The unstability of global food system have aroused growing attention worldwide. Althrough there is sufficient food produced to feed every person, many people in the world are suffering from hunger. Moreover, the current food system is harmful to the environment. As our global population continues to rise, the ability to produce more food while sustaining, and even improving, the health of our environment counts.

The FSMM(Food System Monitoring Model) provides score rank using entropy weight and subjective weight to evaluate the current state of the food system for most countries in the world. It contains 9 individual features to measure multiple aspects, including efficiency, profitability, sustainability and equity.

Considering the future trend of the food system, we apply Gray Forecast Model to forecast the next 5 years of the development of the food system to figure out the time for each country to change into equity and sustainability.

To find out the relation between external factors and food system, The FSMM uses Boosting Regression Model to find the correlation between the scores and 10 indicators which represent the influences of energy use, government, agriculture, social factors and population ratio. The FSMM fits the data from 178 countries from 2000 to 2019. After simulating and adjusting the parameters to decrease the loss of the model, we gets the importance rate of each indicator.

We find the indicators whose importance rate change significantly when the food system is optimized for equity & sustainability. And we use these indicatos as dependent variable and apply Linear Regression to fit by using the yields of the wheat, meat and vegetables as independent variable. By doing this, We find out the direct impact of reoptimization on the food system.

We finally get the importance rate and the coefficient of two regression model and analyze the specific influence of various factors on the food system and compare the differences between the influence in developing and developed countries.

After the overall analysis of the influence on developed and developing countries, we pick some specific developing and developed countries to analyze and discuss the scalability and adaptability of the model.

Key Words: Boosting Regression , Linear Regression , FSMM , Entropy Weight, data mining , supervised learning , Energy use.