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Determinants of Consumption Structure of Livestock Products among Rural Chinese Residents: Household Characteristics and Regional Heterogeneity

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Abstract: Livestock products provide essential micro-nutrients and animal protein to rural residents. Upgrading the consumption pattern of livestock products is not only crucial for improving rural residents' health and quality of life but also for achieving food security and a healthy China under the "Great Food View" development concept. To identify the characteristics and determinants of residents' livestock products consumption structure in rural China, we used the Logit model to empirically analyze the key factors affecting rural residents' consumption structure of livestock products from the perspective of household characteristics and regional heterogeneity using a survey data of 4529 rural residents across 10 provinces. The findings reveal that, firstly, rural residents consume a variety of livestock product categories, predominantly meat, meat-egg, meat-milk, and meat-egg-milk. Secondly, the family characteristics of the number of people eating at home, education level, access to food nutrition and health information, ethnicity, and age structure significantly affect the consumption structure of livestock products among rural residents. Thirdly, self-raising of livestock and poultry can support rural residents' consumption of livestock products. Fourthly, there are notable variations in the consumption structure of livestock products between different regions. Based on this, we suggest strategies to optimize and support the consumption structure of livestock products for rural residents, such as promoting consumption upgrading, advocating market segmentation for livestock products, and improving regional self-sufficiency.

Keywords: rural residents; consumption structure of livestock product; household characteristics; regional heterogeneity

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1. Introduction

Food security, as an important guarantee for world peace and development and an essential foundation for the community of human destiny, has received considerable attention worldwide. Food security refers to the physical, social, and economic access of all people, at all times, to sufficient, safe, and nutritious food to maintain an active and healthy life [1]. In recent years, the international situation has been complex and volatile, with the New Crown Epidemic sweeping the world, the outbreak of the Russia-Ukraine conflict, and the intensification of climate change posing unprecedented challenges to global food security [2]. Worldwide, 150 million children under the age of five experienced stunted growth in 2020, and 45.4 million children under the age of five suffer from excessive wasting [3]. Inadequate intake of nutrients and unbalanced dietary structures are major causes of child malnutrition, especially the insufficient consumption of livestock products, which increases the risk of child malnutrition. Livestock consumption increases the risk of child malnutrition [4,5]. Livestock products are rich in essential amino acids, zinc, iron, calcium, selenium, vitamin

A, vitamin B12, and many other high-quality macronutrients [6,7]. Adequate intake of livestock products is not only beneficial for bone health, growth and development, blood cell production, immunity enhancement, etc. [8] but also helps to improve the nutritional performance of plant foods and enhance human nutritional status [9].

Per capita, consumption of livestock products has increased as per capita income and awareness of nutrition and health have risen globally. In 2020, per capita consumption of meat consumption reached 42.76 kg, showing a 2.7% increase compared with 2010. Per capita egg consumption rose to 10.45 kg, reflecting an 18.8% increase since 2010. Per capita consumption of milk reached 71.02 kg, showing an increase of 7.2% compared to 2010. The structure of the global dietary energy supply has also changed, with the proportion of dietary energy supplied by meat per person per day increasing from 7.7% in 2000 to 8.05% in 2020, and the proportion of dietary energy supplied using dairy and egg products increasing from 5.57% in 2000 to 6.34% in 2020 [10]. It can be seen that the per capita consumption of meat, milk, and eggs has risen to varying degrees, leading to a greater contribution of livestock products in providing dietary energy for human nutrition. From the viewpoint of the domestic environment, since the reform and opening up, the income level and living standard of rural residents have continuously improved. Consequently, the food consumption of residents has gradually shifted from a focus on quantity, known as "subsistence consumption", to a focus on quality and nutrition, known as "well-off consumption". This transition has resulted in changes in the structure of residents' food consumption [11]. Remarkably, there has been a monumental transformation in the dietary structure of rural residents. The consumption of staple foods, such as grain, has experienced a steady decline, while the consumption of meat, eggs, milk, and other livestock products has steadily increased [12]. Data from the National Bureau of Statistics show that, in 2022, China's per capita grain consumption decreased by 5.4% compared to the previous year, whereas per capita meat consumption increased by 5.0%, per capita egg consumption increased by 2.4%, and per capita milk consumption nearly doubled compared to the previous year [13]. Livestock products, which were once regarded as "rare delicacies" on dining tables 40 years ago, have now become "common dishes" and essential food in rural residents' daily diets [14]. Livestock products play an important role in enriching the "vegetable basket", "meat plate", "egg basket", and "milk bottle" of rural residents, improving the dietary structure of rural residents, and improving the health and well-being of rural residents [12,15].

However, compared with the global per capita consumption of livestock products, the consumption of meat and milk by rural residents in China is relatively low, especially the consumption of milk. According to the Scientific Research Report on Dietary Guidelines for Chinese Residents 2021, Chinese residents should have a daily intake of 40–75 g of livestock and poultry meat, 40–50 g of eggs, and 300 g of milk. Nevertheless, the current per capita consumption of livestock products by rural residents in China falls short, with an average daily meat intake of about 95 g, egg intake of about 37 g, and milk intake of about 118 g, which indicates an insufficient intake of both eggs and milk and excessive consumption of meat. It can be seen that the current food consumption structure of rural residents in China is unreasonable, thereby leading to widespread dietary imbalance [1]. In this context, exploring the factors affecting the consumption structure of livestock products for rural residents and regional heterogeneity is conducive to guiding rural residents to optimize and adjust their consumption structure of livestock products, thereby improving their dietary quality and nutritional health and ultimately achieving the United Nations Sustainable Development Goals (SDGs) and realizing food security and improved nutrition.

While there have been fewer studies specifically focusing on the consumption structure of livestock products for rural residents, some studies have utilized yearbook data or research data to analyze the trends, characteristics, and factors influencing livestock product consumption [16].

First, the consumption of livestock products by urban and rural residents is analyzed comparatively. In terms of overall consumption, rural residents consume significantly

less livestock products than that of urban residents [17–19]. From the perspective of consumption structure, urban residents in China are gradually reducing their intake of pork and eggs while increasing their consumption of aquatic products and dairy products. Rural residents, however, continue to maintain high levels of pork and egg consumption [20], resulting in an imbalanced consumption structure of livestock products in rural areas [21].

The second is to analyze the factors influencing residents' consumption of livestock products. Qualitative analysis found that household income, consumption habits, urban-rural disparities, urbanization level, livestock product prices, regional differences, and population size and structure are important factors affecting residents' consumption of livestock products [22–24]. Quantitative studies have also been conducted to understand these influences. Lu et al. [11] employed the Extended Linear Expenditure System ELES model and found that with the increase in income, urban residents preferred dairy consumption, while rural residents preferred poultry consumption. Ma [25] identified demand, price, and demographic factors as the main determinants of livestock consumption using factor analysis. Mohammadi et al. [26] discovered that age, education, awareness of nutritional value, advertisement, and household income have a significant effect on chicken consumption. Daba et al. [27] analyzed Ethiopian rural research data and found that property ownership, income, education, household size, unavailability of livestock products, and unaffordability of prices led to low livestock consumption among rural residents. Bundala et al. [28] analyzed Tanzania farm research data and found that lack of nutritional knowledge and limited number of livestock on the farm were significant factors hindering the consumption of livestock products. Other scholars divided livestock consumption into home consumption and out-of-home consumption and found that in addition to income and urbanization level as the main factors affecting residents' livestock consumption, price, preference, and health concerns were the main factors affecting the amount of livestock consumed by residents at home, while the employment status of the wife, the number of males in the family, and the presence of minors were the main factors affecting livestock consumption outside the home [29].

Academic research on the factors affecting the consumption of livestock products by residents of various countries provides valuable insight for this paper. However, a review of existing literature reveals three shortcomings in the current research on the impact of livestock product consumption by rural residents in China. Firstly, there is a lack of research specifically focused on the consumption structure of livestock products by rural residents in China. Secondly, the existing research on the analysis of China's livestock product consumption structure is mainly based on yearbook data, which denotes a limited sample size and lack of latest year data. Thirdly, the research samples are confined to a certain province or a certain city in a certain province, and there is a lack of analysis of the differences in the consumption structure of livestock products among rural residents in different regions. There are obvious variations in residents' propensity to consume livestock products across different regions in China; ignoring these regional differences can lead to biased outcomes in the model [20].

Therefore, to bridge the research gap, identifying the characteristics and determinants of rural residents' consumption structure of livestock products, we explore the key factors affecting the consumption structure of livestock products of rural residents from the perspective of household characteristics and regional heterogeneity by using the Logit model based on the survey data of 4529 rural residents across 10 provinces in China. Our research is envisioned to put forward countermeasures and suggestions to optimize and promote the consumption structure of livestock products of rural residents in China.

2. Materials and Methods

2.1. Data Sources

The data in this paper are sourced from the China Rural Microeconomics Database, established by the Institute of Agricultural Economics and Development of the Chinese Academy of Agricultural Sciences (CAAS) starting in 2011, with a baseline survey con-

ducted in 2012 and annual tracking surveys, which use a combination of stratified and probability sampling to select samples of rural residents. All the surveys were conducted by having interviews face-to-face, and each interview lasted over one hour. In view of the completeness and timeliness of the data on rural residents, this paper conducts empirical analysis based on the data from 2020. By screening out the samples with important data missing, 4529 samples from 10 provinces and regions were valid for our analysis. The 10 provinces and regions include Anhui (462), Fujian (516), Yunnan (371), Hebei (411), Henan (490), Hunan (500), Jilin (471), Sichuan (509), Xinjiang (394), and Zhejiang (405). The number of samples in each province is in the parentheses. In order to explore regional differences, this paper adopts the regional division provided by the Bureau of Statistics, dividing the 10 provinces into six regions, namely East China, Central China, North China, Northeast China, Northwest China, and Southwest China. The geographic location and regional division of specific provinces are detailed in Figure 1.

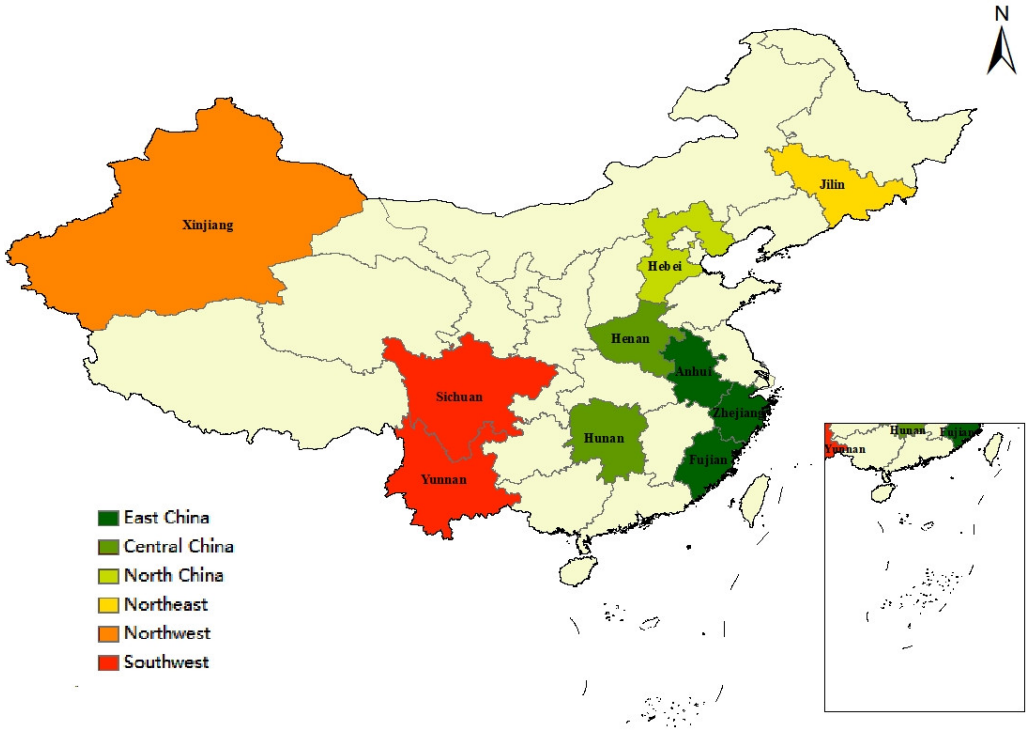


Figure 1. Distribution of surveyed provinces and regional divisions.

2.2. Method

Since the consumption structure of livestock products for rural residents is a typical dichotomous variable, a Logit model is appropriate. The basic form of the model is:

$$y_i = f(x_i) + \varepsilon_i$$

In the above equation, y_i represents the consumption structure of livestock products of rural residents i. When y_i is taken as 1, it means that the consumption structure of livestock products of rural residents is one of the seven kinds, x_i represents the factors affecting the consumption structure of livestock products of rural residents i, ε_i is the random perturbation term, and i is the number of samples. The specific form of the regression model is as follows:

$$Ln(\frac{p_i}{1-p_i}) = \alpha + \sum_{i=1}^{n} \beta x_i$$

In the above equation, p_i denotes the probability that the consumption structure of livestock products for rural residents is one of the seven types, α is the constant term, and β is the regression coefficient.

2.3. Design of Indicators

With reference to the research on the factors affecting residents' consumption of livestock products, this paper analyzes the factors affecting the consumption structure of livestock products of rural residents from three aspects: family characteristics, self-raising livestock, and regional variables.

Family consumption is the main carrier of rural residents' livestock consumption. Without a doubt, family characteristics would influence the structure of residents' consumption of livestock products [30]. There are differences in the consumption of livestock products among families with different ethnic attributes, age structure, and education level [26,27]. In this paper, we consider variables related to ethnic attributes (whether the rural resident belongs to an ethnic minority family), education level (the highest number of years of education), age structure (presence of elderly individuals and minors in the family) to explore their influence on the consumption structure of livestock products. Family income, as the economic basis of residents' consumption, is also a crucial determinant of residents' consumption of livestock products [22,23,26,27]. With the increase in family income level, rural residents tend to prioritize food nutrition, leading to an increased consumption of livestock products that are rich in protein and various nutrients.

Furthermore, family size has a certain impact on livestock product consumption [27]. Since the livestock product consumption is based on the family unit, the size of the family will inevitably affect the overall consumption of livestock products. Additionally, family size has a direct impact on the growth of per capita income, which in turn indirectly affects the level and structure of livestock product consumption [31]. In households with similar incomes, the demand curve for livestock products will shift downward, and vice versa for larger households that consume more staple foods [32]. In this paper, the number of people eating at home is used as a proxy variable for population size.

Awareness of nutritional value is considered to be one of the factors affecting residents' consumption of livestock products [26,28]. We employ whether individuals obtain food nutrition and health information via the internet as the proxy variable to denote rural residents' awareness of the nutritional value of livestock product consumption. Considering the impact of major family events on rural residents' livestock product consumption, this paper designed the variable of whether big events have occurred in the family in recent years to examine the impact of family changes on livestock product consumption structure.

Referring to the findings of Bundala et al. that the number of farm animals has a significant impact on residents' livestock product consumption [28], this paper introduces the types of livestock and poultry owned by rural households into the model to explore the impact of owned livestock and poultry on the consumption structure of livestock products by rural residents. Furthermore, there are noticeable variations in the propensity of residents to consume livestock products across different regions in China, and disregarding these regional differences would yield biased results [20]. Therefore, in this paper, regional dummy variables are introduced into the model to obtain more accurate results and examine the impact of regional heterogeneity. The detailed explanation of all variables is as follows:

1. Explained variables. There are seven categories in the consumption structure of livestock products for rural residents: meat, egg, milk, meat-egg, meat-milk, egg-milk, and meat-egg-milk. Due to the low percentage of rural residents who consume eggs, milk, or egg-milk, the sample size was insufficient to meet the empirical requirements, and thereby, they are not included in the empirical analysis. Therefore, this paper focuses on four consumption structures, namely, residents' consumption of meat, meat-egg, meat-milk, and meat-egg-milk. It should be noted that the consumption of meat, eggs, and milk includes cases where residents engage in self-production and self-consumption. If residents consume meat only, we assign the variable meat the value of 1, otherwise 0. If residents consume both meat and egg/milk, we assign the variable meat-egg/meat-milk the value of 1, otherwise 0. If residents consume meat, eggs, and milk, we assign the variable meat-egg-milk the value of 1, otherwise 0.

2. Explanatory variables. Factors affecting the consumption structure of livestock products by rural residents include family characteristics, self-raised livestock, and regional variables, of which family characteristics and regional variables are the focus of this study. Family characteristics variables include nine specific variables, "Number of people eating at home" is obtained using the residents' answers to the question, "How many people eat at home every day on average in your family throughout this year?" Residents' responses of the actual number of people eating at home are assigned as the value of the variable "Number of people eating at home". The highest number of years of education is the actual number of academic education years received by rural residents. "Annual household income" refers to the residents' actual total household income last year and selects the unit of thousands of yuan to reduce the variance and for analysis convenience. Ethnic minority household refers to whether any member of the rural household belongs to a minority group, assigned the value of 1 if true and 0 otherwise. The value of "Households with the elderly and minors" captures whether there are both elderly people (over 65 years old) and minors (under 18 years old) in the rural household. We assign the value of 1 if yes and the value of 0 if no. The rules of the value assignment of both "Households with elderly persons" and "Households with minors" are likewise. "Family events" refers to if there were major events that occurred in the household, such as marriage, funeral, children's promotion to higher education, construction of a new house, or house renovation during the year. We assign the value of 1 if it occurred; otherwise, 0 if not. "Food nutrition health information" refers to whether rural residents used the internet to obtain food nutrition and health information; a value of 1 indicates usage, while 0 signifies otherwise. Self-raised livestock and poultry variables include five specific variables. Research has indicated that rural residents commonly raise hogs, beef cattle, meat goats, broiler chickens, and meat ducks for self-consumption, consequently influencing their consumption structure of livestock products. The variable of self-raised livestock refers to whether rural residents engage in raising these specific types of livestock within their families, assigned a value of 1 if true and 0 otherwise. In order to explore the regional disparities in the consumption structure of livestock products among rural residents, we introduce five regional dummy variables, namely, North China, East China, Central China, Northeast China, and Northwest China, in the model. Details are presented in Table 1.

Table 1. Descriptive statistics of the variables.

Variable Category	Variable	Unit	Mean/Ratio
Explained variables			
Consumption structure of livestock products	meat	%	20.51
	meat-egg	%	31.42
	meat-milk	%	10.47
	meat-egg-milk	%	36.45
Explanatory variable			
Household characteristics	Number of people eating at home	Persons	3.18
	Highest years of education	Years	10.81
	Annual household income	Ten thousand yuan	11.68
	Ethnic Minority Households	%	13.65
	Households with the elderly and minors	%	16.71
	Households with elderly persons	%	28.11
	Households with minors	%	28.95
	Family Events	%	7.15
	Food Nutrition Health Information	%	34.68

Table 1. *Cont.*

Variable Category	Variable	Unit	Mean/Ratio
Self-raised livestock and poultry	Self-raised hogs	%	8.03
	Self-raised beef cattle	%	0.75
	Self-raised meat goats	%	1.96
	Self-raised broiler chickens	%	8.90
	Self-raised broiler ducks	%	1.92
Region	North China	%	9.07
	East China	%	30.54
	Central China	%	21.86
	Northeast China	%	10.40
	Northwest China	%	8.70
	Southwest China	%	19.43

3. Results and Analysis

3.1. Characteristics of Rural Households in Different Regions

Statistical analysis of the whole sample shows that the number of people who eat at home every day is 3.18 persons. The highest level of education years reached 10.81, which denotes half of the respondents' completion of junior middle education. The average annual household income is 111,700 yuan. 13.65% of respondents are from ethnic minority families. From the perspective of age pattern, 16.71% of sample households consist of both elderly people and minors, 28.11% of sample households have elderly people and no minors, and 28.95% of sample households have minors and no elderly people. 7.15% of sample households have experienced major events (marriage, funeral, children's promotion to higher education, construction of new or renovated houses, etc.) during the year.

In terms of region variations, the number of people eating at home daily in rural households is lower in the Northeast region compared to other regions, reaching a maximum of 3.39 persons in East China. The highest level of education years among rural households in the Northwest China region reached 11.05 years, which is 1.14 years higher than the lowest in the Northeast China region. In terms of annual household income, the Northeast region has the lowest average at 42,100 yuan. Both East China and Central China have annual household incomes exceeding 120,000 yuan. The proportion of households with elderly individuals or minors does not significantly differ among regions. However, there is a notable disparity in the proportion of households with both elderly and minors, especially in the Northeast and Northwest China, where the proportion is relatively lower, not exceeding 10%, and more than one times less than the highest in East China. The proportion of households experiencing major events is relatively even across regions, with only the Northeast region showing a relatively low proportion. Details are shown in Table 2.

Table 2. Statistical tables on the situation of rural households in different regions.

Region Household Characteristics	North China	East China	Central China	Northeast China	Northwest China	Southwest China	All Samples
Number of people eating at home, persons	3.14	3.39	3.09	2.66	2.97	3.34	3.18
Highest years of education, years	10.67	10.99	10.99	9.91	11.05	10.76	10.81
Annual household income, 10,000 yuan	7.66	12.50	12.54	4.21	16.71	10.45	11.17
Ethnic Minority households, %	1.95	1.88	14.65	11.04	55.33	19.20	13.65
Households with elderly and minors, %	12.90	22.70	13.03	7.86	9.90	21.02	16.71
Households with elderly, %	30.66	28.34	25.76	33.33	25.63	27.50	28.11
Households with minors, %	32.36	27.19	36.26	20.38	27.92	26.93	28.95
Major event in household, %	6.08	9.33	6.46	1.91	7.36	7.73	7.15
Sample size, individuals	411	1383	990	471	394	880	4529

3.2. Analysis of the Consumption Structure of Livestock Products for Rural Residents

Based on the consumption of meat, egg, and milk by rural residents, the consumption structure of livestock products in the surveyed samples can be divided into seven categories, including meat, egg, milk, meat-egg, meat-milk, egg-milk, meat-egg-milk and so on (see Figure 2). In terms of all samples, the proportion of samples consuming meat, egg, and milk reached 36.45%, followed by 31.42% of samples consuming meat and egg, 20.51% of samples consuming only meat, and a lower proportion of samples consuming only egg or milk, neither of which exceeded 1%. Regarding the situation in each region, the consumption structure of livestock products for rural residents in North China is dominated by meat-egg and meat-egg-milk, with 96.1% of the samples. Less than 4% of the samples consume other livestock products, and the samples that consume only egg or egg-milk are almost 0. The consumption structure of livestock products for rural residents in East China is dominated by meat, egg-milk, and meat-egg, with the total number of samples accounting for 86.92%. The consumption structure of livestock products is more balanced than that in North China. The consumption structure of livestock products for rural residents in Central China is dominated by meat-egg, meat-egg-milk, and meat, with 85.35% of the samples, and the consumption structure is balanced to a degree comparable to that of eastern China, with no samples consuming egg-milk. The consumption structure of livestock products for rural residents in Northeast China is dominated by meat and meat-egg, with the total sample accounting for 85.56% and less than 15% of the sample consuming other kinds of livestock products. The purchase of milk and egg-milk is almost 0. The consumption structure of livestock products for rural residents in the Northwest region is dominated by meat and meat-egg, accounting for 91.88% of the total sample size. The samples consuming only egg or milk or egg-milk are almost none. The consumption structure of livestock products for rural residents in the Southwest region is dominated by meat-egg, meat-egg-milk, and meat, accounting for 83.98% of the total sample size. For the consumption of meat-milk, the sample size is higher, accounting for 14.66%. In general, the consumption of livestock products by rural residents in the research area is dominated by meat-egg, with relatively few samples consuming milk.

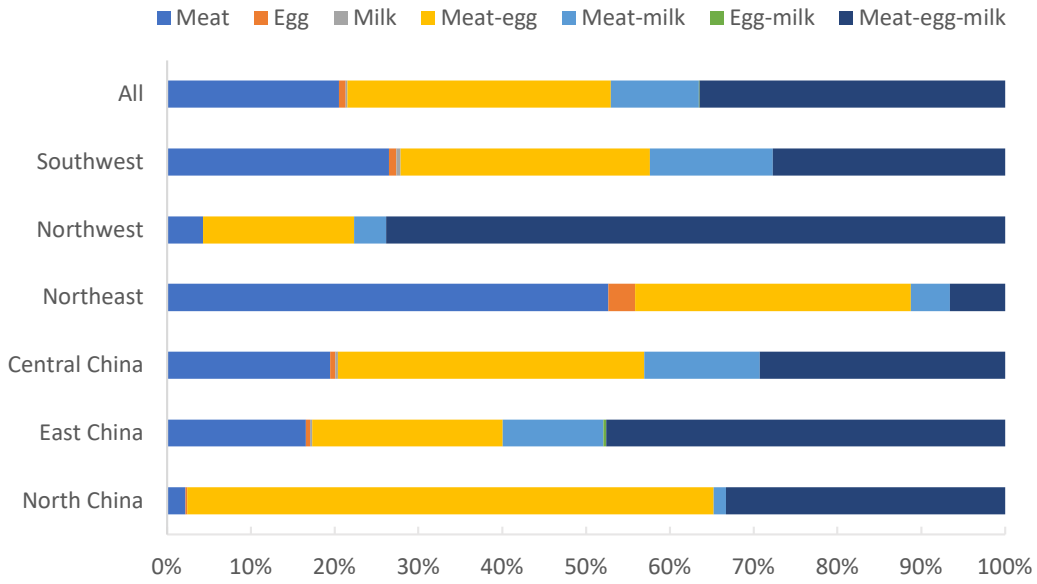


Figure 2. Consumption structure of livestock products of rural residents in different regions.

3.3. Analysis of Factors Affecting the Consumption Structure of Livestock Products by Rural Residents

Before the empirical analysis, we carry out the multicollinearity test on the respective variables, and the results show that the maximum value of variance inflation factor (VIF) is 2.22, and the average value is 1.42, which is much lower than the reasonable value of 10,

indicating there is a slight possibility of multicollinearity in the model. As introduced in the method part, this paper employed the Logit model to explore factors influencing rural residents' consumption structure of livestock products by utilizing stata15.0. Detailed results are presented in Table 3.

Table 3. Logit model regression results.

Variable	Meat	Meat-Egg	Meat-Milk	Meat-Egg-Milk
Number of people eating at home	−0.019	−0.137 ***	0.150 ***	0.07 **
	(0.036)	(0.032)	(0.037)	(0.029)
Highest years of education	0.040 ***	−0.047 ***	0.046 ***	0.005
	(0.013)	(0.011)	(0.015)	(0.01)
Annual household income	−0.004	0.001	−0.006	0.005 *
	(0.004)	(0.003)	(0.004)	(0.003)
Ethnic Minority Households	0.703 ***	−0.102	−0.343 *	−0.316 **
	(0.133)	(0.122)	(0.187)	(0.125)
Households with the elderly and minors	−0.057	−0.424 ***	0.362 **	0.328 ***
	(0.15)	(0.125)	(0.18)	(0.121)
Households with elderly persons	0.354 ***	−0.267 ***	0.469 ***	−0.237 **
	(0.117)	(0.097)	(0.158)	(0.105)
Households with minors	−0.516 ***	−0.621 ***	0.253	0.806 ***
	(0.131)	(0.102)	(0.157)	(0.102)
Family Events	0.122	−0.411 ***	0.397 **	0.013
	(0.159)	(0.157)	(0.17)	(0.133)
Food Nutrition Health Information	−0.425 ***	−0.542 ***	0.284 ***	0.621 ***
	(0.096)	(0.08)	(0.106)	(0.074)
Self-raised hogs	0.986 ***	−0.418 ***	0.465 ***	−0.801 ***
	(0.145)	(0.161)	(0.172)	(0.162)
Self-raised beef cattle	1.105 **	−0.788	−0.657	−0.041
	(0.486)	(0.693)	(1.03)	(0.466)
Self-raised meat goats	−0.010	−1.301 ***	0.455	0.711 **
	(0.47)	(0.479)	(0.466)	(0.306)
Self-raised broiler chickens	0.898 ***	−0.890 ***	1.025 ***	−0.822 ***
	(0.146)	(0.172)	(0.152)	(0.149)
Self-raised broiler ducks	0.418	−0.105	0.550 **	−0.906 ***
	(0.275)	(0.306)	(0.265)	(0.335)
North China	−1.893 ***	1.068 ***	−1.925 ***	−0.270 *
	(0.355)	(0.145)	(0.431)	(0.147)
East China	0.131	−0.696 ***	0.104	0.477 ***
	(0.128)	(0.119)	(0.146)	(0.111)
Central China	0.402 ***	−0.002	0.425 ***	−0.478 ***
	(0.134)	(0.117)	(0.156)	(0.121)
Northeast China	1.896 ***	−0.512 ***	−0.374	−1.938 ***
	(0.17)	(0.172)	(0.297)	(0.259)
Northwest China	−1.761 ***	−0.839 ***	−0.928 ***	1.749 ***
	(0.332)	(0.177)	(0.341)	(0.171)
_cons	−2.116 ***	0.991 ***	−3.644 ***	−1.262 ***
	(0.211)	(0.175)	(0.278)	(0.174)
Number	4150	4150	4150	4150

Notes: This table presents the coefficients of all models. Standard error is in parentheses; ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

As shown in the results of meat-only consumption, several household characteristic variables, including highest years of schooling, ethnic minority households, presence of elderly people, presence of minors, and access to information on the nutritional health of food, have significant effects on meat-only consumption by rural residents. Specifically, rural residents with minors in their household are 40.3% less likely to consume meat-only than those without minors (exp (−0.516) = 0.597). Rural residents who access information on food nutrition and health via the internet are 34.6% less likely to consume meat only than those who do not (exp (−0.425) = 0.654). Ethnic minorities have a positive effect

on meat consumption, with the odds of ethnic minority rural residents consuming meat being twice as high as those of non-Han rural residents. This is consistent with the fact that ethnic minorities are predominantly meat consumers. Rural residents with elderly people in their families are 42.5% more likely to consume meat compared to households without elderly people (exp (0.354) = 1.424. The highest education year of rural residents is positively related to meat consumption, although the influence coefficient is relatively small. Regarding self-raised livestock and poultry, the presence of self-raised hogs, beef cattle, and broiler chickens has a significant positive impact on rural residents' consumption of meat-only, indicating that self-raised livestock and poultry strongly support rural residents' meat consumption. Furthermore, there are differences in the direction of regional variables, with North China and Northwest China having a negative impact on rural residents' consumption of meat and Central China and Northeast China having a positive impact on meat consumption.

With regard to the factors influencing residents' meat-egg consumption, the number of people eating at home, the highest years of education, households with elderly people and minors, households with elderly people, households with minors, the occurrence of a major event in the household, and access to information on food nutrition and health are estimated to have significant negative effect. with one-unit increase in the number of people eating at home and the highest years of schooling, the odds of rural residents consuming meat-egg would reduced by 12.8% and 4.5%, respectively (exp (−0.137) = 0.872; exp (−0.047) = 0.954). The odds of consuming meat-egg for rural residents with elderly and minors in the household, minors in the household, and elderly people in the household are 34.6%, 23.4%, and 46.3% lower, respectively, than for those who do not have (exp (−0.424) = 0.654; exp (−0.267) = 0.766; exp (−0.621) = 0.537). The odds of consuming meat-egg for rural residents who have experienced major events during the year and who access information on food nutrition and health via the internet are 33.7% and 41.8% lower than for those who do not (exp(−0.411) = 0.663; exp(−0.542) = 0.582), respectively. It can be seen that among the household characteristic variables, the number of people eating at home has a greater effect on the rural residents' consumption of meat-eggs. In terms of self-raised livestock, self-raised hogs, meat goats, and broiler chickens all have a significant negative impact on rural residents' consumption of meat-egg. Among them, the effect of raising meat goats is larger, and the probability of consuming meat-egg by residents raising meat goats is 72.8% lower than that of residents without raising meat goats (exp (−1.301) = 0.272), followed by raising broilers, with a decrease in the probability of 58.9% (exp (−0.890) = 0.411), and the smaller effect is on the number of raising hogs, with a decrease in the probability of 34.2% (exp (−0.418) = 0.658). The effects of regional variables are various as well, with the exception of North China, which has a positive effect on meat-egg consumption, East China, Northeast China, and Northwest China, which have a significant negative effect on meat-egg consumption.

With regard to the results of meat-milk consumption, the household characteristic variables of the number of people eating at home, the highest years of education, ethnic minorities, households with elderly and minors, households with elderly people, the occurrence of a major event in the household, and information on the nutritional and health aspects of food have a significant effect on the consumption of meat-milk by rural residents. Among them, all of the above influencing factors are positively related to the consumption of meat-milk, except for ethnic minorities, which have a negative effect on the consumption of meat-milk. Compared to Han Chinese, ethnic minorities were 29% less likely to consume meat-milk (exp (−0.343) = 0.710). For each unit increase in the number of people eating at home and the highest years of schooling, the odds of rural residents consuming meat-milk increase by 16.2% and 4.7%, respectively (exp (0.150) = 1.162; exp (0.046) = 1.047). Rural residents with elderly and minors in the household and those with only elderly are 43.6% and 59.8% more likely to consume meat-milk, respectively, than those without (exp (0.362) = 1.436; exp (0.469) = 1.598). Rural residents who have a major household event and who use the internet for food nutrition information are 48.7% and 32.8% more likely to

consume meat-milk than those who do not (exp (0.397) = 1.487; exp (0.284) = 1.328). Among the own-raised livestock variables, own-raised hogs, broiler chickens, and broiler ducks have a significant positive effect on rural residents' consumption of meat-milk. The highest impact effect is observed in the case of own-raised broiler chickens (1.8 times), followed by own-raised broiler ducks (73.3%) and own-raised hogs (59.2%). Own-raised livestock and poultry support the rural population's meat-milk consumption. There are also differences in the direction of regional variables, with the exception of Central China, which has a positive effect, and North China, Northeast China, and Northwest China, which have a negative effect.

With regard to the results of meat-egg-milk consumption, the household characteristic variables of the number of people eating at home, annual household income, ethnic minorities, having elderly people and minors in the household, having elderly people, having minors, and nutritional and health information of food have a significant effect on the consumption of meat-egg-milk by rural residents, of which ethnic minorities and having elderly people in the household have a significant negative relationship with the consumption of meat-egg-milk by rural residents. Han Chinese and rural residents without elderly people in the household have higher chances of consuming meat-egg-milk. The number of people eating at home and annual household income have a significant positive relationship with rural residents' consumption of meat-egg-milk, but the effect is not obvious. Rural residents with elderly people and minors in the household and with access to information using the internet have a significant positive relationship with the consumption of meat-egg-milk, which is higher than those without by 38.8%, 124%, and 86.1%, respectively. Among the variables of self-raised livestock and poultry, self-raised meat goats have a significant positive effect on rural residents' consumption of meat-egg-milk, while self-raised hogs, broiler chickens, and meat ducks have a significant negative effect. There are also differences in the direction of the regional variables, with North China, Central China, and Northeast China having a negative impact, except for East China and Northwest China, which have a positive impact.

3.4. Robustness Tests

In order to test the reliability of the regression results, this paper, based on the study of Chang et al. [33], conducts a robustness test using the subsample regression method. Considering that the consumption structure of livestock products of rural residents with lower or higher incomes is relatively special, this paper excluded the samples with annual household incomes below 10,000 yuan or above 500,000 yuan and re-regress the data. The regression results, as shown in Table 4 indicates that the significant level and direction of influence of the family characteristics, self-raised livestock, and region variables are basically consistent with the results of the benchmark model. Therefore, the results of the above benchmark regression model are relatively robust.

Table 4. Robustness test results.

Variable	Meat		Meat-Egg		Meat-Milk		Meat-Egg-Milk	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Number of people eating at home	−0.028	0.039	−0.121 ***	0.035	0.129 ***	0.039	0.071 **	0.032
Highest years of education	0.044 ***	0.015	−0.051 ***	0.012	0.039 **	0.017	0.011	0.011
Annual household income	−0.016 ***	0.006	−0.001	0.005	0.004	0.006	0.008 *	0.004
Ethnic Minority Households	0.733 ***	0.145	−0.093	0.133	−0.314	0.204	−0.344 **	0.137
Households with the elderly and minors	−0.089	0.162	−0.476 ***	0.133	0.26	0.192	0.435 ***	0.128

Table 4. *Cont.*

Variable	Meat		Meat-Egg		Meat-Milk		Meat-Egg-Milk	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Households with elderly persons	0.233 *	0.129	−0.22 **	0.105	0.45 ***	0.169	−0.196 *	0.114
Households with minors	−0.600 ***	0.141	−0.616 ***	0.11	0.202	0.166	0.851 ***	0.109
Family Events	0.191	0.169	−0.45 ***	0.167	0.307 *	0.185	0.04	0.141
Food Nutrition Health Information	−0.337 ***	0.103	−0.571 ***	0.085	0.292 ***	0.113	0.591 ***	0.078
Self-raised hogs	1.057 ***	0.155	−0.416 **	0.171	0.362 **	0.182	−0.764 ***	0.168
Self-raised beef cattle	1.185 **	0.533	−1.108	0.847	−0.465	1.061	0.048	0.523
Self-raised meat goats	−0.644	0.554	−1.383 **	0.542	0.687	0.492	0.885 ***	0.333
Self-raised broiler chickens	0.857 ***	0.159	−0.969 ***	0.191	1.136 ***	0.159	−0.854 ***	0.164
Self-raised broiler ducks	0.541 *	0.292	−0.102	0.334	0.496 ***	0.274	−1.025 ***	0.376
North China	−1.812 ***	0.376	1.018 ***	0.153	−2.247 ***	0.522	−0.247	0.154
East China	0.150	0.139	−0.738 ***	0.127	0.019	0.155	0.530 ***	0.117
Central China	0.388 ***	0.146	0.002	0.123	0.373 **	0.166	−0.428 ***	0.128
Northeast China	1.994 ***	0.188	−0.560 ***	0.189	−0.333	0.319	−2.055 ***	0.293
Northwest China	−1.470 ***	0.337	−0.898 ***	0.197	−1.174 ***	0.394	1.749 ***	0.187
_cons	−2.071 ***	0.233	1.036 ***	0.191	−3.530 ***	0.307	−1.383 ***	0.189
Number	3600		3600		3600		3600	

Notes: This table presents the coefficients of all models. Standard error is in parentheses; ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

4. Discussion

Analyzing the current situation of the consumption structure of livestock products for rural residents and its influencing factors is the basis for optimizing the consumption structure of livestock products for rural residents and improving the level of nutrition and health. Currently, the total consumption of meat and eggs is high among rural residents, while the consumption of milk is relatively low. This is consistent with the results of Xie's [23] analysis based on yearbook data. Xie points out that the main difference between the livestock products consumption structure in rural and urban areas lies in the high proportion of meat consumption and the low proportion of milk consumption. In terms of consumption structure, there are four categories of livestock product consumption structures among rural residents which are meat-egg-milk, meat-milk, meat-egg, and meat. The consumption structure of livestock products varies across different regions in China. Among them, the consumption of meat-egg-milk by rural residents in Northwest China accounts for a considerable proportion, and residents in North China consume a higher proportion of meat-egg, followed by a combination of meat-egg-milk. Rural residents in Northeast China consume a larger proportion of meat, while rural residents in East, Central, and Southwest China choose a more balanced proportion of meat, meat-egg, meat-milk, and meat-egg-milk combinations. These regional differences in livestock product consumption structure can be attributed to variations in geographical environments, production levels of livestock products, and the preferences and habits of residents in different regions [22].

In terms of household influencing factors, the number of people eating at home has a significant negative effect on the consumption of meat-egg, and a significant positive effect on the consumption of meat-milk and meat-egg-milk, but the influence coefficient on meat-egg-milk is quite small. This indicates that as the number of people eating at home increased, rural residents tended to consume more meat and milk in their livestock products. The higher the education level, the higher the rural residents' consumption of meat and meat-milk, and the lower the consumption of meat-egg. In addition to a small significant positive effect on the consumption of meat-egg-milk, the impact of household income on the structure of all types of consumption is not significant, indicating that the relationship between rural residents' income and the structure of rural residents' consumption of

livestock products is not obvious. Generally, many scholars have found that household income and consumption of livestock products are significantly positively related [11,12], but we find that the relationship between the household income of rural residents and their consumption structure of livestock products is not significant. This may be attributed to the relaxation of income restraints as rural residents' income levels rise, enabling them to freely choose their preferred types of livestock products for consumption. Compared with Han rural households, ethnic minority households have a higher probability of consuming only meat and make fewer choices about the consumption structure of meat-milk and meat-egg-milk. Families with both elderly people and minors prefer to consume meat-milk and meat-egg-milk, while families with elderly people and no minors prefer to consume meat and meat-milk, and families with minors and no elderly people choose to consume a wider variety of livestock products such as meat-egg-milk. It can be seen that families with minors tend to consume meat-egg-milk, which is the same situation in India [34], while families with elderly people mainly consume meat-milk, indicating the consumption of meat and milk is a common choice for families of different age structures. This shows that rural residents have realized the inadequacy of solely relying on meat as a singular source of animal protein within their dietary structure. The occurrence of big events in the family has a negative impact on the consumption of meat-egg and a positive impact on the consumption of meat-milk, indicating that big events such as weddings and funerals, children's promotion to higher education, and the construction of new or renovated houses stimulate the consumption of meat and milk. The utilization of the internet to obtain food nutrition and health information has a negative effect on the consumption of meat and meat-egg, while it has a significant positive effect on meat-milk and meat-egg-milk, and has the largest influence coefficient on the consumption of meat-egg-milk. This indicates that rural residents believe that consuming meat-milk and meat-egg-milk are scientific dietary structures. Rural residents' use of the internet to obtain food nutrition and health information is conducive to the diversification of their livestock product consumption structure.

In terms of the influence of self-raised livestock and poultry, the type of self-raised livestock and poultry has a certain impact on the consumption structure of livestock products of rural residents, and the direction of the impact varies according to the type of self-raised livestock and poultry. Specifically, rural residents who raise hogs and broiler chickens have a positive impact on the consumption of meat and meat-milk, and a significant negative impact on meat-egg and meat-egg-milk. It indicates that rural residents who raise hogs and broiler chickens at home are more inclined to consume meat and milk and less egg consumption, which probably results from the convenience and accessibility of meat and milk. Moreover, raising beef cattle is found to have a substantial positive effect on meat consumption, indicating that rural residents who raise beef cattle prioritize meat consumption and pay less attention to egg and milk consumption. Owning meat goats has a significant negative impact on the consumption of meat-egg, and a significant positive impact on the consumption structure of meat-egg-milk, indicating that rural residents who own meat goats place greater emphasis on diversified livestock product consumption. In addition, Own-raised broiler ducks have a significant positive impact on the consumption of meat-milk, and a significant negative impact on the consumption of meat-egg-milk, indicating that rural residents who raise broiler ducks are more inclined to consume milk and show less interest in the consumption of egg. Overall, China's rural residents' self-raised livestock and poultry basically support residents' consumption of livestock products. This result is also justified by the research of Bundala et al., which reveals that livestock keepers are consuming more animal-source foods than their counterparts [28].

Regional differences play a significant role in shaping the consumption structure of livestock products for rural residents, which is supported by the research of Jiang et al.'s [35] and Yuan's [36]. These differences stem from two main factors: income levels and consumption habits/preferences. Regional differences caused by income levels are mainly reflected in the total consumption of livestock products, while differences based on consumption

preferences are mainly reflected in the consumption structure [22]. Therefore, this paper argues that the differences in the consumption structure of livestock products among rural residents in different regions are mainly affected by the consumption preferences and consumption habits of rural residents in each region. China is a vast country, and there are huge differences in the customs, beliefs, and production conditions of people in different regions, resulting in different consumption habits and preferences. Specifically, in North China, there is a preference for the consumption structure of meat-milk, which is consistent with Zhou's [37] research, whereas East China exhibits a more diversified consumption pattern, with a negative impact on meat-egg consumption and a positive impact on meat-egg-milk consumption. The consumption structure of livestock products in Northeast China and Central China is relatively similar; both Central China and Northeast China have a positive impact on the consumption of meat and a negative impact on the consumption of meat-egg-milk, but Central China has a positive link with the consumption of meat-milk, and Northeast China has a negative link with the consumption of meat-egg, which shows that compared to other regions, Central and Northeast China's consumption structure of livestock products is relatively homogeneous, with meat as the mainstay, supplemented by the consumption of dairy products, and a lower emphasis on eggs. Northwest China has a significant positive effect on the consumption of meat-egg-milk and a significant negative effect on the consumption structure of other livestock products, indicating that rural residents in Northwest China have a more varied preference for livestock product consumption compared to other regions.

5. Conclusions and Recommendations

5.1. Conclusions

Based on the survey data of 4529 rural residents across 10 provinces in 2020, we investigate the characteristics of rural residents' consumption structure of livestock products by statistical analysis and use the logit model to empirically analyze the factors affecting rural residents' consumption structure of livestock products from household characteristics and regional variations. Conclusions can be summed into four aspects: First, the consumption structure of livestock products of rural residents can be categorized into seven types: meat, egg, milk, meat-egg, meat-milk, egg-milk, meat-egg-milk, etc. At present, the dominant consumption categories of livestock products among rural residents in China are meat, meat-egg, meat-milk, and meat-egg-milk. Second, as verified by the model, higher numbers of people eating at home tend to be associated with meat-milk and meat-egg-milk consumption, while lower numbers tend to lean towards meat-egg consumption. The higher levels of education and access to food nutrition and health information positively influence rural residents' perception of the scientific dietary structure, and it is necessary to strengthen the popularization of the relevant information. Rural residents believe that livestock product consumption of meat-milk and meat-egg-milk is a scientific dietary structure. Ethnic minority families mainly consume meat, families with elderly people and minors and families with minors and no elderly people mainly consume meat-milk or meat-egg-milk, and families with elderly people and no minors mainly consume meat and meat-milk. Third, the rearing of livestock and poultry within households also affects rural residents' consumption patterns. Specifically, the self-raised hogs, beef cows, and broiler chickens are favorable to the meat consumption of rural residents. Fourth, regional heterogeneity is evident in the consumption patterns of rural residents. Rural residents in North China mainly consume meat-egg, rural residents in East China and Northwest China mainly consume meat-egg-milk, and rural residents in Central China and Northeast China mainly prefer meat. Therefore, the Government should take into account the heterogeneity of different regions when introducing the relevant nutrition policy.

5.2. Recommendations

Based on the conclusions provided, we put forward the following two policy suggestions on how to optimize and support the consumption structure of livestock products for rural residents.

Firstly, strengthen the popularization of livestock product consumption and promote the consumption upgrading of rural residents. We should compile and print manuals on the consumption of livestock products and scientific and reasonable dietary knowledge and widely disseminate the knowledge of livestock product consumption using publicity boards, jingles, etc. By providing rural residents with multi-channel access to food nutrition and health information, we can guide them to understand the nutritional value of livestock products and choose the consumption structure of livestock products in a scientific and reasonable way, thereby upgrading their consumption pattern of livestock products.

Secondly, we advocate market segmentation of livestock products to meet the diverse needs of different groups of people. For ethnic minorities, understand their consumption habits and consumption tendencies, and strengthen the market segmentation of pork, beef, mutton, and fresh milk to cater to the specific consumption preferences of ethnic minorities. For families with different age structures, categorize and grade livestock products and introduce livestock products that meet different ages to satisfy the needs of all ages. For rural residents in different regions, there are regional differences in the consumption of livestock products, and regional self-sufficiency should be improved. In Northwest China, we should further develop the breeding of beef cattle and meat goats. In East China, we should strengthen the breeding of broiler chickens and dairy cows. In Central China, we should strengthen the breeding of broiler chickens, and in Northeast China, we should strengthen the processing of dairy products.

Although results and conclusions in this paper have certain reference values for upgrading rural residents' consumption structure of livestock products, there are still some limitations, for example, a lack of differentiation of meat. Due to data constraints, distinctions regarding the consumption patterns of specific meats like pork, beef, chicken, etc., were not possible. Further exploration of the detailed meat consumption in the structure of residents' livestock products is expected.

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References

1. FAO. *Food and Agriculture Organization. The State of Food Insecurity in the World 2010*; FAO: Rome, Italy, 2010; p. 8.
2. Fan, S.G.; Zhang, Y.M. Strategic choices for practicing the big food concept to promote the nutritional health and sustainable development of all people. *J. Agric. Econ. Issues* **2023**, *5*, 11–21. (In Chinese)
3. UNICEF; WHO; World Bank. *Levels and Trends in Child Malnutrition: Key Findings of the 2021 Edition of the Joint Child Malnutrition Estimates*; Word Health Organization: Geneva, Switzerland, 2021.
4. Headey, D.; Hirvonen, K.; Hoddinott, J. Animal sourced foods and child stunting. *J. Am. J. Agric. Econ.* **2018**, *100*, 1302–1319. [CrossRef] [PubMed]

5. Kaimila, Y.; Divala, O.; Agapova, S.E.; Stephenson, K.B.; Thakwalakwa, C.; Trehan, I.; Maleta, K.M. Consumption of animal source protein is associated with improved height-for-age Z scores in rural Malawian children aged 12–36 months. *J. Nutr.* **2019**, *11*, 480. [CrossRef] [PubMed]
6. Neumann, C.; Harris, D.M.; Rogers, L.M. Contribution of animal source foods in improving diet quality and function in children in the developing world. *J. Nutr. Res.* **2002**, *22*, 193–220. [CrossRef]
7. Murphy, S.P.; Allen, L.H. Nutritional importance of animal source foods. *J. Nutr.* **2003**, *11*, 3932S–3935S. [CrossRef]
8. Eaton, J.C.; Rothpletz-Puglia, P.; Dreker, M.R.; Iannotti, L.; Lutter, C.; Kaganda, J.; Rayco-Solon, P. Effectiveness of provision of animal source foods for supporting optimal growth and development in children 6 to 59 months of age. *J. Cochrane Database Syst. Rev.* **2019**, *2*, 1465–1858. [CrossRef]
9. Darapheak, C.; Takano, T.; Kizuki, M.; Nakamura, K.; Seino, K. Consumption of animal source foods and dietary diversity reduce stunting in children in Cambodia. *J. Int. Arch. Med.* **2013**, *6*, 29. [CrossRef]
10. FAO. *FAO STAT: Food Balances (2010-)*; FAO: Rome, Italy, 2022.
11. Lu, W.C.; Mei, Y. An Empirical Study on the Trend of Livestock Consumption Structure of Urban and Rural Residents in Income Growth—Taking Zhejiang Province as an Example. *J. Tech. Econ.* **2008**, *2*, 81–85+100. (In Chinese)
12. Xin, X.F.; Zhang, Y.; Wang, J.M. Consumption of livestock products in China: Current situation, influencing factors and trend judgment. *J. Agric. Econ. Issues* **2015**, *10*, 77–85+112. (In Chinese)
13. Bureau of Statistics of the People's Republic of China. *China Statistical Yearbook*; China Statistics Press: Beijing, China, 2023.
14. Shang, X.D.; Li, B.L. Characteristics and Problem Analysis of Livestock Product Consumption of Urban and Rural Residents in China—Based on the Perspective of Consumption Structure and Income Gap. *J. Ecol. Econ.* **2012**, *6*, 45–52. (In Chinese)
15. Tang, B.l.; Zhang, Q.Q. Research on Constraints, Development Trend and Countermeasures of Livestock Product Consumption. *J. Huaiyin Norm. Coll. (Philos. Soc. Sci. Ed.)* **2017**, *39*, 72–75. (In Chinese)
16. Li, J.; Qin, F.; Ding, P. Characteristics and Development Trend of Livestock Product Consumption in China. *J. Res. Agric. Mod.* **2007**, *6*, 664–667. (In Chinese)
17. Wang, J.M.; Yuan, X.G.; Li, Z.Q.; Fan, Y.L. Livestock products consumption structure and behavior of urban and rural residents. *J. China Food Nutr.* **2000**, *2*, 9–12. (In Chinese)
18. Li, Y.H. Research on livestock product consumption problems of urban and rural residents in Datong City. *J. Heilongjiang Anim. Husb. Vet. Med.* **2016**, *12*, 17–20. (In Chinese)
19. Wang, P.; Tran, N.; Enahoro, D.; Chan, C.Y.; Shikuku, K.M.; Rich, K.M.; Byrd, K.; Thilsted, S.H. Spatial and temporal patterns of consumption of animal-source foods in Tanzania. *J. Agribus.* **2022**, *38*, 328–348. [CrossRef]
20. Ma, H.; Rae, A.; Huang, J.; Rozelle, S. Chinese animal product consumption in the 1990s. *Aust. J. Agric. Resour. Econ.* **2004**, *48*, 569–590. [CrossRef]
21. Shao, H.L.; Lu, J.; Shen, P. Analysis of the consumption structure of livestock products of urban and rural residents in Hebei Province. *J. Heilongjiang Anim. Husb. Vet. Med.* **2011**, *2*, 14–15. (In Chinese)
22. Jiang, N.H.; Xin, X.; Yin, J. Analysis of Influencing Factors on Livestock Consumption of Urban and Rural Residents in China. *J. China Rural Econ.* **2002**, *12*, 48–54. (In Chinese)
23. Xie, Z.Y. Influencing factors and changes in the consumption of livestock products and development trend in China. *J. Jiangsu Agric. Sci.* **2019**, *15*, 339–342. (In Chinese)
24. Yang, X. Analysis and Forecast of Livestock Product Consumption in China. *J. China Food Nutr.* **2007**, *5*, 28–30. (In Chinese)
25. Ma, F.Y. Research on the influencing factors of consumption demand of livestock products based on factor analysis. *J. Syst. Sci. Math.* **2013**, *33*, 110–117. (In Chinese)
26. Mohammadi, H.; Saghaian, S.; Boccia, F. Antibiotic-Free Poultry Meat Consumption and Its Determinants. *J. Foods* **2023**, *12*, 1776. [CrossRef] [PubMed]
27. Daba, A.K.; Murimi, M.; Abegaz, K.; Hai, L.D. Determinants and constraints to household-level animal source food consumption in rural communities of Ethiopia. *J. Nutr. Sci.* **2021**, *10*, e58. [CrossRef] [PubMed]
28. Bundala, N.; Kinabo, J.; Jumbe, T.; Rybak, C.; Sieber, S. Does homestead livestock production and ownership contribute to consumption of animal source foods? A pre intervention assessment of rural farming communities in Tanzania. *J. Sci. Africa* **2020**, *7*, e00252. [CrossRef]
29. Liu, H.; Deblitz, C. *Determinants of Meat Consumption in China*; Asian Agribusiness Research Centre Charles Sturt University: Wagga, NSW, Australia, 2007.
30. Gittelsohn, J.; Vastine, A.E. Sociocultural and household factors impacting on the selection, allocation and consumption of animal source foods: Current knowledge and application. *J. Nutr.* **2003**, *133*, 4036S–4041S. [CrossRef]
31. Tong, X.C. Analysis of Livestock Product Consumption in China. *J. Inn. Mong. Univ. Natl. (Soc. Sci. Ed.)* **2007**, *3*, 86–89. (In Chinese)
32. Zhou, Z.; Tian, W.; Wang, J.; Liu, H.B.; Cao, L.J. Food consumption trends in China, report submitted to the Australian Government Department of Agriculture. *J. Fish. For.* **2012**, *4*, 73–80.
33. Chang, Q.; Zhang, C.Y.; Wang, L.W.; Jin, B.Y.; Zhao, M.J. The impact of non-farm employment on the cropping structure of farm households in the middle and upper reaches of the Yellow River Basin. *J. China Rural Econ.* **2021**, *11*, 89–106. (In Chinese)
34. Priyadharsini, S.; Kathiravan, G.; Thirunavukkarasu, M.; Ganpat, W. Evaluation of determinants influence for consumption of livestock products in Second-Tier cities of Tamil Nadu in India. *Bangladesh J. Anim. Sci.* **2016**, *45*, 25–30. [CrossRef]

35. Jiang, N.H.; Xin, X.A.; Yin, J. *Study on Co-Supply Demand and Trade Behavior of Livestock Products in China*; China Agricultural Press: Beijing, China, 2003. (In Chinese)
36. Yuan, X.G. Study on the Consumption of Livestock Products in China. Ph.D. Thesis, Institute of Agricultural Economics and Development, Chinese Academy of Agricultural Sciences, Beijing, China, 2001. (In Chinese).
37. Zhou, J.C.; Qin, F. Factors affecting food consumption of urban and rural residents in China and their implications. *Surv. World* **2006**, *7*, 42–44. (In Chinese)

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