



## Statistic Characteristics of Chinese Provinces' and Municipalities' Agriculture Sector at 2008

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### Abstract

This paper selected several agricultural development indicators in China at 2008 to do statistical analysis. Demonstrated by the new type of data table graph, some information is showed, and the distributed rule of several indicators are described. Agricultural development regions are classified according to Q-type Cluster. The corresponding analysis methods are applied to gain the relationship among the provinces and municipalities and variables. Moreover, some revelations are educed.

**Keywords:** Statistical analysis, Distributed rule, Chinese agriculture

### 1. Introduction

In 2008, under the guidance of Deng Xiaoping Theory, thoroughly implement the scientific concept of development, farmers in the provinces and municipalities strive to overcome the serious natural disasters that rarely seen in history and the impact of the international financial crisis, making economic development of agriculture keep fast. The future development's most difficult task of building a well-off society in an all-round way in our country is still the "three rural" problem. It is of great significance to sum up the rule of the distributed rules of agriculture at every province and municipality, for sustained, rapid, healthy and coordinated agricultural development in the future.

### 2. The DING Chart (Ding, Yuechao, 2007) of original data

According to "China Statistical Yearbook 2008", the original data include Cereal, Beans, Tubers, Oil-bearing Crops (OBC), Fruit, Cattle, Pig, Sheep, Total Aquatic Products (TAP), and Animal Husbandry (AH). The original data has 10 indicators, 31 records. It is difficult to analyze in horizontal and vertical and to find the rule of the distribution. For too much indicators and data, the ordinary histogram, broken line maps, graphs, pie-chart, have been power less. Now use the newly created grid-form chart to display information (Figure 1). The figures in each grid of the intuitionist chart are transferred into ovals to indicate the relative size of the data, through standardization of the data to ring from 0 to 1. Each field indicators for the smallest is only a line, the largest grid for a full oval.

It can be seen directly from the Figure 1, the ovals of Heber, Shandong, Henan and Sichuan are bigger than others. These provinces are the major agricultural province in China. Agriculture in region of Beijing, Tianjin, Shanghai, Tibet, Qinghai, and Ningxia is backward. On the whole, agriculture in the northeast, north China, east China, central China (except municipalities of Beijing, Tianjin and Shanghai) is prosper compared to the South China, Southwest, Northwest region.

It also can be clearly seen from Figure 1 that the production of grain in the northeast, north China, east China and central China is higher, while that in the north China, southwest and northwest region is lower. Heilongjiang is the main area of Beans, the production here is the highest of China. The production of Tubers in Sichuan and Chongqing is higher than any other place, because it is suitable for drought-resistant and barren-resistant Beans to grow in the basin, hilly and dry land of Sichuan. Oil-bearing Crop and fruits in Shandong and Henan be produced most, while the number of cattle in the municipalities and East China is only a little and only a few pigs in the southwest at the end of year 2008. Inner Mongolia and Xinjiang where grasslands are more common have more sheep than other place. Total Aquatic products are proper in the coastal areas.

### 3. The divisions of similar regions

Through Q-type Cluster Analysis, The analysis of the similarity of the development of agriculture characteristics among the regions can be got. The 31 provinces' and municipalities' pedigree map is showed in figure 2, the similarity of the indicators is measured by similar coefficient. The similar characteristics samples will be clustered together by the

Q-type Cluster Analysis. Most parts of East China, Central China, South China are clustered to class I, while northeast, North China, southwest and northwest are clustered to class II, only a few specific regions have some fluctuation. Seen from Ding Chart, the size of oval of class I is big and same, while that of class II is various and small.

Combination of the division and analyzing the DING Chart, some rules and characteristics are easier to be found out.

The characteristics of class I: all the agricultural production development balanced, and the production of most part of the regions is higher. This is because South China, Central China and East China own large area of plain and vast river which have plenty of water for irrigation. In southern coastal area, the weather is hot and rainy, which has a long frost-free period that crops can grow well throughout the year. In all, the climate and the geographical location of these areas are helpful, making agriculture, forestry, animal husbandry and fishery be able to be better and more balanced development.

Agricultural production in these areas is higher than that of other areas. These areas' agriculture developed well, which is China's major agricultural production areas.

Northeast, North China, southwest, northwest cluster into class II, agricultural production in these areas is Unbalanced. From Figure 1, the sizes of the ovals of these areas are different and non-uniform and the size of the ovals are small, indicating these areas are low-yield. Northeast, where is the base commodity grain production location, has a long period of cold winter and a warmth summer that the sunshine is long. The climate in North China is dry; as a result, most of the areas are shortage of water for irrigation. Most part of the southwest are subtropical, and southern Yunnan is tropical and vertical difference is marked that make a mountain climate. The agricultural in Qinghai-Tibet area restricted by the climate, which makes it unsuitable for crop, however, the animal husbandry develop better compared with others. The grasslands are mainly distributed around the lakes and rivers.

The special climate and geographical position make agriculture in these areas varied and backward, especially for marine production.

#### 4. The explanation of the relationship of variables and regions

Correspondence Analysis can reveal the differences between the various categories of the same variables and the correspondence relationships between different variables and various categories. In order to facilitate the observation and analysis, we make the factors of the R-load and Q-load matrix into the more intuitive scatter plot (Figure 3). The scatter plot can be divided into three sections, thus some conclusions can be got.

Guangdong, Fujian, Hainan, Shandong and Zhejiang: marine production and fruit develop well. Marine production and fruit require water and good climate. Coastal climate and the vast ocean provide proper condition for marine production and fruits. The coast of East Sea and Yellow Sea is a good place for fishing, where owns various species of fish, and the ground is flat and the depth is shallow. Fishers here find out the marine fish's "temper", using "one divides into two" to analysis the relationship between the wind and the fish, insisting "publicity stunts, catch the wind tail" in order to get marine fisheries harvest.

Shanxi, Ningxia, Gansu, Qinghai, Tibet, Inner Mongolia and Xinjiang: sheep and cattle indicators are high, indicating a better development of animal husbandry in these areas. Sheep and cattle are herbivores, and these areas are in western China, where the grasslands, grass-mountain possess the main part of country's total area. The western regions have the advantages over the animal husbandry resources, which provide the western a broad prospect. And the western make full use of the large area of grass to develop the animal husbandry and achieve the coordination of configuration for agricultural resources between the east and the west to form the agricultural division and cooperation in the regional economy.

Other provinces and municipalities: a combination of grain, beans, potato, oil and pigs, animal husbandry. Pig and animal husbandry provide organic fertilizer for these crops, making soil more fertile. And the soil horizon in these areas is deep, higher fertility of black soil is all over the areas that is beneficial to the growth of agricultural mechanization, thus the crops grow better.

#### 5. Conclusion

From the 2008 Chinese provinces' and municipalities' agricultural development's DING Chart, some conclusions can be made. Hebei, Henan, Shandong, Sichuan is the major agricultural province, while the western provinces' and municipalities' agricultural are backward. From the vertical perspective, the national agricultural development can be divided into two regions. The indicators of region I develop balanced and well, while that of region II is various and backward. Though correspondence analysis, we can conclude that agricultural development is different, every region has its own characteristics. Making full advantage of the characteristics of every province and municipality to develop the specialty agriculture make our country's agriculture grow sustained, rapid, healthy, coordinated.

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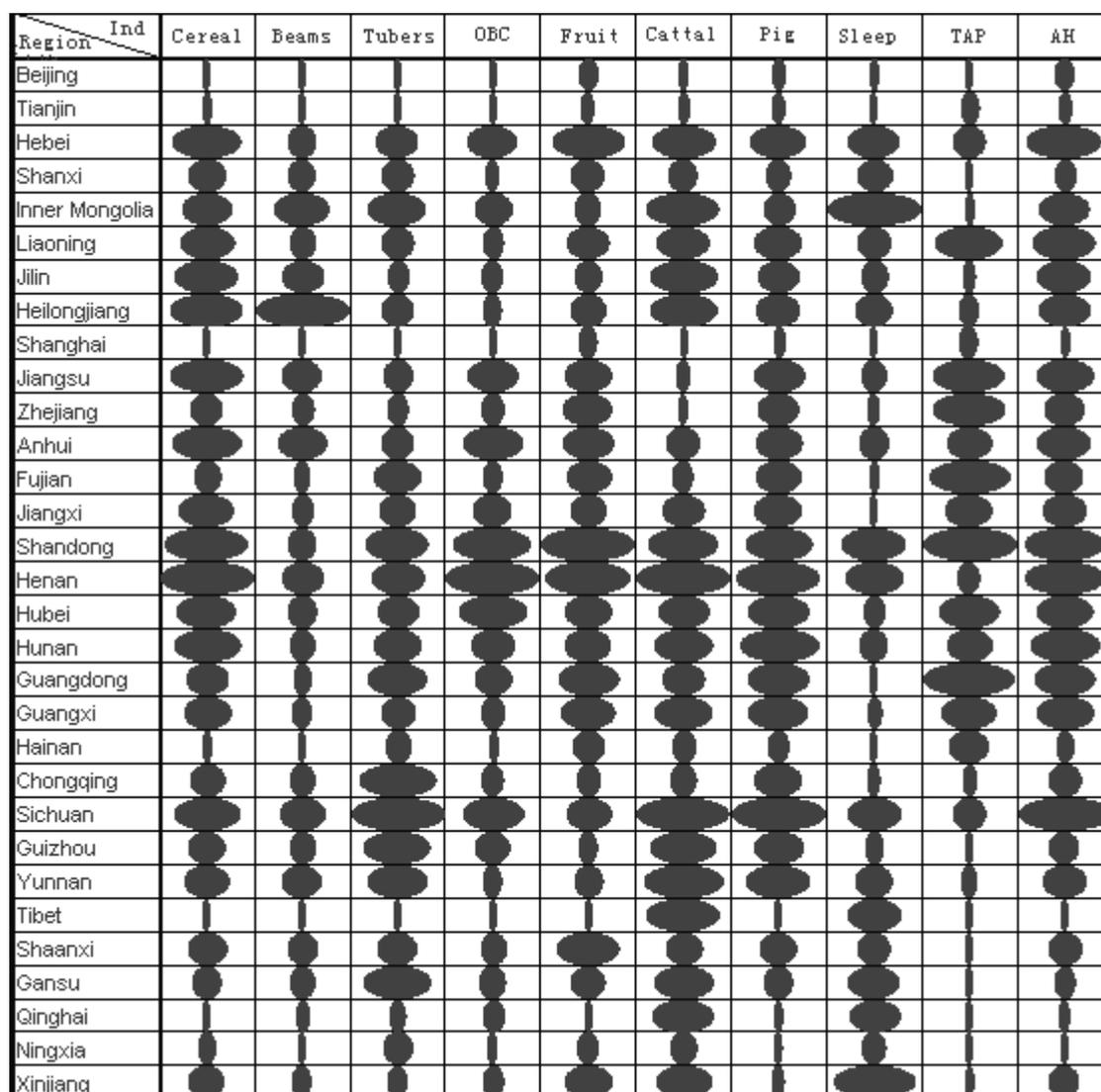


Figure 1. DING Chart of Chinese provinces' and municipalities' agricultural indicators at 2008

