)+W2\gamma(h22)+W3\gamma(h23)+\lambda=\gamma(h20)$$

$$W1\gamma(h31)+W2\gamma(h32)+W3\gamma(h33)+\lambda=\gamma(h30)$$

$$W1+W2+W3+0=1.0$$

Where,  $\gamma(hij)$  is the semi-variation between the known points  $i$  and  $j$ ;  $\gamma(hi0)$  is the semi-variation between the  $i$ -th known point and the unknown point.  $\gamma$  is the Lagrange coefficient introduced to ensure minimal error in the estimation. After the weight is calculated,  $Z0$  can be estimated by the following equation.

$$Z0=Z1W1+Z2W2+Z3W3$$

#### 4. Survey results and analysis

##### 4.1 Behavior characteristics of Yanbian scalpers

###### 4.1.1 Analysis of the basic situation of surveyed consumers

A total of 250 questionnaires were issued, 210 were recovered, and 204 valid questionnaires were obtained, with an effective recovery rate of 81.6%, excluding those with unreasonable answers and missing answers to relevant key questions. The questionnaire is based on gender, age, monthly family income, education level, occupation, permanent residence and other aspects of the respondents. The statistical results were analyzed by SPSS and the following results were obtained.

Table 1 Basic information of surveyed consumers

item	Statistical index	Number of persons	Comparison example	item	Statistical index	Number of persons	Comparison example
sex	male	99	48.5%	Permanent residence	Anhui	5	2.5%
	female	105	51.5%		Beijing	3	1.5%
age	Under 20	29	14.2%		Fujian	8	4.0%
	21 to 30	84	41.2%		Guangdong	7	3.4%
	31 to 40	43	21.0%		Guangxi	5	2.5%
	41 to 50	29	14.2%		Hainan	3	1.5%
	Over 50	19	9.3%		Hebei	5	2.5%
Monthly household income	Less 3000	2	1.0%		Henan	5	2.5%
	3001~5000	18	8.8%		Heilongjiang	30	14.7%
	5001~7000	31	15.2%		Hubei	8	4.0%
	7001~9000	66	32.3%		Hunan	5	2.5%
Educational level	Over 9000	87	42.6%		Jilin	61	30.0%
	Below junior high school	4	2.0%		Jiangsu	5	2.5%
	High school	18	8.8%		Liaoning	22	10.8%
	Junior college	48	23.5%	Neimenggu	5	2.5%	
	undergraduate	81	39.7%	Qinghai	3	1.5%	
Master degree or above	53	26.0%	Shanghai	3	1.5%		

occupation	student	54	26.5%	Sichuan	5	2.5%
	Individual dealers	29	14.2%	Tianjin	3	1.5%
	Office worker	55	27.0%	Yunnan	5	2.5%
	Have already retired	9	4.4%	Zhejiang	5	2.5%
	other	57	27.9%	Chongqing	3	1.5%

As can be seen from Table 1, among the surveyed consumers, there are 99 males (48.5%) and 105 females (51.4%), with female respondents slightly more than males, which is consistent with the Chinese style of family women in charge of economic power; The age group is mainly from 21 to 40 years old, accounting for 62.2% (41.2%+21.0%) of the total number of respondents. In Chinese families, people in this age group are generally the backbone of the family, and most of them are responsible for purchasing food materials needed by the family. According to the survey, families with a monthly income of more than 7,000 yuan have more beef consumption ability, accounting for about 74.9% (32.3%+42.6%); In terms of education level, college degree or above is the rising point, the higher the education level, the higher the consumption power, accounting for 65.7% (39.7%+26.0%); Most of the buyers were office workers or students with certain pressure, accounting for 53.5% (26.5%+27.0%) of the survey, reflecting that beef can provide energy for consumers with its unique nutritional value. In addition, it is found from the survey that the consumption areas of Yanbian yellow beef are mostly concentrated in the three eastern provinces of China, accounting for about 55.5% (14.7%+30.0%+ 10%) of the samples. 8%).

#### 4.1.2 Reliability analysis

Internal consistency reliability reflects the degree of correlation between questions in a questionnaire. Internal consistency confidence is usually measured by Cronbach's  $\alpha$  coefficient. Cronbach's  $\alpha$  coefficient value is between 0 and 1, the larger the  $\alpha$  coefficient value is. The higher the correlation among items, the higher the reliability of internal consistency. In general, an  $\alpha$  coefficient greater than 0.8 means that the internal consistency is excellent, between 0.7-0.8 means better, and the  $\alpha$  coefficient 0.6-0.7 means general and acceptable. If it is lower than 0.6, the internal consistency is poor, and the questionnaire scale should be modified.

#### 4.1.3 Yanbian cattle tasting experience analysis

Table 2 Cronbach reliability analysis (n=204)

item	Total correlation of correction items (CTTC)	The term has been deleted for the $\alpha$ coefficient	Cronbach's $\alpha$ coefficient
You think Yanbian yellow beef looks delicious	0.660	0.791	0.832
You think Yanbian yellow beef tastes good	0.637	0.797	
You think Yanbian yellow beef is unique	0.624	0.801	
You think Yanbian yellow beef meat is very greasy	0.623	0.802	
You think Yanbian yellow beef tastes better than other beef	0.617	0.803	

Note: Standardized Cronbach  $\alpha$  coefficient =0.832

As can be seen from the above table, the reliability coefficient value is 0.832, which is greater than 0.8, indicating that the reliability quality of the research data is high. For " $\alpha$  coefficient of deleted item", the reliability coefficient does not increase

significantly after any item is deleted, so the item should not be deleted. For "CITC value", the CITC value of analysis items is greater than 0.4, indicating that there is a good correlation between analysis items and a good reliability level. In summary, the reliability coefficient value of the research data is higher than 0.8, which indicates that the data reliability quality is high.

**4.1.4 Yanbian cattle consumption experience analysis**

Table 3 Cronbach reliability analysis

item	Total correlation of correction items (CTTC)	The term has been deleted for the $\alpha$ coefficient	Cronbach's $\alpha$ coefficient
You have a good experience when buying Yanbian yellow beef	0.695	0.823	0.859
You think it is very convenient to buy Yanbian yellow beef	0.715	0.815	
Do you think that when I buy Yanbian yellow beef, I buy it in the Hanwlinary way	0.685	0.827	
Do you think that when buying beef at the same price, I would choose Yanbian yellow beef	0.717	0.814	

Note: Standardized Cronbach  $\alpha$  coefficient =0.859

As can be seen from the above table, the reliability coefficient value is 0.859, which is greater than 0.8, indicating that the reliability quality of the research data is high. For " $\alpha$  coefficient of deleted item", the reliability coefficient does not increase significantly after any item is deleted, so the item should not be deleted. For "CITC value", the CITC value of analysis items is greater than 0.4, indicating that there is a good correlation between analysis items and a good reliability level. In summary, the reliability coefficient value of the research data is higher than 0.8, which indicates that the data reliability quality is high.

**4.1.5 Analysis of consumption habits of Yanbian cattle**

Table 4 Cronbach reliability analysis

item	Total correlation of correction items (CTTC)	The term has been deleted for the $\alpha$ coefficient	Cronbach's $\alpha$ coefficient
When you buy Yanbian yellow beef, I will choose a fresh meat shop near my home to buy	0.726	0.840	0.871
When you buy Yanbian yellow beef, I will choose to buy online (e-commerce, mini program)	0.674	0.849	
When you buy Yanbian yellow beef, I will choose to buy in the freezer shop	0.722	0.840	
When you buy Yanbian yellow beef, I will choose to buy it in the vegetable market	0.687	0.847	
When you buy Yanbian yellow beef, I will choose to buy in the brand outlet store	0.564	0.867	
When you buy Yanbian yellow beef, I	0.658	0.852	

will choose the products with more  
exquisite packaging to buy

Note: Standardized Cronbach  $\alpha$  coefficient =0.871

As can be seen from the above table, the value of the reliability coefficient is 0.871, which is greater than 0.8, indicating that the reliability quality of the research data is high. For " $\alpha$  coefficient of deleted item", the reliability coefficient does not increase significantly after any item is deleted, so the item should not be deleted. For "CITC value", the CITC value of analysis items is greater than 0.4, indicating that there is a good correlation between analysis items and a good reliability level. In summary, the reliability coefficient value of the research data is higher than 0.8, which indicates that the data reliability quality is high.

#### 4.1.6 Yanbian characteristic food identity

Table 5 Cronbach reliability analysis

item	Total correlation of correction items (CTTC)	The term has been deleted for the $\alpha$ coefficient	Cronbach's $\alpha$ coefficient
You have a strong identification with Yanbian cuisine	0.694	0.825	0.859
After you tasted Yanbian yellow beef, you had the idea of wanting to taste it again	0.671	0.831	
When you taste yellow beef, you will discuss the local specialty Yanbian yellow beef with the restaurant	0.699	0.824	
Yanbian scalpers are special to you	0.645	0.837	
You will buy Yanbian yellow beef for your family/friends to taste	0.669	0.831	

Note: Standardized Cronbach  $\alpha$  coefficient =0.859

As can be seen from the above table, the reliability coefficient value is 0.859, greater than 0.8, which indicates that the reliability quality of the research data is high. For " $\alpha$  coefficient of deleted item", the reliability coefficient does not increase significantly after any item is deleted, so the item should not be deleted. For "CITC value", the CITC value of analysis items is greater than 0.4, indicating that there is a good correlation between analysis items and a good reliability level. In summary, the reliability coefficient value of the research data is higher than 0.8, which indicates that the data reliability quality is high.

#### 4.1.7 Overall reliability analysis

Table 6 Cronbach reliability analysis

item	Total correlation of correction items (CTTC)	The term has been deleted for the $\alpha$ coefficient	Cronbach's $\alpha$ coefficient
You think Yanbian yellow beef looks delicious	0.451	0.893	
You think Yanbian yellow beef tastes good	0.441	0.893	
You think Yanbian yellow beef is unique	0.484	0.892	
You think Yanbian yellow beef meat is very greasy	0.507	0.892	

You think Yanbian yellow beef tastes better than other beef	0.433	0.894	0.896
You have a good experience when buying Yanbian yellow beef	0.604	0.889	
You think it is very convenient to buy Yanbian yellow beef	0.615	0.888	
Do you think that when I buy Yanbian yellow beef, I buy it in the Hanwlinary way	0.520	0.891	
Do you think that when buying beef at the same price, I would choose Yanbian yellow beef	0.620	0.888	
When you buy Yanbian yellow beef, I will choose a fresh meat shop near my home to buy	0.473	0.893	
When you buy Yanbian yellow beef, I will choose to buy online (e-commerce, mini program)	0.579	0.890	
When you buy Yanbian yellow beef, I will choose to buy in the freezer shop	0.529	0.891	
When you buy Yanbian yellow beef, I will choose to buy it in the vegetable market	0.491	0.892	
When you buy Yanbian yellow beef, I will choose to buy in the brand outlet store	0.416	0.894	
When you buy Yanbian yellow beef, I will choose the products with more exquisite packaging to buy	0.556	0.890	
You have a strong identification with Yanbian cuisine	0.541	0.891	
After you tasted Yanbian yellow beef, you had the idea of wanting to taste it again	0.515	0.891	
When you taste yellow beef, you will discuss the local specialty Yanbian yellow beef with the restaurant	0.579	0.890	
Yanbian scalpers are special to you	0.524	0.891	
You will buy Yanbian yellow beef for your family/friends to taste	0.481	0.892	

Note: Standardized Cronbach  $\alpha$  coefficient =0.896

As can be seen from the above table, the reliability coefficient value is 0.896, which is greater than 0.8, indicating that the reliability quality of the research data is high. For " $\alpha$  coefficient of deleted item", the reliability coefficient does not increase significantly after any item is deleted, so the item should not be deleted. For "CITC value", the CITC value of analysis items is greater than 0.4, indicating that there is a good correlation between analysis items and a good reliability level. In summary, the reliability coefficient value of the research data is higher than 0.8, which indicates that the data reliability quality is high.

#### 4.1.8 Validity analysis

Validity refers to the degree to which the measured result reflects the content to be investigated. The more consistent the measured result is with the content to be investigated, the higher the validity is. Otherwise, the validity is lower. Validity test

needs to look at the significance of KMO coefficient and Bartlett sphericity test, in which the value of KMO coefficient ranges from 0 to 1, and the closer the value is to 1, the better the structural validity of the questionnaire. If the significance of Bartlett sphericity test is less than 0.05, we can also consider the questionnaire to have good structural validity.

Table 7 Validity analysis results

item	Factor load coefficient				Common factor variance
	Factor 1	Factor 2	Factor 3	Factor 4	
You think Yanbian yellow beef looks delicious	0.010	0.771	0.070	0.264	0.669
You think Yanbian yellow beef tastes good	0.130	0.776	0.131	-0.027	0.638
You think Yanbian yellow beef is unique	0.062	0.706	0.252	0.134	0.583
You think Yanbian yellow beef meat is very greasy	0.088	0.705	0.191	0.208	0.585
You think Yanbian yellow beef tastes better than other beef	0.125	0.759	0.093	0.068	0.606
You have a good experience when buying Yanbian yellow beef	0.218	0.203	0.753	0.149	0.678
You think it is very convenient to buy Yanbian yellow beef	0.187	0.209	0.676	0.184	0.701
Do you think that when I buy Yanbian yellow beef, I buy it in the Hanwlinary way	0.131	0.088	0.837	0.103	0.736
Do you think that when buying beef at the same price, I would choose Yanbian yellow beef	0.175	0.235	0.753	0.201	0.693
When you buy Yanbian yellow beef, I will choose a fresh meat shop near my home to buy	0.829	0.056	0.098	-0.008	0.699
When you buy Yanbian yellow beef, I will choose to buy online (e-commerce, mini program)	0.735	0.154	0.187	0.119	0.613
When you buy Yanbian yellow beef, I will choose to buy in the freezer shop	0.800	0.019	0.177	0.089	0.679
When you buy Yanbian yellow beef, I will choose to buy it in the vegetable market	0.784	0.105	0.126	-0.007	0.641
When you buy Yanbian yellow beef, I will choose to buy in the brand outlet store	0.676	0.029	0.015	0.207	0.501
When you buy Yanbian yellow beef, I will choose the products with more exquisite packaging to buy	0.725	0.132	0.189	0.100	0.588
You have a strong identification with Yanbian cuisine	0.213	0.203	0.038	0.813	0.748
After you tasted Yanbian yellow beef, you had the idea of wanting to taste it again	0.040	0.136	0.274	0.780	0.703
When you taste yellow beef, you will discuss the local specialty Yanbian yellow beef with the restaurant	0.127	0.178	0.280	0.751	0.690
Feature root (before rotation)	6.215	2.591	1.621	1.325	-
Variance interpretation % (before rotation)	34.527%	14.394%	9.007%	7.362%	-
Accumulated variance explanation rate % (before rotation)	34.527%	48.921%	57.928%	65.291%	-
Feature root value(after rotation)	3.700	3.065	2.837	2.150	-
Variance interpretation rate % (after rotation)	20.556%	17.027%	15.763%	11.945%	-
Accumulation variance explanation rate % (after rotation)	20.556%	37.583%	53.346%	65.291%	-
KMO value		0.882			-
Barth spherical value		1652.085			-
df		153			-
p-value		0.000			-

Blue indicates an absolute load factor greater than 0.4

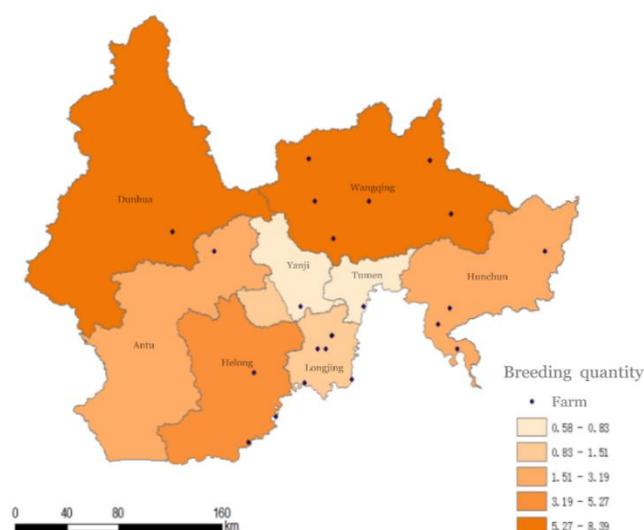
It can be seen from the above table that the common degree value corresponding to all research items is higher than 0.4, indicating that the information of research items can be effectively extracted. In addition, the KMO value is 0.882, greater than 0.6, and the data can be effectively extracted. In addition, the variance explanation rates of the four factors were 20.556%, 17.027%, 15.763% and 11.945%, respectively, and the cumulative variance explanation rates after rotation were 65.291% > 50%. This means that the information of the research can be effectively extracted.

The data in this study were rotated using the maximum variance rotation method (varimax) in order to find out the correspondence between factors and study items. The above table shows the information extraction of factors for research items and the corresponding relationship between factors and research items. From the above table, we can see that the common degree value of the corresponding value of all research items is higher than 0.4, which means that there is a strong correlation between research items and factors, and factors can effectively extract information. After ensuring that the factor can extract most of the information of the research item, the corresponding relationship between the factor and the research item is analyzed (when the absolute value of the factor load coefficient is greater than 0.4, it indicates that the item has a corresponding relationship with the factor).

## 4.2 Spatial characteristics of consumption behavior of Yanbian yellow cattle

### 4.2.1 Yanbian cattle breeding distribution

Figure 1 and Figure 2 are equivalent regional maps classified by natural breakpoints. The former shows the number of yellow cattle breeding and the distribution of farms in each county and district of Yanbian Prefecture, while the latter shows the per capita beef consumption in each county and district of Yanbian Prefecture.



**Figure. 1** Distribution of cattle breeding in Yanbian

Yanbian Prefecture has superior natural environment, more grass, more water and less cultivated land, which is conducive to the raising of Yanbian yellow cattle. Yanbian scalpers are distributed in eight counties and cities in Yanbian Prefecture, mainly in the following townships. As can be seen from Figure 1, among the eight counties and cities, the Yanbian yellow cattle breeding quantity in Wangqing County is the largest, and the total breeding amount in the whole state is the highest, reaching more than 80,000. The distribution of other breeding sites is mostly in the form of small-scale free-range breeding. And it has the most farms in the county, there are 6; Second is Dunhua City, although there is only one farm, but still more than 70,000 cattle are being raised; Yanji City and Tumen City are the two cities with the lowest number of scalpers, there is only one farm in the city, and the number of scalpers is less than 10,000. Beef can be distributed in a variety of ways. With the completion of the Changchun - Jilin - Tumen high-speed railway, as well as the continuous upgrading of transportation facilities in Yanbian. It makes the circulation of Yanbian cattle products more convenient and fast. The consumption demand of beef directly affects the development of beef cattle industry, and the more the demand, the more conducive to the development of beef cattle industry.

#### 4.2.2 Per capita consumption of cattle in Yanbian

As can be seen from Figure 2, Wangqing County and Yanji City are the provinces that consume the most beef per capita, reaching more than 3kg per person. The former may be due to the large number of scalpers in the county, which makes beef cheap and convenient for local residents to buy, so people are more willing to buy and consume scalpers. The latter may be due to the fact that Yanji is the most economically prominent province in Yanbian, and residents have more money to buy consumer scalpers. In contrast, Tumen, as the city with the smallest GDP in Yanbian Prefecture, its per capita consumption of beef is also very small, only more than 2kg.

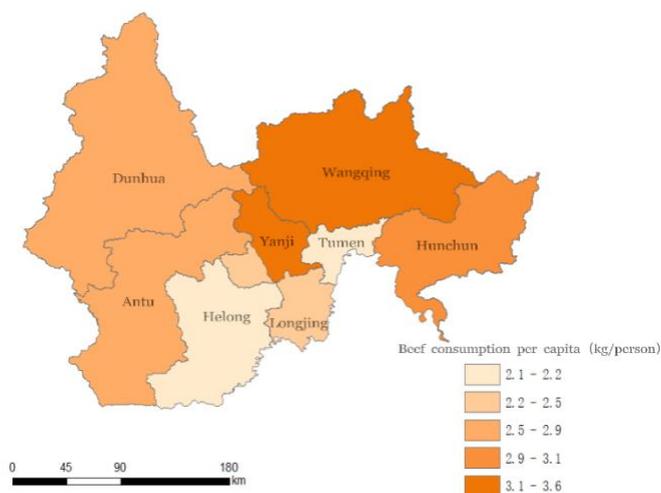


Figure. 2 Per capita consumption of yellow cattle in Yanbian

#### 4.2.3 Consumption space proportion of scalpers

Figure 3 is the density map using the ordinary Kriging interpolation method, which shows the proportion of cattle consumption in the total consumption of each county in Yanbian Prefecture. As can be seen from the figure, the highest proportion is Dunhua City, and the farther north the proportion is higher, reaching a maximum of more than 0.4, and the whole city is about 0.25. The lowest proportion is in the north of Wangqing County and the north of Antu County, where the consumption of scalper by residents is only about 0.2, and the entire region is about 0.15. The proportion of Yanji city is mainly between 0.18 and 0.23.

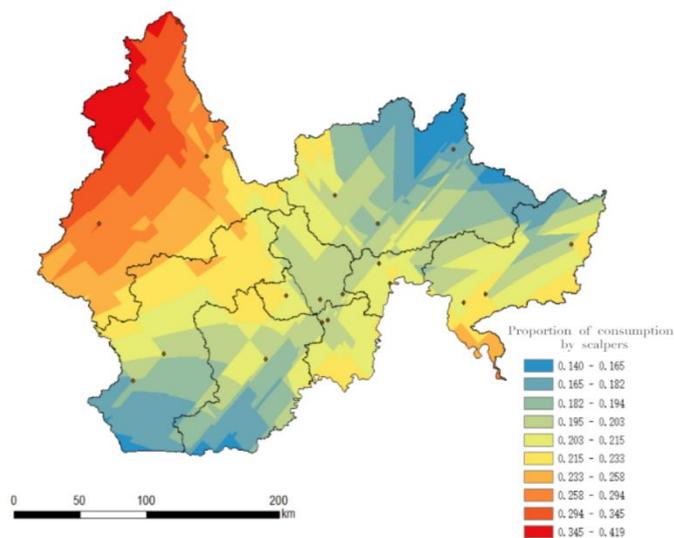


Figure. 3 Consumption space proportion of scalpers

## 5. Conclusions and Suggestions

### 5.1 Research Conclusions

#### 5.1.1 Unbalanced consumption

The phenomenon of unbalanced yellow beef consumption in Yanbian Prefecture refers to the situation that the per capita yellow beef consumption in Yanji City and Wangqing County is relatively high, while the consumption in other areas such as Tumen City is relatively low, resulting in unbalanced consumption. This imbalance has led to a mismatch in the allocation of resources, with excess cattle breeding in some areas and short supply in others.

The per capita consumption of yellow beef in Yanji City and Wangqing County is relatively high, which is related to the level of economic development and residents' income in these two areas. As the political, economic and cultural center of Yanbian Prefecture, Yanji city has a high economic strength and consumption ability. Yanji residents pay more attention to the quality of life and diversified food choices. Therefore, yellow beef, as a high-quality meat product, has been loved and consumed by the majority of residents. Compared with Yanji City and Wangqing County, the per capita yellow beef consumption in Tumen City is relatively low. Compared with Yanji City and Wangqing County, the economy of Tumen City and other regions is relatively backward, and the residents' income level is relatively low. Residents in Tumen City are faced with low consumption power and limited market supply choices, resulting in a relatively low yellow beef consumption.

In the whole cattle breeding industry in Yanbian Prefecture, Yanji City and Wangqing County, as consumption highlands, the development of aquaculture is relatively rapid, and the scale of aquaculture is relatively large. However, due to the low consumption in other areas, it does not match the scale of breeding, leading to the situation of excess cattle breeding in some areas, and the problem of resource waste and rising breeding costs. The consumption of beef in these regions is relatively low, the supply is relatively large, and the demand is limited, resulting in a phenomenon of short supply. This has not only led to increased economic pressure on some farmers, but also affected the sustainable development of the livestock industry in these areas.

#### 5.1.2 Geographical and traffic factors

Tumen City is located in the northeast of Yanbian Prefecture, on the border, adjacent to North Korea, the geographical location is relatively remote. Due to geographical restrictions, the economic development level of Tumen City is relatively low, the GDP is small, and the income level of residents is relatively limited. This low economic situation directly affects the consumption capacity and consumption level of residents, and then affects the sales and circulation of yellow beef. The city of Tumen has relatively poor transportation accessibility. Although the city is accessible by road and rail, due to its remote location, it is less accessible than other areas. The transportation cost of yellow beef and other agricultural products is high, and there may be food preservation and quality problems, which makes the residents of Tumen limited the consumption choice of yellow beef and other agricultural products, affecting the market supply and demand balance and consumption demand. Due to the economic situation of Tumen city and the restriction of transportation convenience, the sales and circulation of yellow beef in this area have been affected to a certain extent. On the one hand, the low consumption level in Tumen makes the demand for high-quality yellow beef and other products in the region low, resulting in excess supply in the market. On the other hand, due to the inconvenience of transportation, the circulation of products such as yellow beef is subject to certain restrictions, making it difficult for residents in the region to obtain a rich and diverse choice of agricultural products. This imbalance between supply and demand has led to overproduction of cattle and demand in other areas.

#### 5.1.3 Regional differences in breeding and consumption

The regional difference between breeding and consumption refers to the phenomenon that the amount of cattle raised in some areas is large, but the proportion of consumption is low. In the case of the largest amount of breeding in Wangqing County, the proportion of yellow beef consumption in the northern region where the county is located is low, and this difference leads to additional transportation and sales costs, affecting the circulation and sales of yellow beef.

Wangqing County, as the county with the largest amount of cattle breeding, has a rapid development of cattle breeding in this region, and the scale of breeding is relatively large, but the consumption proportion of the northern region where Wangqing County is located is low, that is, the consumption demand is insufficient. It may be related to the economic situation and the income level of residents in the northern region. Compared with other regions, the economic development level of the northern region is relatively low, the income level of residents is relatively low, and the consumption capacity is limited, so the demand for high-quality meat products such as yellow beef is relatively low.

Wangqing County is located in the north of Yanbian Prefecture, the geographical location is relatively remote, compared with other areas, the traffic is inconvenient, which makes the sale and circulation of yellow beef and other agricultural products face certain difficulties, increasing the transportation cost and sales cost. Due to the increase in transportation and sales costs, the price of yellow beef is relatively high, and the willingness of consumers to buy is relatively low, resulting in a low consumption ratio. The consumption ratio in the northern region is low, the supply and demand of yellow beef is unbalanced, some farmers may face sales difficulties, product accumulation pressure increases, resulting in a decline in sales prices, affecting the efficiency of breeding, due to the remote geographical location and inconvenient transportation, farmers face higher transportation costs and time costs when transporting products to the market for sale. This additional cost of transportation and distribution can further restrict the circulation and sale of products such as yellow beef.

## **5.2 Suggestions and Countermeasures**

### **5.2.1 Increase market development efforts in low-consumption areas**

Strengthen the economic coordination and cooperation among different regions in Yanbian Prefecture, and promote the sharing and optimal allocation of resources. Through the construction of agricultural products logistics and distribution center, the construction of agricultural products information service platform and other ways to improve the circulation efficiency of agricultural products in Yanbian Prefecture, and promote the reasonable circulation and consumption of agricultural products such as yellow beef. At the same time, resources can be shared and advantages can be complementary through cooperative breeding and regional cooperative marketing, so as to promote the cooperative development of yellow beef industry in Yanbian Prefecture, organize agricultural products fairs, hold food festivals and other activities to enhance consumers' interest in and demand for yellow beef. In addition, it is necessary to strengthen market supervision and business training to improve farmers' management level and market competitiveness. We will promote balanced consumption and rational allocation of resources. To promote the development of yellow beef industry in Yanbian Prefecture, improve the consumption level and realize the healthy development of the whole economy.

### **5.2.2 Improving traffic conditions**

Improve transportation efficiency and reduce transportation costs, increase investment in the construction of transportation infrastructure in Tumen City, build or improve road and railway traffic, increase freight capacity and convenience, strengthen transportation cooperation with surrounding areas, promote the construction of trans-regional agricultural product logistics and distribution system, and improve the circulation efficiency and market supply capacity of agricultural products. It is also necessary to strengthen market publicity and promotion to improve consumers' awareness of yellow beef and purchase willingness. To enhance consumers' interest in and demand for yellow beef by holding agricultural product fairs, launching special menus, and holding food festivals, and to use the Internet and new media platforms to carry out online promotion and sales, improve the popularity and market share of yellow beef, improve the consumption level of yellow beef in Tumen City, optimize market supply and demand, and promote the healthy development of agricultural products industry.

### **5.2.3 Optimize the supply structure**

As the largest cattle breeding county, Wangqing county should pay attention to market demand and optimize the supply structure. By strengthening market research and information feedback, we can understand the demand and supply of the market, adjust the scale and output of farming in a timely manner, avoid the sales pressure caused by excess production, and improve the quality and added value of products to increase consumers' willingness to buy. Pay attention to the quality and image of yellow beef, improve the technology and service level of yellow cattle breeding. The quality and safety of yellow beef can be improved by optimizing breeding environment, improving breeding methods, and strengthening disease prevention and control, so as to increase consumers' trust and purchase willingness. It can also establish cooperative partnerships with surrounding counties and cities to jointly carry out feeding technology research and industrial cooperation, and jointly promote the development of yellow beef industry. At the same time, we can strengthen the monitoring and analysis of the market, adjust the feeding scale and production in time, and ensure the balance of supply and demand of yellow beef.

## **Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, author-ship, and/or publication of this article.

### Data Sharing Agreement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

### Reference

- [1] Nie Yongfang, Nie Qingguo. Measurement of China's consumption resilience level and analysis of spatial spillover effects. *Journal of Commercial Economics*. 2024, (03): 63-66.
- [2] Mao Yuanyuan, Liu Sijie, Wang Can, et al. Research on the Spatial Consumption Attraction Features of Cultural and Creative-themed Commercial Complex: A Case Study of Eslite Bookstore in Suzhou. *South Architecture*. 2024, (02): 1-9.
- [3] Zhou Lin, Tang Chengcai, Zhou Cheng, et al. Spatial structure and driving mechanism of national night cultural and tourism consumption clusters. *Journal of Arid Land Resources and Environment*. 2024, 38(01): 171-179. DOI: 10.13448/j.cnki.jalre.2024.019.
- [4] Zheng Yinan. Research on Shanghai Urban Cultural Space Planning Strategy from the Perspective of Consumption//China Urban Planning Society. *People's City, Planning Empowerment-2023 China Urban Planning Annual Conference Proceedings (20 Master Plan)*. Shanghai Urban Planning and Design Institute. 2023: 8. DOI: 10.26914/c.cnkihy.2023.045883.
- [5] Li Yinghao, Zhu Li. A review of the research on the impact of social identity on consumer behavior. *Inquiry Into Economic Issues*. 2013, (02): 165-170.
- [6] Han Zhen. On national identity, ethnic identity and cultural identity - an analysis and thinking based on historical philosophy. *Journal of Beijing Normal University(Social Sciences)*, 2010, (01): 106-113.
- [7] Wang Jiaxu, Cui Yinhe. A study on the impact path of urban regional cultural identity under the perspective of human geography - taking Jinpu New District in Dalian as an example. *Journal of Liaoning Normal University*, 2023, 46(03): 409-415.