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<https://doi.org/10.32014/2019.2224-526X.8>**Gaukhar M. Rakhimzhanova, A. Kudaibergenova**Kazakh national agrarian university, Almaty, Kazakhstan.
E-mail: gaukhar-muratkyzy@mail.ru; aisulu_ka70@mail.ru**THE FOOD SECURITY OF THE REPUBLIC OF KAZAKHSTAN
UNDER THE CONDITIONS OF THE FOOD DEMAND CHANGE**

Abstract. The article researches the state of the food security in the Republic of Kazakhstan under the conditions of the global food demand change. Moreover, predictions are made whether the food security of Kazakhstan may face challenges in the future. The research purpose is to define theoretical bases that may help to improve the food security level of the Republic of Kazakhstan through applying economic mechanisms. The research methodology is based on econometric, analytic, comparative and quantitative methods. The research practical significance is to assess the current state of the food security in Kazakhstan while the food demand continues changing worldwide. The research results show that the global population is expected to grow by 9,771,823 thousand people by 2050, and 68.4% of them are expected to reside in the urban area. As a result, the demand in the food market is expected to grow in the future.

Keywords: food security, Kazakhstan, food demand, urbanisation, food deficit, global undernourishment prevalence, population growth.

The global food market is transforming worldwide due to technologic improvements [1]. For instance, introduction of the precision agriculture in the developing countries may help to increase agricultural yield globally [2]. On the other hand, the global food security is facing different threats, including the population growth [3]. According to the Food and Agriculture Organization of the United Nations the global population between 2009 to 2050 is expected to grow by 2.3 billion people which is going to create the significant food demand [4]. The figure below illustrates how the global population may grow till 2100.

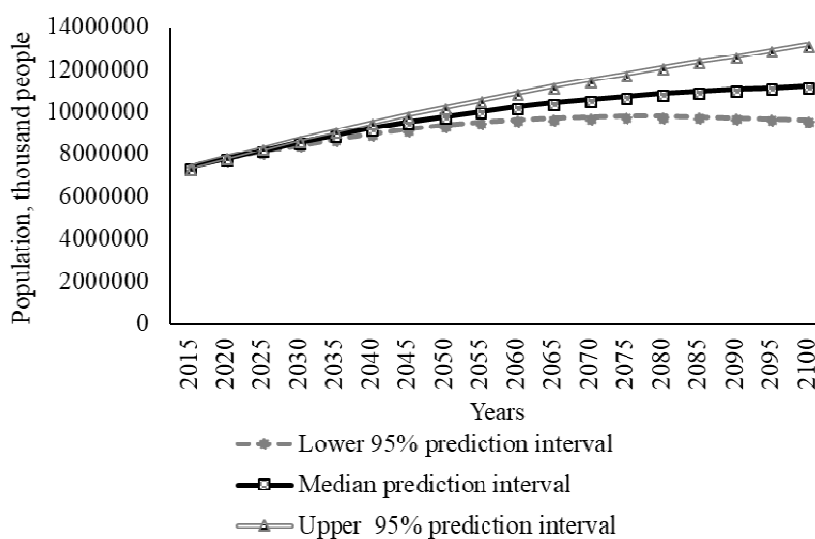


Figure 1 – The prediction for the global population growth by 2100, thousand people.

Note: From the source 5. The annual increments are based on five-year averages.

The figure above shows that while predicting on the medium range the global population may grow to 11,184,368 thousand people in 2100, after getting to 9,771,823 thousand people in 2050 [5]. This growth may increase pressure on agriculture, food production and global infrastructure which is used for transporting food from the beginning of the production chain to consumers [6]. On the other hand, the figure below illustrates that the rate of population growth is different in low-, medium- and high-income.

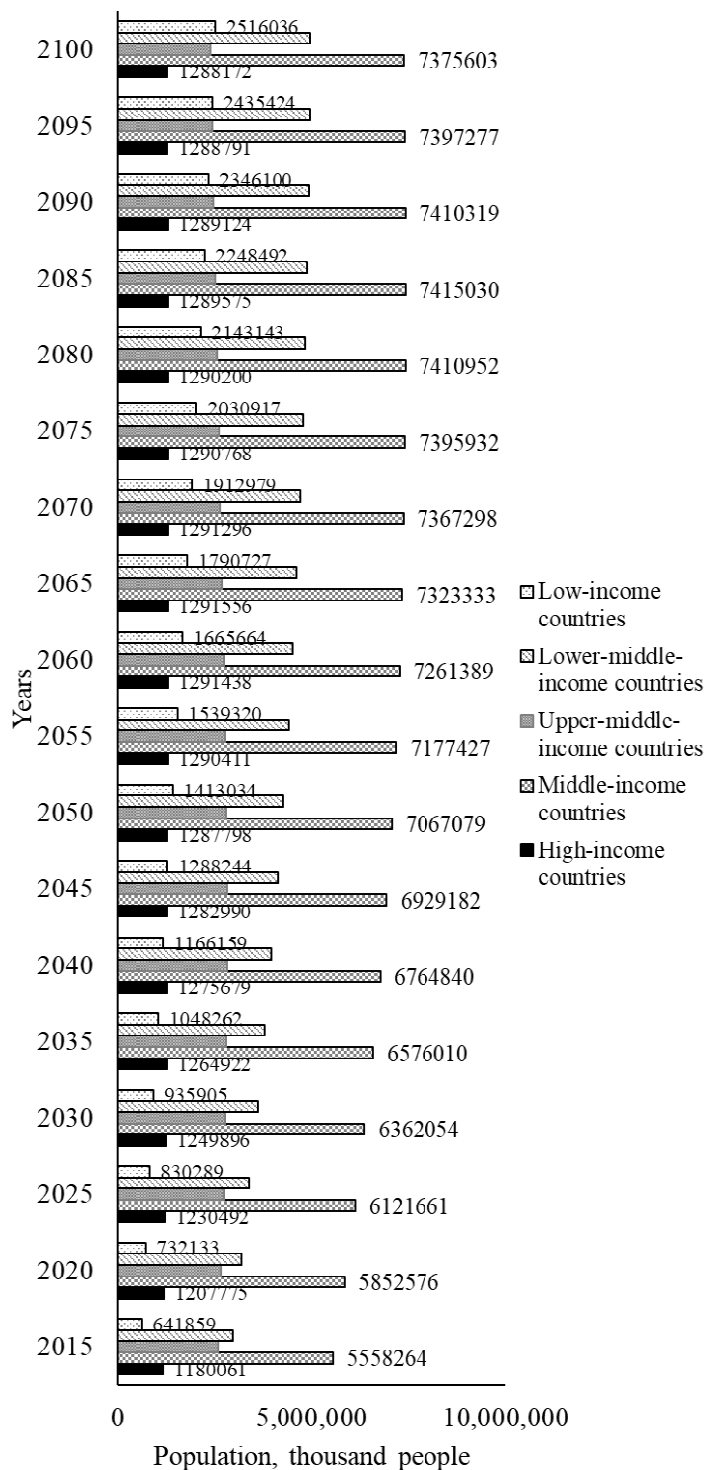


Figure 2 – The prediction for population growth in different income country groups, thousand people.

Note: From the source 5. The annual increments are based on five-year averages. Middle-income group is the sum of the upper-middle-income and the lower-middle-income country groups.

The figure above shows that the high-income countries are not predicted to become the leading group for the population growth rate. Moreover, the majority of the global population is expected to live in the middle-income countries by 2100 - 7,375,603 thousand people which is nearly 65,946% of the total predicted global population. The migration of the rural population to the urban areas is one of the main contributors towards the process of urbanisation [7]. The predicted increase in the number of megapolises would mean increase in the food demand per square urban meter while the majority of the available space would not be used for agriculture [8]. Moreover, nearly most urban dwellers are net food consumers, while the poorest among them often do not earn enough to feed own families as well as not enough space available for them to live off the land [9]. Land even in the peripheries of growing cities and rural zones adjacent to megapolises often tend to become more expensive, therefore, farmers are forced to sell those lands for non-agricultural usage which may result in further urban growth [10]. Moreover, water is one of the key agricultural resources often wasted in domestic use by urban dwellers or overexcessively used in production [11]. As a result, the demand for water grows while its availability shrinks, therefore the food security becomes endangered. Therefore, the urbanisation is another factor which creates the significant pressure on food consumption patterns, supply processes and production [12]. The figure below illustrates the change between rural and urban population worldwide.

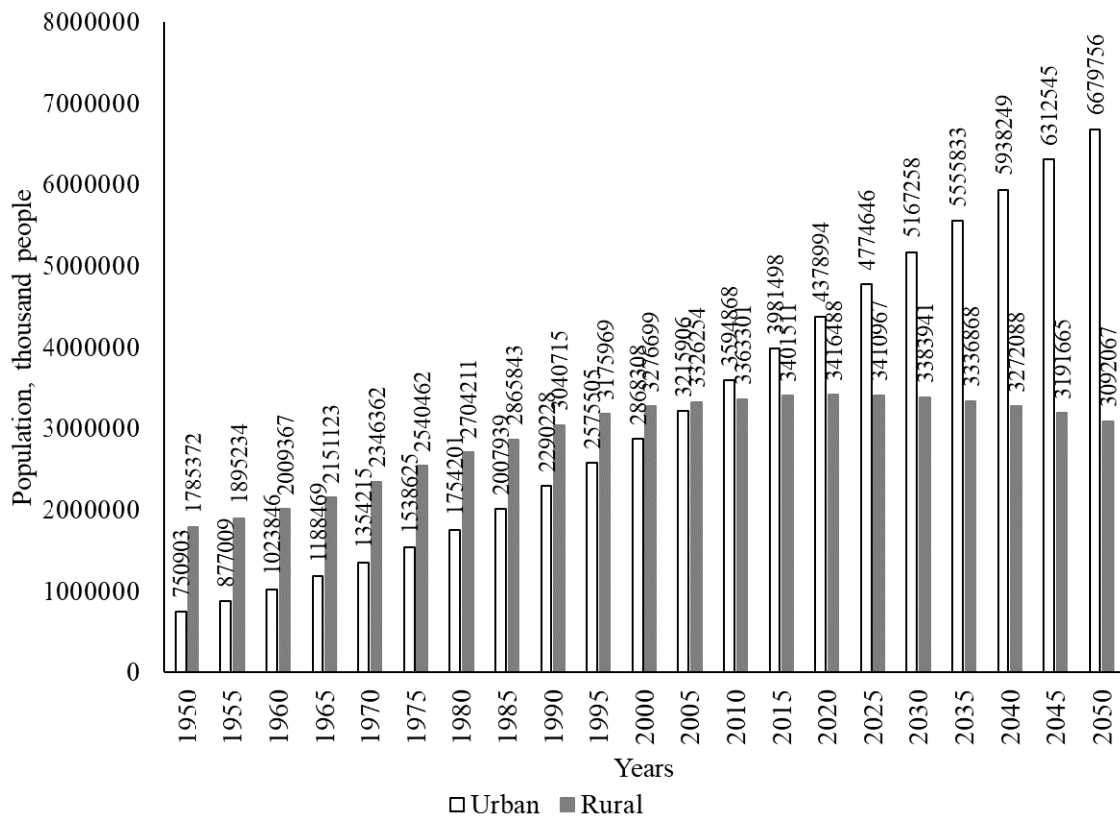


Figure 3 – The mid-year prediction for the global rural and urban population growth by 2050, billion people.
 Note: From the sources 13-14. The annual increments are based on five-year averages.

The figure above shows that 2.4 billion more people by 2050 may become urban dwellers while rural areas may face net decline by 200 million people [13-14]. On the other hand, the population ratio between urban and rural areas may differ depending on how high is income level of a country which is illustrated by the figure below.

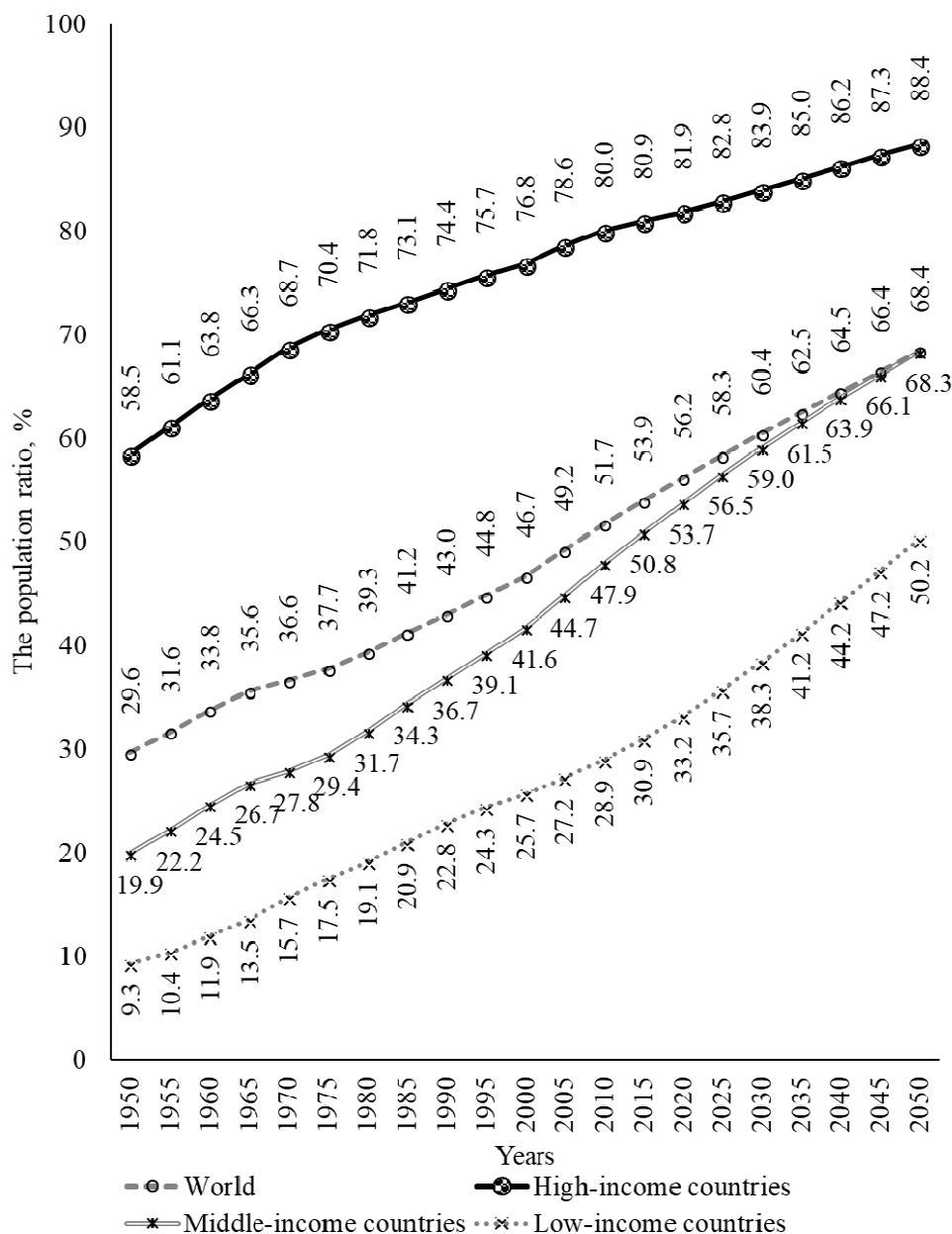


Figure 4 – The prediction for the ratio of population at mid-year residing in urban area, %.

Note: From the source 15. The annual increments are based on five-year averages.

The figure above shows that only by 2050 more than a half of the population in low-income countries would be living in the cities [15]. Moreover, 85% of the population in high-income countries would be living in the urban areas by 2050. In addition, more than 60% of the global population would be living in cities, towns and urban agglomerations by 2030.

The rapid increase in the urban population as well as the population growth in general may cause undernourishment [8-10]. The figure below illustrates three-year average for prevalence of undernourishment worldwide.

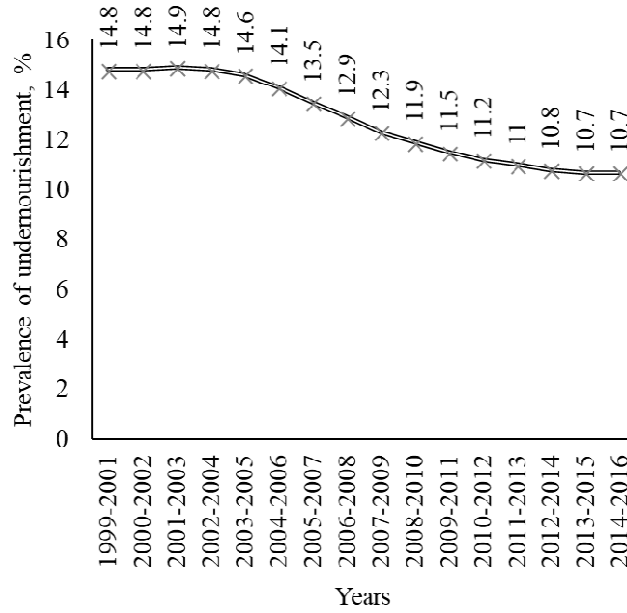


Figure 5 – The prevalence of undernourishment worldwide for three-year average, %.

Note: From the source 16.

The figure above illustrates that since the three-year undernourishment average since 1999-2001 to 2014-2016 has fallen by 4.1% [16]. However, even 10.7% indicator is high enough.

The figure below illustrates the summary report for the data above.

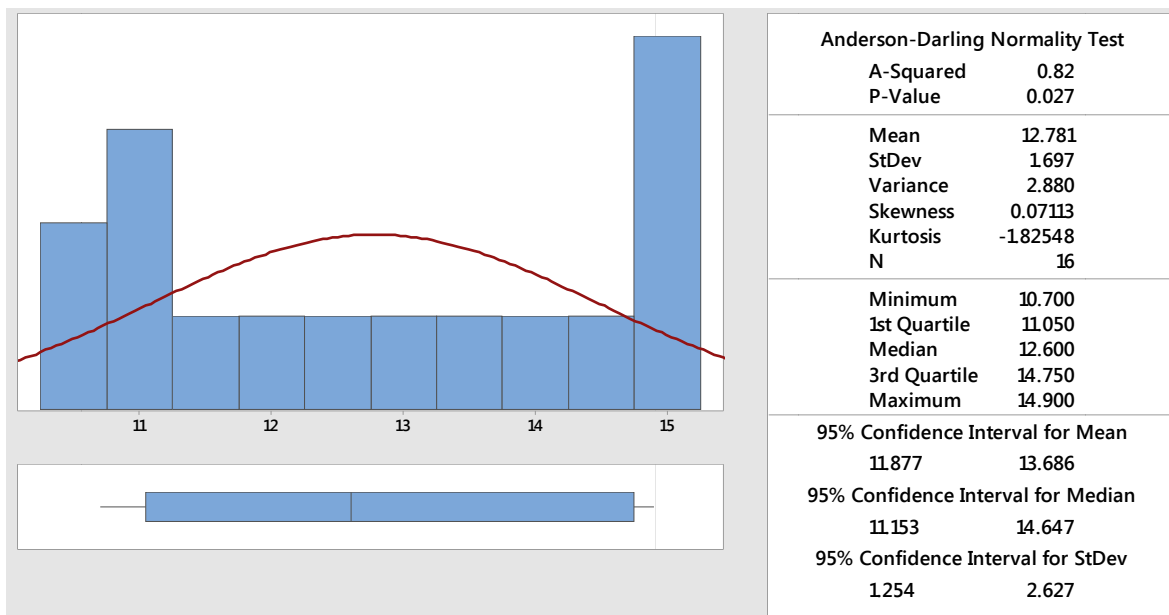


Figure 6 – The summary report for the three-year average of the undernourishment prevalence worldwide.

Note: Calculated by the author.

The figure above illustrates the standard deviation value of the three-year average of the undernourishment prevalence from 1999-2001 to 2014-2016 equals to 1.697%.

In order to feed growing global population different agricultural products are offered around the world [9-11]. The wheat is one of the main agricultural exports of Kazakhstan [17]. The wheat consumption level worldwide is illustrated by the figure below.

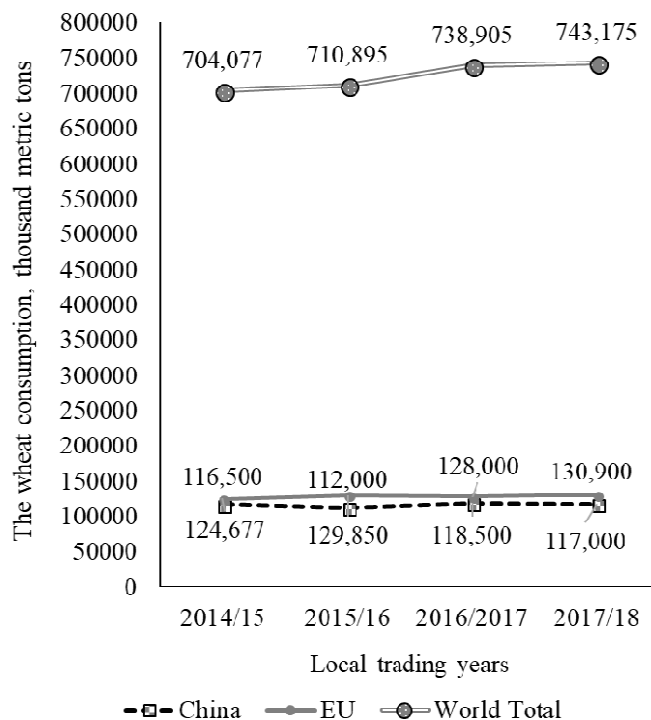


Figure 7 – The wheat consumption level worldwide, thousand metric tons.

Note: From the source 18.

The figure above shows that the consumption of the wheat in the 2017/2018 trading year has increased by 4730 thousand metric tons compared to the 2016/2017 trading year [18]. The figure below illustrates the global wheat production.

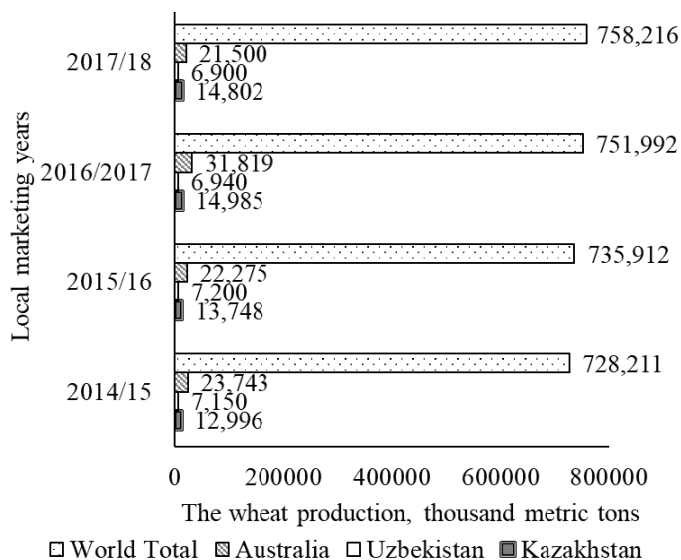


Figure 8 – The wheat production volume worldwide, thousand metric tons.

Note: From the source 18.

The figure above shows that for the 2017-2018 marketing year the Republic of Kazakhstan has produced nearly 1.95% of the global wheat. The figure below illustrates the wheat production level in Kazakhstan.

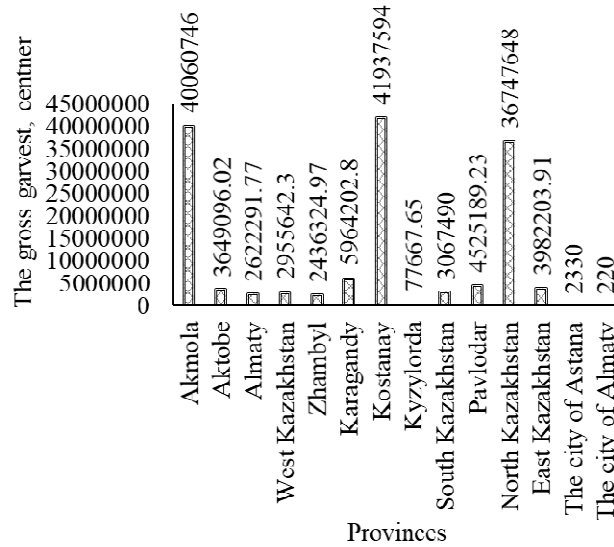


Figure 9 – The gross wheat harvest (both autumn and spring wheat) among provinces of the Republic of Kazakhstan in 2017, centner.

Note: From the source 19.

The figure above illustrates that the highest harvest of wheat in 2017 was in Kyzylorda province - 41 937 594 centners [19]. The figure below illustrates the summary report for the figure above without taking two main megapolises of Kazakhstan into the account.

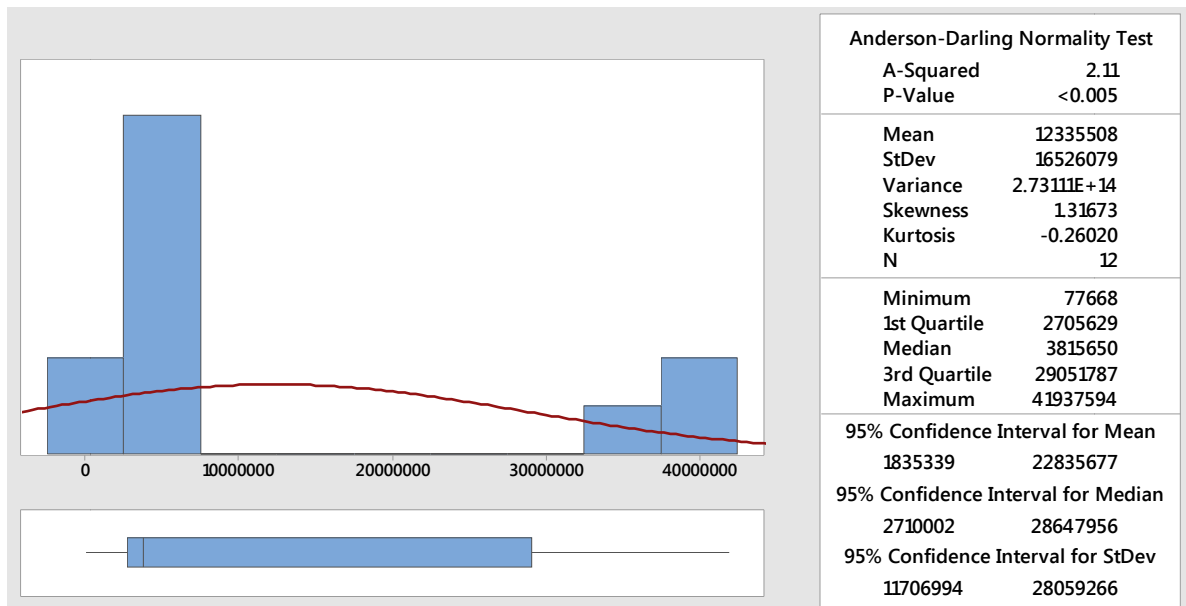


Figure 10 – The summary report for the gross wheat harvest among provinces of Kazakhstan without taking into account the cities of Almaty and Astana.

Note: Calculated by the author.

The figure above illustrates that the mean value for the gross wheat harvest equals to 12 335 508 centners. The possibility of growing wheat in Kazakhstan has its impact on reducing the food deficit. The figure below illustrates the depth of the food deficit in Kazakhstan.

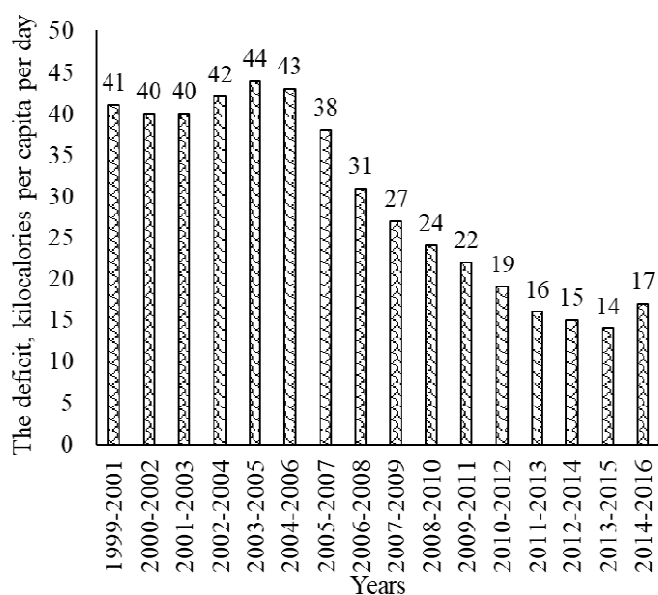


Figure 11 – The three-year average for the depth of the food deficit in Kazakhstan, kilocalories per capita per day.
 Note: From the source 16.

The figure above illustrates that since 1999-2001 to 2014-2016 the three-year average for the food deficit decreased by nearly 58.54%.

The figure below illustrates the summary report for the figure above.

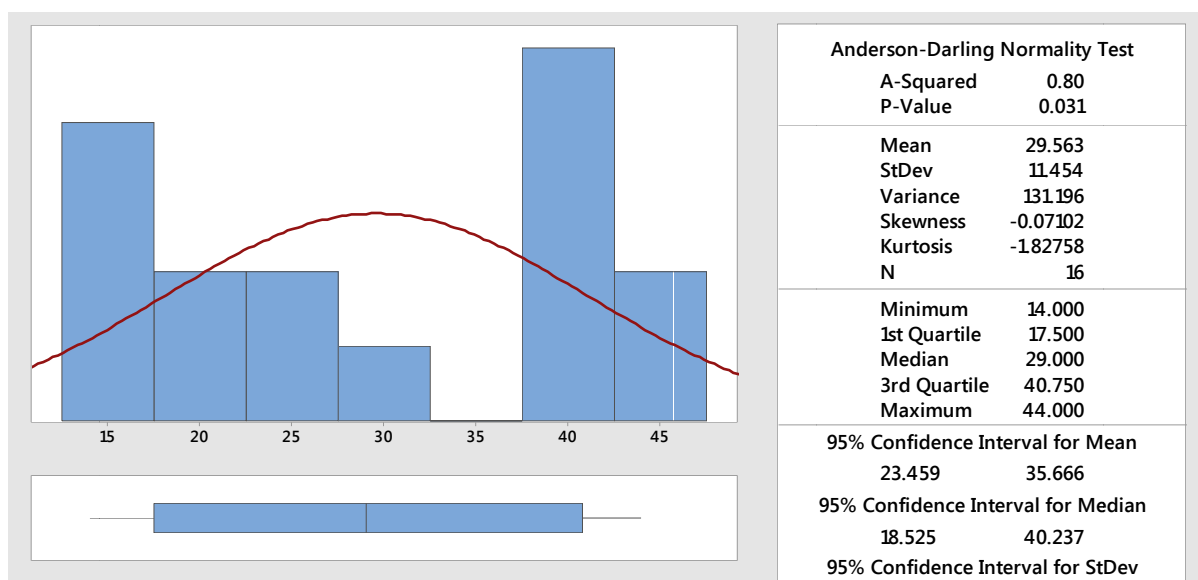


Figure 12 – The summary report for the three-year average of the food deficit depth in Kazakhstan.
 Note: Calculated by the author.

The figure below illustrates that the mean value for the three-year average of the food deficit depth is 29.563 kilocalories per capita per day. The food deficit depth analysis indicates that the food security of the Republic of Kazakhstan has increased in the recent years. On the other hand, there are other indicator that may determine how well the food market in Kazakhstan is performing. For instance, a dietary energy supply adequacy which is shown in the figure below.

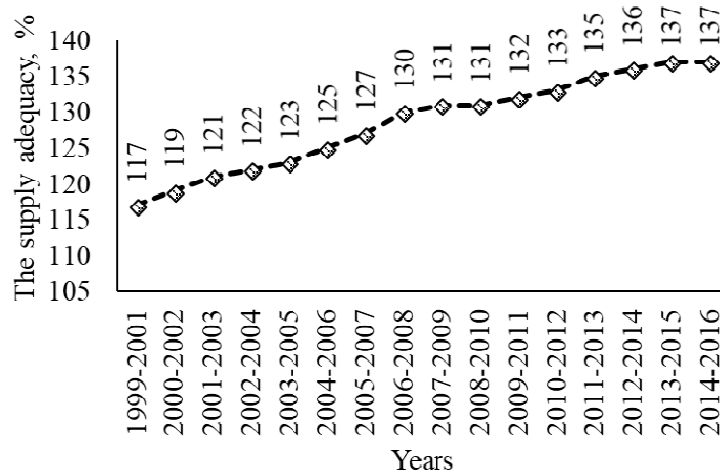


Figure 13 – The three-year average for the average dietary energy supply adequacy in the Republic of Kazakhstan, %.
 Note: From the source 16.

The figure above illustrates that between 1991-2001 to 2014-2016 the average dietary energy supply adequacy has improved by risen from 117% to 137%. This result means that the operational efficiency of the food market in Kazakhstan has significantly improved. On the other hand, the population growth in Kazakhstan in the future may put additional pressure on the food security of the Republic of Kazakhstan. The figure below illustrates the population growth estimate for Kazakhstan.

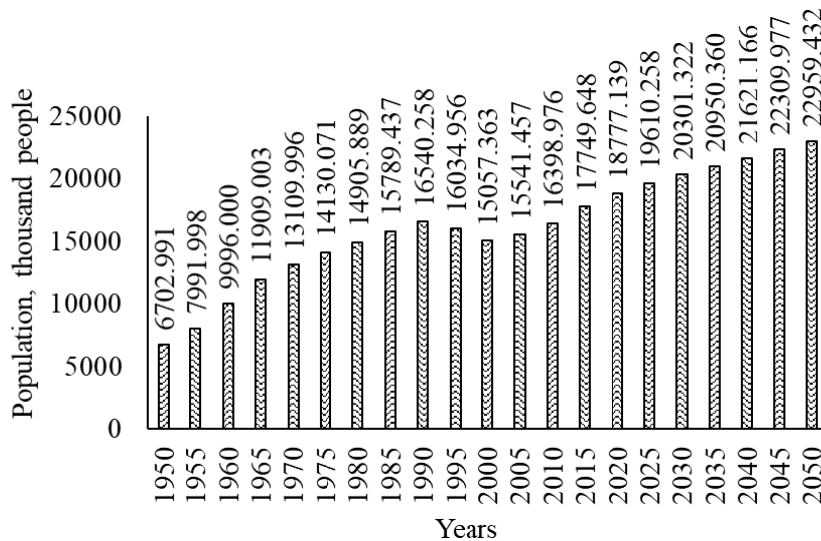


Figure 14 – The mid-year prediction for the population growth in Kazakhstan by 2050, thousand people.
 Note: From the sources 13-14. The annual increments are based on five-year averages.

The figure above illustrates that the population of the Republic of Kazakhstan is expected to grow to 22.959 million people by 2050. On the other hand, there is possibility that Kazakhstan may face rapid urbanisation in the future which may create an additional pressure on the food market. The figure below illustrates the urbanisation prospects of Kazakhstan by 2050.

The figure above shows that 69.1% of the population in Kazakhstan by 2050 would be residing in the urban areas which would become the significant source of pressure on the stability of the food market.

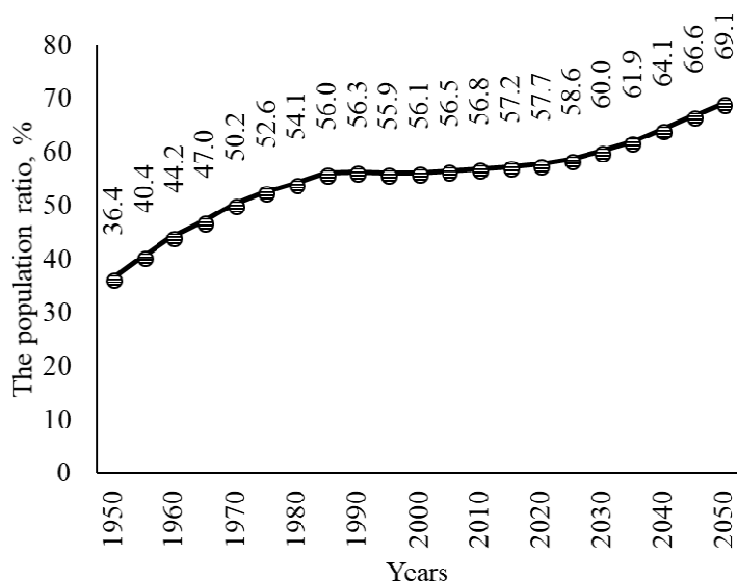


Figure 15 – The prediction for the ratio of population at mid-year residing in the urban areas of Kazakhstan, %.
Note: From the source 15. The annual increments are based on five-year averages.

In conclusion, the global population is expected to grow by 9,771,823 thousand people by 2050, and 68.4% of them are expected to reside in the urban area. The mentioned factors are expected to create the significant demand in the global food market. Kazakhstan is an active member of the international food market, and for its major agricultural export, wheat, the Republic of Kazakhstan for the 2017-2018 marketing year has produced nearly 1.95% of the global volume. Moreover, the food security of Kazakhstan significantly improved in the recent years which is shown by the factor that between 1991-2001 to 2014-2016 the average dietary energy supply adequacy has improved by risen from 117% to 137%. Finally, the population of Kazakhstan is expected to become equal to 22.959 million people by 2050, including 69.1% of them are expected to reside in the urban zones. Therefore, the population growth and the urbanisation in Kazakhstan in the future are expected to create more pressure on the food security.

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АЗЫҚ-ТҮЛІККЕ СҰРАНЫСТЫҢ ӨЗГЕРУІ ЖАҒДАЙЫНДАҒЫ ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ АЗЫҚ-ТҮЛІК ҚАУІПСІЗДІГІ

Аннотация. Мақала азық-түлікке жаһандық сұраныстың өзгеруі жағдайындағы Қазақстан Республикасының азық-түлік қауіпсіздігін қамтамасыз етуді зерттейді. Сондай-ақ, Қазақстанның азық-түлік қауіпсіздігі болашақта қиындықтарға тап бола ма деген болжамдар жасалады. Зерттеудің мақсаты экономикалық тетіктерді қолдану арқылы Қазақстан Республикасында азық-түлік қауіпсіздігінің деңгейін көтеруге көмектесетін теориялық негізді сипаттау болып табылады. Зерттеу әдістемесі эконометрикалық, аналитикалық, салыстырмалы және сандық әдістерге негізделген. Зерттеудің практикалық маңызы – сол екі арада азық-түлік сұранысының әлемдік ауқымда өзгеруі жалғасып жатқанында Қазақстанның азық-түлік қауіпсіздігінің қазіргі жағдайын бағалау. Сауалнама нәтижелері 2050 жылға қарай әлем халқының 9 771 823 мың адамға дейін өсетінін көрсетеді, және олардың 68,4% қалалық жерлерде орналасатын болады деп күтілуде. Нәтижесінде, болашақта азық-түлік нарығына деген сұраныс өседі деп күтілуде.

Түйін сөздер: азық-түлік қауіпсіздігі, Қазақстан, азық-түлікке сұраныс, халықтың ірі қалаларға шоғырлануы, азық-түлік тапшылығы, жаһандық деңгейде жеткіліксіз тамақтанудың таралуы, халықтың өсуі.

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ПРОДОВОЛЬСТВЕННАЯ БЕЗОПАСНОСТЬ РЕСПУБЛИКИ КАЗАХСТАН В УСЛОВИЯХ ИЗМЕНЕНИЯ ПИЩЕВОЙ ПОТРЕБНОСТИ

Аннотация. Статья исследует состояние продовольственной безопасности в Республике Казахстан в условиях глобального изменения спроса на продовольствие. Кроме того, сделаны прогнозы может ли продовольственная безопасность Казахстана столкнуться с проблемами в будущем. Целью исследования является описание теоретической базы, которая может помочь улучшить уровень продовольственной безопасности Республики Казахстан через применение экономических механизмов. Методология исследования основана эконометрических, аналитических, сравнительных и квантитативных методах. Практическая значимость исследования – это оценка современного состояния продовольственной безопасности в Казахстане в то время как продовольственный спрос продолжает изменяться в мировом масштабе. Результаты исследования показывают, что ожидается рост мирового населения до 9 771 823 тысяч человек к 2050 году, и ожидается, что 68.4% из них будут проживать в городских районах. В результате ожидается рост спроса на рынке продовольствия в будущем.

Ключевые слова: продовольственная безопасность, Казахстан, продовольственный спрос, урбанизация, дефицит продовольствия, распространенность недоедания в мировом масштабе, рост населения.

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