Print ISSN : 0972-8813
e-ISSN : 2582-2780

[Vol. 21(3) September-December 2023]

Pantnagar Journal of Research

(Formerly International Journal of Basic and Applied Agricultural Research ISSN : 2349-8765)

G.B. Pant University of Agriculture & Technology, Pantnagar

PANTNAGAR JOURNAL OF RESEARCH

Vol. 21(3) September-December 2023

CONTENTS

Temporal analysis of milk production and consumption in the Central Asian countries[#]

ABDUL WAHID[1*] and S. K. SRIVASTAVA[2]

[1]Department of Agricultural Economics and Extension, Sayed Jamaluddin Afghani University, Kunar province, Afghanistan, [2]Department of Agricultural Economics, College of Agriculture. G.B. Pant University of Agriculture and Technology, Pantnagar (U. S. Nagar, Uttarakhand)
[*]Corresponding author's email id: abdulwahid.sultaniaws@gmail.com

ABSTRACT: Livestock plays a major role in global food systems as the main source of animal protein (milk, meat and eggs) and contributes to the livelihoods and nourishment of millions people in low and middle income countries. The study examined the status, growth and instability of production and consumption of milk in different countries of Central Asia region from 2000 to 2017. Descriptive statistics like average, percentage, etc.; estimation of compound annual growth rates (CAGR) in production and consumption of milk, and Cuddy - Della Valle indices are constructed in the study. In Central Asia region, milk production increased at CAGR of 1.79 per cent in Kazakhstan to 6.79 per cent in Uzbekistan while, total consumption of milk grew with the CAGR between 1.81per cent to 6.79 per cent. All the countries in the region registered positive growth rate for both production and consumption. All the countries of Central Asia region remained with low instability in both milk production and consumption during the study period.

Key words: Central Asia, milk production, milk consumption, growth and instability

Livestock plays major role in the world food systems as the main source of animal protein (milk, meat and eggs) and contributes to the livelihoods and nourishment of millions of people in developing countries. Livestock is one of the main sectors of the agriculture in many countries, which helps in economic growth. Moreover, the livestock sector employed about 1.3 billion people in the world and directly generated income for 600 million of poor and small landholder farmers in low- and meddle-income countries (Thornton, 2010), which registered 2.2 % annual growth rate from 1995 to 2005 globally and 5.5% in developing countries, which contributed about 30% of the agricultural GDP (Gerber and Steinfeld, 2008). FAO data shows that, in the Asia GDP, the share of agriculture and livestock both has increased over the period i.e., share of agriculture increased from 7.46 per cent to 8.33 per cent and livestock from 2.13 % to 2.50% in 2000 and in the year 2016, respectively. World milk production was 843 million tons in 2018 which increased by 2.2 per cent from 2017. In Asia milk production increased by 3.9 per cent in 2018 with the higher contribution of India and Pakistan. In India milk production increased by 5.6 per cent from 2017 to 2018 because of expansion in dairy herd and higher productivity level of animals. An increase in intake of animal products would significantly add to health through increase of energy, protein, iron and vitamin A consumption. As Asian countries have larger share in world population as compared to other countries, many children are suffering from malnutrition. Reducing malnutrition in world depends on to reduced malnutrition in Asia, because 70 per cent of world malnourished children live in Asia. Milk is considered as a good source of children nourishment. Milk production increased by more than 100 per cent from the year 2000 to 2017 in Turkey, Saudi Arabia, Jordan, Oman and Kuwait but decreased in Georgia, Iraq and Bahrain. Quite variation observed in per capita consumption of milk in countries of West Asia which ranged from about 12 kg/year in Yemen to as high as 257.68 kg/year in Armenia during 2017 (Wahid and Srivastava, 2023). In Tajikistan 27 per cent of under five-year age children were stunted followed by Uzbekistan which figured at 20 per cent

[#]*This paper is drawn from the Post Graduate thesis submitted by first author under supervision of the second author.*

in the year 2012 (Robinson, 2020). These observations from different studies indicate that different countries have different level of availability of milk along with variability therein. In view of the aforementioned present study has been carried out for different countries of Central Asia region.

MATERIALS AND METHODS

Methodology

The Central Asia region of the Asia continent is comprised of 5 countries namely; Uzbekistan, Kazakhstan, Turkmenistan, Kyrgyzstan, and Tajikistan. In this research secondary data is used. The data was collected from FAO site for the period from 2000 to 2017 i.e. the latest available during the study. Milk production data was available in the secondary data sources but consumption data was not available. Therefore, availability of milk in the country is measured and taken as a proxy to total consumption of the milk in that country. Total availability data is worked out by adding net import quantity (total import – total export) in the given years to the total domestic production of the country (Wahid and Srivastava, 2022). Total consumption of the milk worked out as,

$$C_{it} = P_{it} + I_{it} - E_{it}$$

Where, C_{it} = consumption of milk in i^{th} country (tonnes) in t^{th} year; P_{it} = production of milk in i^{th} country (tonnes) in t^{th} year; I_{it} = import of milk in i^{th} country (tonnes) in t^{th} year; E_{it} = export of milk from i^{th} country (tonnes) in t^{th} year

Therefore, to generate consumption data for study period, data on quantity of export and import of milk, along with production data were collected across the countries of Central Asia region.

To estimate growth in production and consumption of milk in the different countries of Central Asia region, exponential growth function has been fitted for different countries in this region. Growth rates are worked out to examine the propensity of the variable to increase, decrease or stagnate over period of time. It also indicates the magnitude of the rate of change in variable under consideration per unit of time. In this study, compound annual growth rates of production and consumption of milk in Central Asian countries have been estimated by using the exponential growth function to the following form (Geetha and Srivastava, 2019; Wahid and Srivastava, 2022).

$$Y_t = ae^{bt}$$

Where

Y_t is production / consumption of milk in different countries of Central Asia region in period t.

a is constant and b trend coefficient.

t is time period from the year 2000 to the year 2017.

The above function has been transformed in natural log form to convert it into linear form as,

Log Y = Log a + bt

And CAGR (%) is worked out as,

CAGR (%) = (Anti log b – 1) x 100

To examine the level of instability in production and consumption of milk across the countries of Central Asia region Cuddy - Della Valle instability indices (CDI) are constructed (Geetha and Srivastava, 2019; Wahid and Srivastava, 2022) using following formula,

$$I_x = CV\sqrt{(1 - \bar{R}^2)}$$

Where,

I_x = Index value

Coefficient of variation (CV %) = $\left(\sigma/\overline{X}\right) \times 100$

$\bar{R}^2$ = Adjusted coefficient of multiple determination

σ = Standard deviation

$\overline{X}$ = Mean value

In the present study the CDI values are grouped into three classes, which represent the different level of instability, as follows:

1. Low instability = value of instability index is between 0 to 15
2. Medium instability = value of instability index is more than 15 to 30
3. High instability = value of instability index is greater than 30

RESULTS AND DISCUSSION

Compound annual growth of milk production and consumption

The compound annual growth rates (CAGR) of

production and consumption of milk in different countries of Central Asia region for the period from 2000 to 2017 is presented in the table 1. The table expresses that changes in production and consumption of milk in Central Asia region was positive and grew significantly in all Central Asian countries in this period. The compound annual growth rates of milk production and consumption were highest and same in Uzbekistan (6.79 %) followed by Tajikistan, where it was 6.60 per cent, respectively. The CAGR of production and consumption of milk in Turkmenistan, Kazakhstan and Kyrgyzstan varied between between 2 to 4 per cent per annum. The graphs depicting actual and estimated values of both production and consumption of milk from the year 2000 to the year 2017 are presented below through figures 1 to 5 for each country of the region separately. From the above table it is concluded that Uzbekistan, Turkmenistan and Tajikistan had sufficient increase in production to meet their domestic consumption in the study period. As shown in the figures 1 through 5 the production and consumption of milk in all the countries of the region were almost same

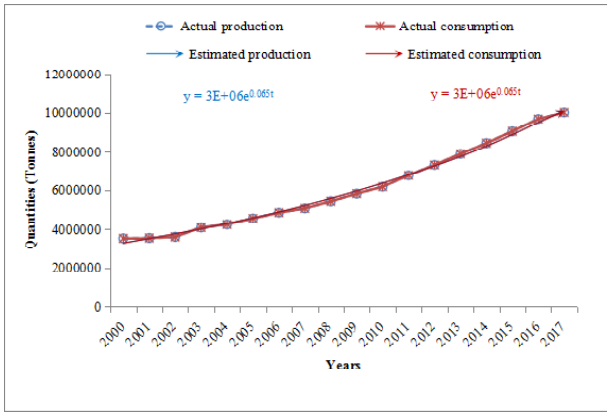

Fig 1: Estimated and actual production and consumption of milk in Uzbekistan

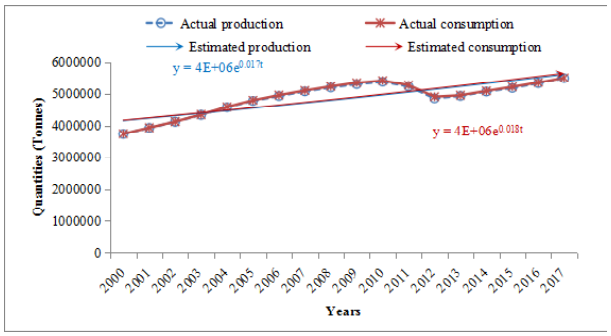

Fig 2: Estimated and actual production and consumption of milk in Kazakhstan

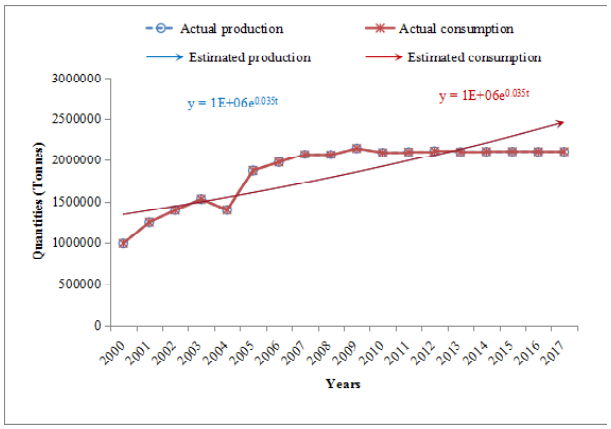

Fig 3: Estimated and actual production and consumption of milk in Turkmenistan

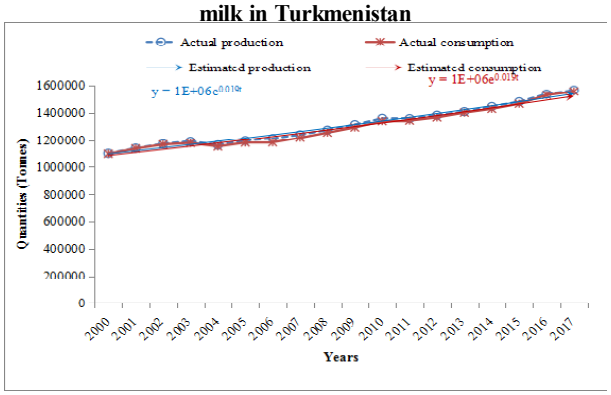

Fig 4: Estimated and Actual production and consumption of milk in Kyrgyzstan

Table 1: Compound annual growth rates in milk production and consumption in the countries of Central Asia region from 2000 to 2017

No.	Countries	Production		Consumption	
		Trend Coefficient	CAGR %	Trend Coefficient	CAGR (%)
1	Uzbekistan	0.0657*(0.0012)	6.79	0.0657*(0.0012)	6.79
2	Kazakhstan	0.0177*(0.0029)	1.79	0.0179*(0.0029)	1.81
3	Turkmenistan	0.0355*(0.0062)	3.61	0.0355*(0.0062)	3.61
4	Kyrgyzstan	0.0197*(0.0007)	1.99	0.0196*(0.0009)	1.98
5	Tajikistan	0.0639*(0.0026)	6.60	0.0638*(0.0026)	6.60

Figures in the parentheses indicate standard error., *Indicate significant at 1 per cent probability level.

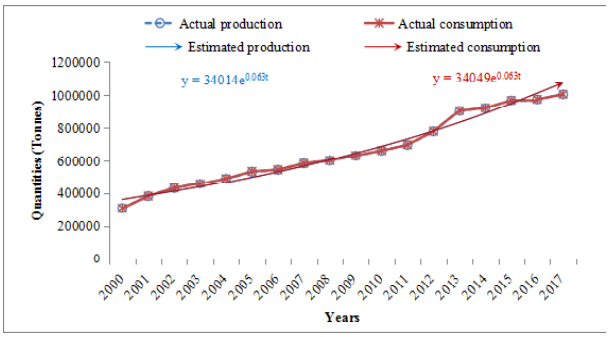

Fig 5: Estimated and Actual production and consumption of milk in Tajikistan

indicating that the countries are in general dependent on their production to meet out the domestic consumption of milk.

Instability in production and consumption of milk

The instability indices of milk production and consumption across countries of Central Asia region is given in Table 2.

Table 2: Level of instability in production and consumption of milk in the countries of Central Asia region

Level of instability	Period 2000 - 2017		
		Production	Consumption
	Countries	Instability index value	
Low instability	Uzbekistan	6.83	6.83
	Kazakhstan	6.00	6.12
	Turkmenistan	11.17	11.14
	Kyrgyzstan	1.89	2.33
	Tajikistan	5.70	5.69

It is deduced from the table that milk production remained with low instability in all the countries of Central Asia region, which ranged between 1.89 to 11.17 per cent during the study period of 18 years, respectively. Similarly milk consumption in all the countries of the region also indicated low variability during this period. Lowest instability was in Kyrgyzstan in both production and consumption to the extent of only around 2 per cent while, maximum instability is observed in Turkmenistan wherein it was around 11 per cent only.

CONCLUSION

In the Central Asia region, production of milk grew at CAGR of 1.79 per cent in Kazakhstan to 6.79 per cent, in Uzbekistan while, total availability of milk grew by CAGR between 1.81 per cent to 6.79 per cent. All the countries of The Central Asia region registered positive growth rate for both production and consumption with low level of instability from the year 2000 to 2017. The study calls for examining the statue of per capita consumption of milk in different countries of this region and if there is short fall from the required consumption level then appropriate steps should be taken to bridge the gap.

ACKNOWLEDGMENTS

The first author thanks the Indian Council of Agriculture Research for providing financial assistance during his post-graduation under India - Afghanistan fellowship, and Government of Afghanistan, especially the Ministry of Higher Education and Ministry of Agriculture, Livestock and Irrigation for providing opportunity to avail the fellowship to pursue higher education under this scheme.

REFERENCES

Geetha, R. S. and Srivastava S. K. (2019). Performance and determinants of maize production in India. *International Journal of Current Research in Biosciences and Plant Biology*, 6(6):17-25.

Gerber, P.J. and Steinfeld, H. (2008). Worldwide growth of animal production and environmental consequences. In Schlegel, P., Durosoy, S. and Jongbloed, W. (Eds). Trace Elements in Animal Production Systems, Pp.19-32.

Thornton, P.K. (2010). Livestock production: recent trends, future prospects. Philosophical Transactions of the Royal Society B: *Biological Sciences*, 365(1554):2853-2867.

Robinson, S. (2020). Livestock in Central Asia: From rural subsistence to engine of growth? Leibniz Institute of Agricultural Development in Transition Economies. Discussion paper No. 193, 44p.

Wahid Abdul and Srivastava S. K. (2022). Trend and

instability in production and consumption of meat: A study of different countries of West Asia region. *Biomed. J. Sci. & Tech. Res.,* 45(2): 36273 – 36283.

Wahid Abdul and Srivastava S. K. (2023). Temporal change in production and consumption of milk in the West Asian countries. *Indian Vet. J.,* 100 (10): 12 – 19.

www.fao.org visited on 30th June, 2020

www.Worldhunger.org visited on 21st April, 2020

Received: December 18, 2023
Accepted: January 9, 2024