



# An Analysis of the Global Vegetable Market: Tomatoes, Carrots, Cauliflower, Lettuce, Onions, Spinach.

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## Abstract

This study provides an in-depth analysis of the global vegetable market using relevant datasets from the Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Unlike previous studies, the analysis presented in this research considers a greater diversity of vegetables and data that spans from 1961 to the present. The vegetables which were analyzed include: carrots, cauliflowers, lettuce, onions, spinach and tomatoes. The study reports the world total as well as the ten largest producing, importing, exporting and consuming countries. This information is invaluable to producers and investors who anticipate selling to grocery chains, farmers' markets and food service providers. Knowing market trends will be beneficial to producers who anticipate coming changes within the market dynamic.

Key Words: Tomatoes, Carrots, Cauliflower, Celery, Lettuce, Onions, Radishes, Spinach, Global, Market, Trend, Analysis.

## Introduction

The world's total population increased from about 3.1 billion in 1961 to about 7.3 billion in 2015 and is expected to grow to 9.6 billion by the year 2050. As the population density rises in cities, rural land is bought for urban development pushing farms further away from the populations they feed. Distribution and the ability of the consumer to afford purchasing food items are the major problems underlying world hunger. There were an estimated 1.4 billion people that lived on less than \$1.25 a day in 2005 representing 25% of the population of the developing world (Chen, 2008) and 870 million people (11.3% of the population or 1 in every 8 people) that are chronically malnourished (FAO, 2015). A paradoxical situation arises in instances of food insecurity whereby excessive energy in the form of kilocalories is provided, however, the nutritional quality and diversity of the foods in the diet may not support a healthy nutritional status due to inadequate micronutrients (Tanumihardjo, 2007).

These problems are most prominent in developing countries while developed countries tend to have the starkly contrasted problem of unhealthy diets that are high in carbohydrates and fats causing a recent rise in obesity. In 2014, more than 1.9 billion adults, 18 years and older, were overweight with over 600 million of these being obese (World Health Organization, 2015). Most of the world's population lives in countries where overweight and obesity kills more people than underweight (World Health Organization, 2015). As the world's governments implement strategies to eliminate poverty, obesity and hunger within their borders, their populations will increasingly be able to access and purchase fresh vegetables among other goods.

A great variety of factors affects the ability and drives of countries to produce, import, export and consume vegetables. The main factors affecting production include prices of inputs, technology, and exogenous factors such as climate change, government policies, pests, diseases, and number of producers. Rates of importation and exportation are largely affected by the rate of production and its affiliated factors as well as the demand or excess of the product. The main factors affecting vegetable consumption include tastes and preferences, income, prices of substitutes and complements, and exogenous factors such as the number of consumers.

## Objectives

- Discuss the factors affecting the world vegetable market.
- Analyze trends in the world vegetable market.
- Identify underlying factors affecting such trends.

## Materials & Methods

Trend analysis of the global vegetable market using datasets from the Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT) from 1961 till the present.

## Production

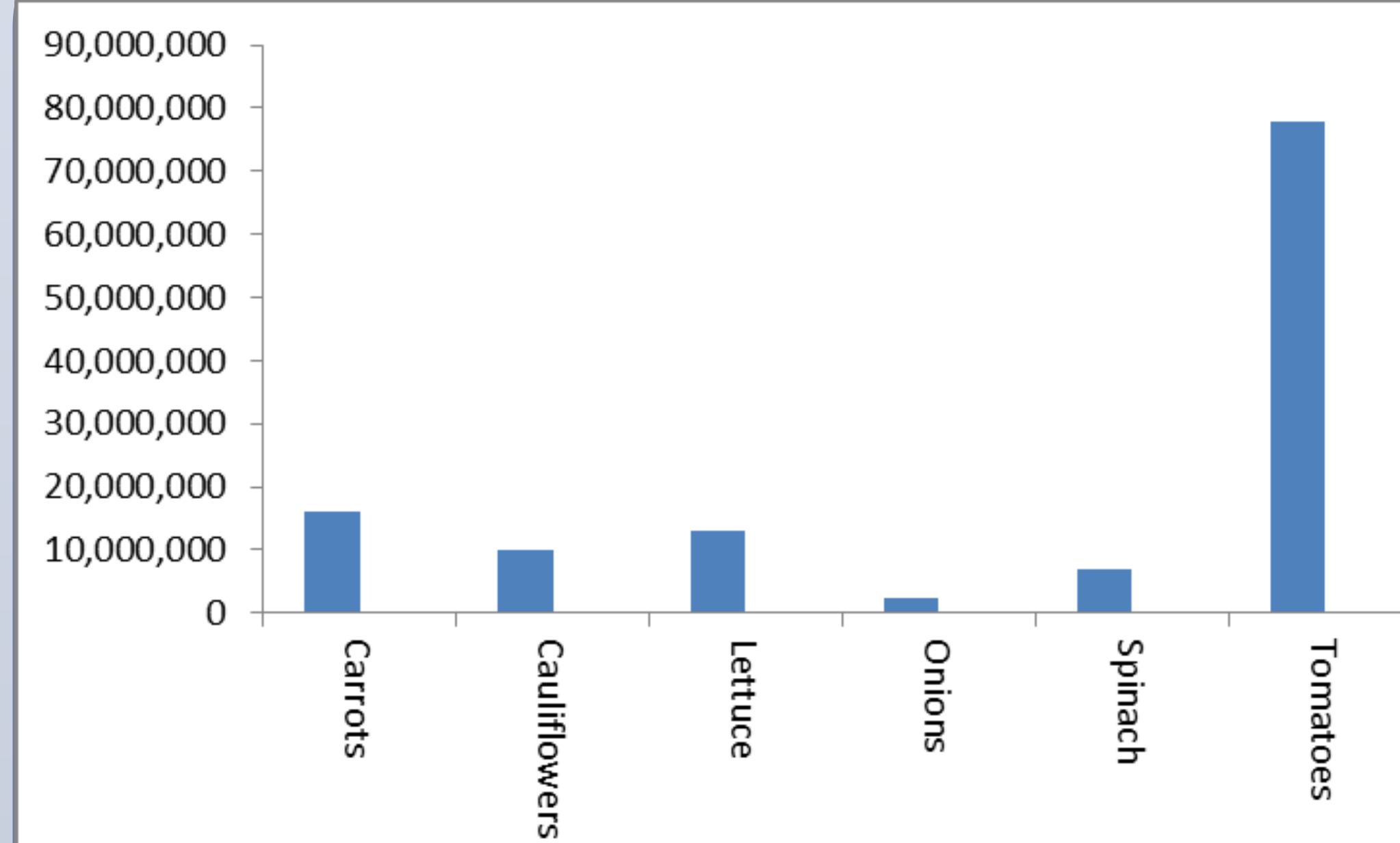


Figure 1. Average Global Vegetable Production (Metric Tons), 1961–2013.

Tomatoes represent the largest annual world production volume with an average share of 62% followed by carrots (13%), lettuce (10%), cauliflower (8%), spinach (6%) and onions (2%). All vegetables had growth in production ranging from 5.31% to 13.16% during the period of 1961-2014.

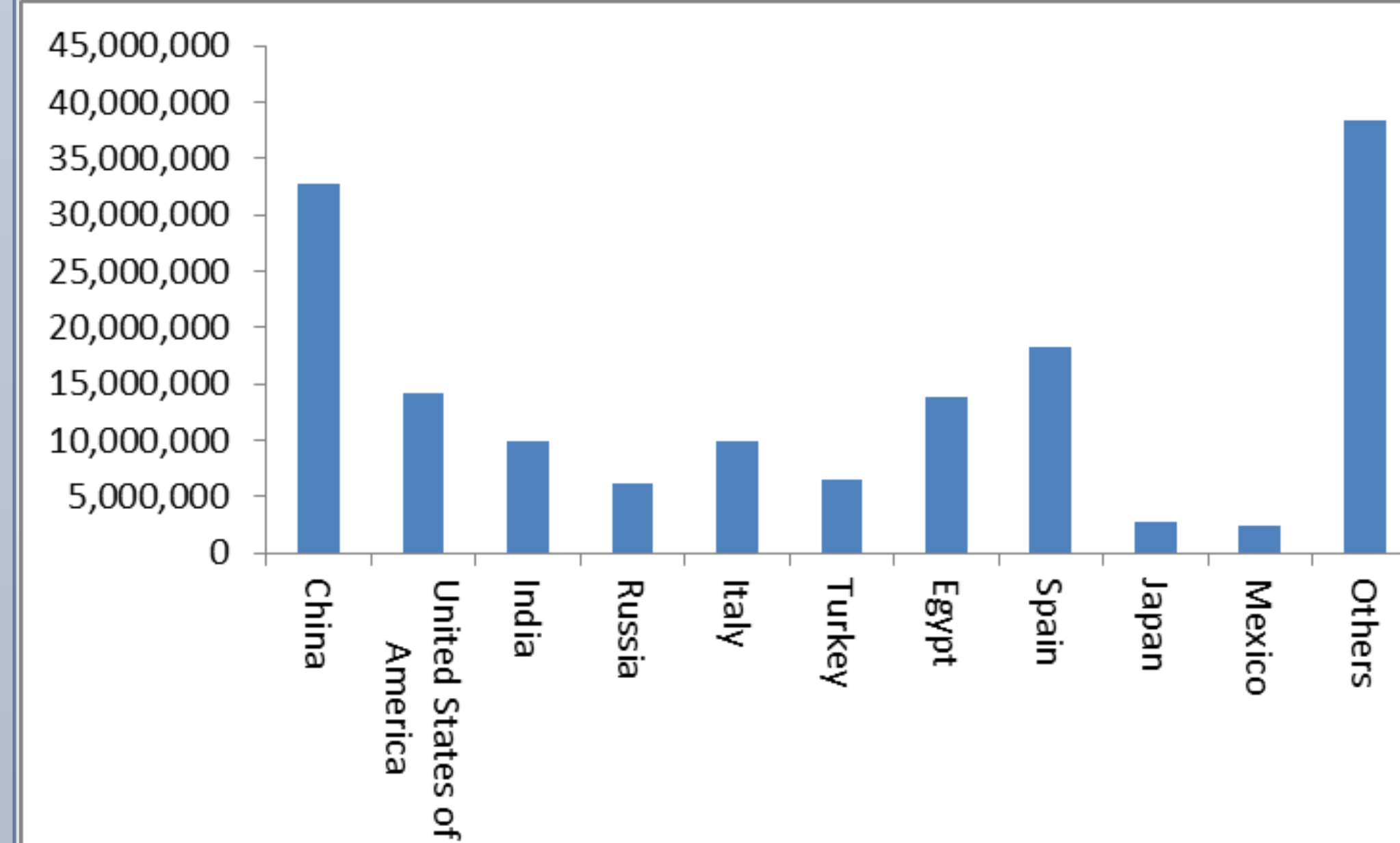


Figure 2. Largest Vegetable Producing Countries (Metric Tons), 1961–2013.

The world's 10 largest vegetable producing countries, in descending order are China (25.26%), Spain (14.06%), USA (10.91%), Egypt (10.73%), Italy (7.69%), India (7.64%), Turkey (5.04%), Russia (4.70%), Japan (2.13%) and Mexico (1.84%). Together these countries account for 74.12% of the total world vegetable production. Additionally, China produces considerably above all of the other countries. With a 25.26% volume production share in the world market, China produces nearly twice as much as the next largest producer, Spain (14.06%). Spinach shows the fastest growth rate having increased by 684% in the analyzed period. All of the analyzed vegetables show an increasing tendency in production since the 1961 baseline: Cauliflowers (557%), Carrots and turnips (537%), Tomatoes (494%), Onions (391%) and Lettuce (276%).

## Carrot Production

China produces 26.91% of the world's carrots, and along with Russia and Germany, they are increasing the fastest while the USA, Poland and Japan have declined.

## Cauliflower Production

Both China with a share of 31.61% and India with a share of 31.04% produce the majority of the world's cauliflower. Among the 10 largest producing countries, only the United Kingdom with a share of 2.81% experienced a decline of 32.98% since 1961.

## Lettuce Production

Both China (35.93%) and the United States of America (24.48%) produce the majority of the world's lettuce. Turkey, Italy, France and the USA have increased the fastest in terms of production since 1961.

## Onion Production

Japan (22.27%), the Republic of Korea (14.73%) and China (12.58%) produce the majority of the world's onions. Japan has shown the fastest growth rate while production has declined in the Republic of Korea by 32.05% and in Iraq by 12.44%.

## Spinach Production

China produces the majority of the world's spinach with a share of 77.66%. Most of the top 10 countries are increasing production while Italy has declined 22.23% since 1961.

## Tomato Production

Combined China (19.03%), United States of America (11.84%), Turkey (7.09%), Italy (6.37%) and India with a share of 5.99% represent more than 50% of the world's tomato production. Of the top 10 countries only Russia declined 22.23% since 1961.

## Importation/Exportation

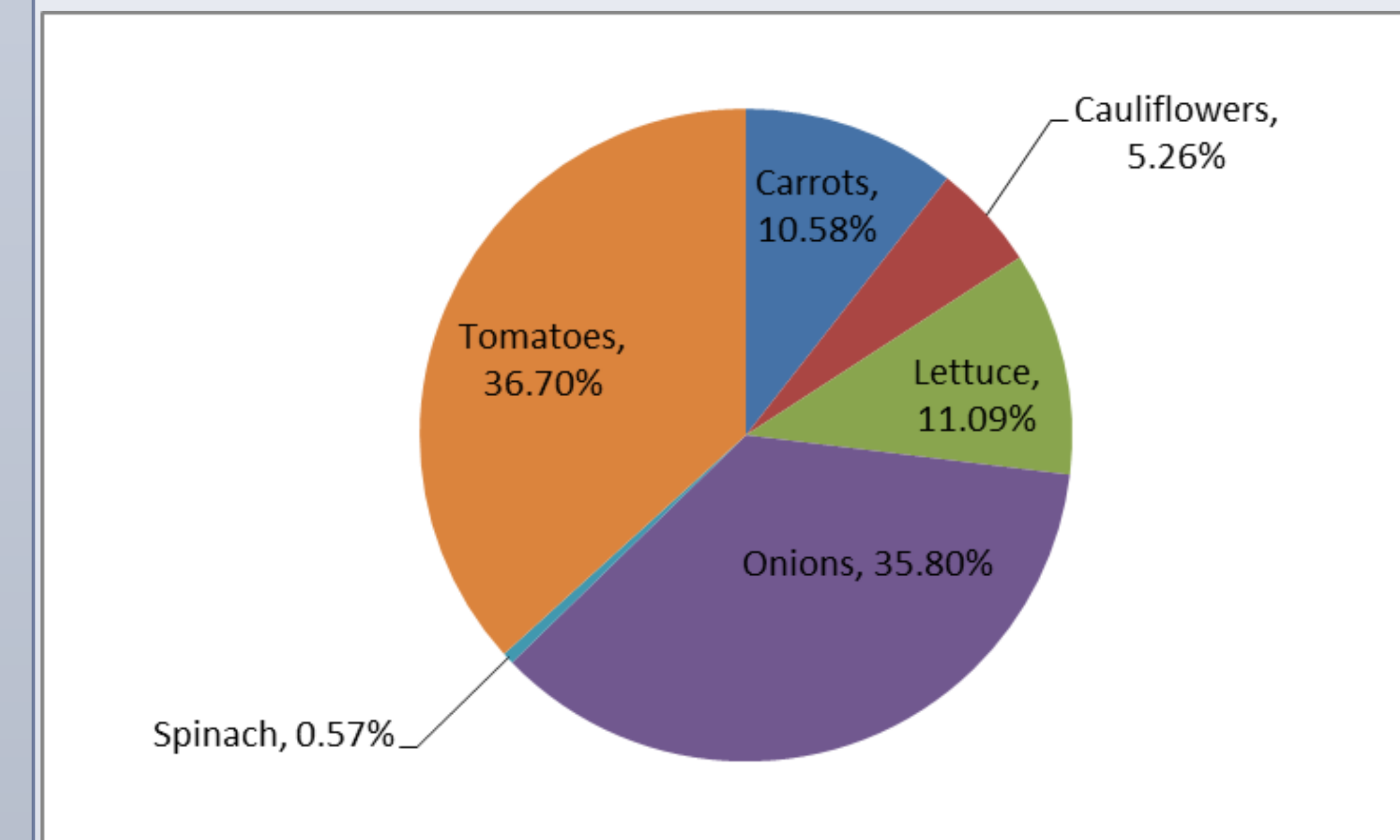


Figure 3. Percent of Total Vegetable Importation (Metric Tons), 1961–2012.

Tomatoes have the largest annual world imports/ exports with an average share of 36.70% followed by Onions (35.80%), Lettuce (11.09%), Carrots (10.58%), Cauliflowers (5.26%) and Spinach (0.57%), respectively.

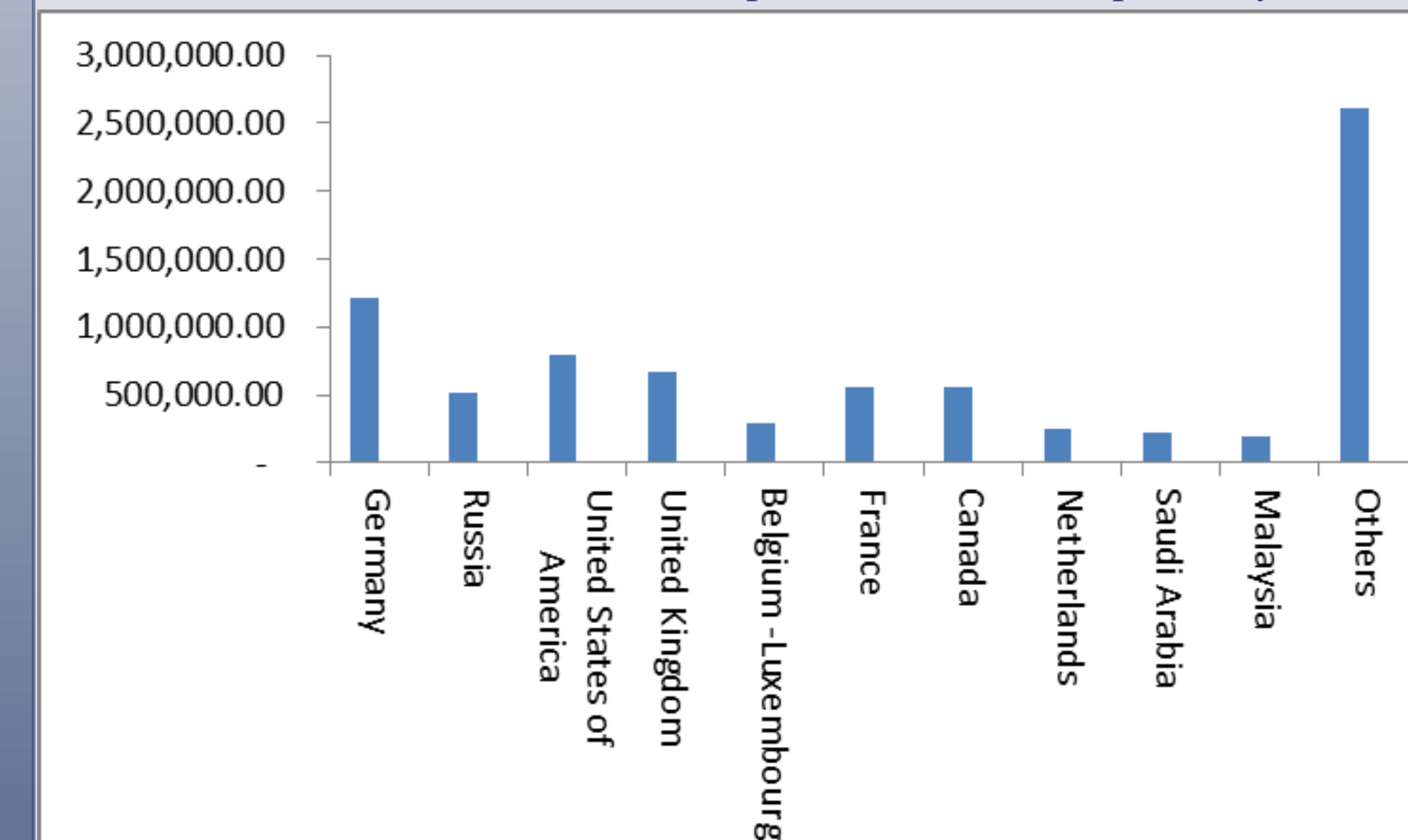


Figure 4. Top 10 Vegetable Importing Countries (Metric Tons), 1961–2012.

In general vegetable imports and exports are increasing with the bulk being tomatoes and onions. Germany, Russia, USA, UK, Belgium, France and Canada import the most while the Netherlands and Spain export notably more than Turkey, China, Mexico and India which are undergoing rapid increases in export rates.

## Consumption

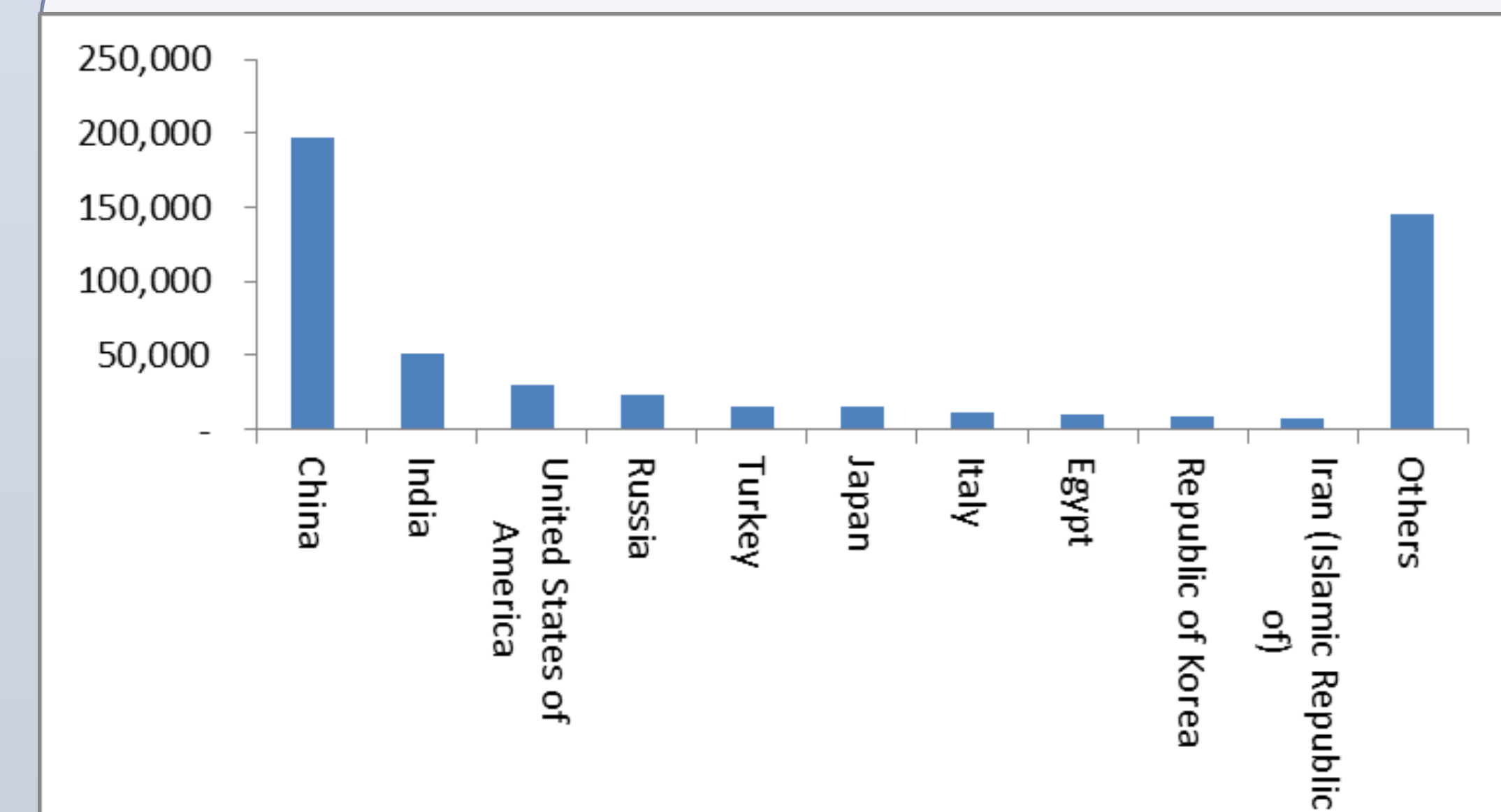


Figure 5. Top 10 Vegetable Domestically Consuming Countries (1,000 Metric Tons), 1961–2011.

Since 1961 world vegetable consumption has steadily increased at an annual average growth rate of 3.24% compared to world production which increased at approximately 9.29% annually. China and India consume considerably more vegetables than any other country while both Iran and China have the fastest growing domestic consumption.

## Conclusions

Growing populations, improved distribution systems, decreasing poverty levels and more health conscious consumers play a key role in the rising demand for food, especially fresh vegetables (due to their perceived health benefits). As world vegetable demand, consumption and trade liberalization increases, it will become exceedingly more important for vegetable producers and exporters to become aware of global markets and understand how they fit in the larger picture of relevant foreign markets.

## Further Research

Further expand analysis on local demand for fresh vegetables in the Fort Worth area utilizing scanner data.

## Acknowledgements

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