

# Regional Variations in Agricultural Productivity- A Study of Uzbekistan

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## Article Info

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## Summary

Agriculture plays an important role in Uzbekistan's economy. It provides employment to about 60 percent rural population. The agricultural sector accounts for 12.2 percent of production assets, 44.4 percent of employment, 70 percent trade, 30.1 percent of G.D.P and 60 percent of exports. The aim of this work is to analyse the temporal and spatial variation in agricultural productivity. This was achieved by employing spearman's rank correlation to the agricultural productivity of the thirteen states of Uzbekistan. The study has revealed that the agricultural productivity has shown marked regional variations. The study area has been divided into five regions on the basis of agricultural productivity. The highest productivity region consists of the states of Fargana and Sirdarya while the lowest productivity region consists of the states of Karakalpakistan and Bukhara. The disparity can be solved through increased output, both in surplus, marginal and negative areas of crop production.

**Key Words:** Productivity, Spatial and Temporal Variation, Ranking coefficient

## Introduction

Growth in agriculture and its productivity are essential in achieving sustainable growth and significant reduction in poverty in developing countries. According to the World Development Report over 1.3 billion people are living on less than \$1/day and around 2.7 billion people lived on under \$2/day [1]. Between two thirds to three fourths of them live in rural areas while 90 per cent of the world's poor inhabit Asia and Sub-Saharan Africa [2]. Therefore, it is in the vast rural sector that significant manifestations of poverty exist. Over the last five decades the world population has increased by 140 per cent. By the middle of this century the world is likely to witness a population growth of 3 to 4 billion with most of this increase occurring in the poorest regions. It is in these countries that the income elasticity of demand for food is very high.

Increasing food production and supply in the presence of constraints on the availability of land - in fact diminishing supply of arable land per capita due to rapid population growth and the resulting need for human settlement and increased urbanization – is a major task that can only be achieved through significant improvements in agricultural productivity. The Green Revolution in many Asian countries, since the mid-1960s, has been canvassed as a major source of the transformation of agricultural production in the developing world. Given the dependence of the high percentage of population on agriculture for their livelihood, little progress can be made on poverty reduction if this sector languishes with a slow rate of growth. Productivity, which measures the increase in outputs not accounted for by the growth in production inputs, is a closely watched economic performance indicator because of its contribution to a healthy and thriving economy.

Agriculture is the backbone of Uzbekistan's economy, contributing almost one-third to the annual GDP. More

importantly, agriculture provides the livelihood for most of the population who live in rural areas [3]. Agriculture is also a great consumer of the natural resources, it accounts for 92% of Uzbekistan's total water use [4], equivalent to 60% of all water use in Central Asia. Since the collapse of the Soviet Union, 80% of Uzbekistan's water supplies have come from neighbouring countries, primarily via the Rivers Amu Darya and Syr Darya [5]. Thus, agriculture and agricultural policy in Uzbekistan now have significant international dimensions. In the present study different factors that explain differences in the productivity of regions are identified.

## Study Area

Uzbekistan is a landlocked country located in central Asia (fig. 1.1). It lies along the famous ancient Silk Route between Europe and the Far-east. It is bordered to the north and north-east by Kazakhstan, to the west and south-west by Turkmenistan, to the south by Afghanistan and to the east by Tajikistan and Kyrgyzstan. The total geographical area of Uzbekistan is 447 400 km<sup>2</sup>. Uzbekistan stretches 1,425 kilometers from west to east and 930 kilometers from north to south. Its terrain is a combination of sandy deserts, intensely irrigated river valleys and mountains. Less than 10% of its territory is intensively cultivated irrigated land in river valleys and oases. The rest is vast desert (Kyzyl Kum) and mountains. The highest point in Uzbekistan is the Khazret Sultan, located at 4,643 meters (15,233 ft) above sea level, located in the southern part of the Gissar Range in Surkhandarya Province, on the border with Tajikistan, just north-west of Dushanbe. The territory of Uzbekistan is a mixture of deserts and the high snow-covered mountains, the high-water rivers and vast arid plains and deserts. Piedmont and highland part of the country comprises the Tyan-Shan and Gissar-Alai mountain ridges and

spurs separated by inter mountain troughs. Height of the mountain ridges is up to 4 thousand meters and more.

The two major rivers in Uzbekistan are the Amu Darya and Syr Darya. The climate is continental, with long hot summers and short mild winters. Most of the rainfall occurs in the winter and spring, with little precipitation expected annually (100–200 millimeters, or 3.9–7.9 inches). The average summer high temperature tends to be 40 °C, while the average winter low temperature is around -23 °C. Major cities include

Bukhara, Samarkand, Namangan and the capital Tashkent. Since the 1970s, Uzbekistan's population has more than doubled. The most recent estimates put the total population at 27 million [6]. The population density is 65.5 people per square km. The desert vegetation dominates on plains and steppe, and grass meadow and forest vegetation in the mountains. Major soil types of Uzbekistan are sierozems and gray-brown desert-ones.



Fig.1.1: Location Map of Uzbekistan

#### Materials and Methods

The main sources of data collection include FAO production Year Books, Agricultural Abstract, published by the United States and Uzbekistan. The published data about the agriculture of Uzbekistan has been collected from different sources like World Bank Reports, Statistical Digests, Asia and Pacific, IMF sources published by United States etc. Other sources of data collection include, Statistical Abstracts published by the office of Prime Minister in Uzbekistan, State Planning Agency of Uzbekistan, Development Plan for Economic and Social Development, Published by Uzbekistan Republic's Government.

The study employs the Spearman's ranking method to determine the productivity of various states of Uzbekistan. For each group, the countries are placed in order of output per hectare. The ranks obtained by each state is on the basis of its average value of productivity. The ranks assigned were ranging from 1 to 13. The state with low productivity has been assigned the highest rank and vice versa.

#### Results and Discussion

The regional variations in productivity of various dominant crops of Uzbekistan are given in table 1.1. For each crop the states are placed in order of output per hectare. The place occupied by each state is the average of 1991 – 1995 and 2001 – 2005. Highest position of yield growth in cotton was recorded in Kashkadarya, Khorezm, Navoi, Karakalpakstan,

Tashkent and Bukhara. While as in wheat Djizak state has ranked first with regard to position of yield growth, it is followed by Kashkadarya, Karakalpakstan, while as the remaining states have shown a medium rank. With respect to growth in yield, position of rice is also high except Samarkand and Tashkent. It is seen that in case of maize, Bukhara is leading and next to it is Karakalpakstan which has recorded high growth in yield; other states have recorded relatively low productivity except Fergana which has recording 9<sup>th</sup> position so far as the yield is concerned. In case of barley, Karakalpakstan has gone high followed by Bukhara. Among remaining states Navoi is having 9<sup>th</sup> position with regard to yield position of the crop. In case of vegetables, Tashkent is leading, followed by Karakalpakstan which had recorded 10<sup>th</sup> position in yield growth, while as remaining states are in medium position. The yield of crops varies a great deal because of difference in climate, soil type, and inputs like fertilizer used, irrigation, quality of seeds and use of insecticides and pesticides

Cotton is the most important crop, accounts about 40 percent of the gross value of agricultural production. Uzbekistan was also the largest producer of fruit and vegetables in former Soviet Union. But during last few decades' agricultural production has decreased rapidly. It is because of the irrigation which has caused serious environmental problems by reducing the volume of the Aral Sea, rather than increasing productivity.

Table 1.1: Comparison of 13 states of Uzbekistan in hectare – yield of 6 Dominant Crops

State	Cotton		Wheat		Rice		Maize		Barley		Vegetables		Total Positions	Average Rank Co-efficient	Rank Position
	Yield	Position	Yield	Position	Yield	Position	Yield	Position	Yield	Position	Yield	Position			
Andijan	1.07	7	2.56	5	3.17	5	1.34	5	0.88	10	0.33	12	4	3.38	6
Bukhara	0.86	8	1.65	10	3.93	4	0.25	13	0.62	12	0.34	11	58	4.46	2
Djizak	1.24	1	1.32	13	1.78	10	0.67	11	1.60	4	0.61	5	4	3.38	6
Kashkadarya	0.45	13	1.45	11	4.25	3	1.10	7	0.90	8	0.55	6	48	3.69	3
Namagan	1.10	6	2.78	3	3.10	6	0.64	12	2.04	2	1.26	1	30	2.84	11
Samarkand	1.34	3	1.31	6	2.68	8	1.58	3	1.20	5	0.42	9	37	2.64	8
Surkhandarya	1.44	2	2.36	6	1.22	12	1.23	6	1.09	7	0.86	2	35	2.69	9.5
Karakalpakstan	0.55	10	1.10	12	0.74	13	0.70	10	0.43	13	0.41	10	68	5.23	1
Syrdarya	1.1	5	2.94	7	4.98	2	1.79	2	1.17	6	0.50	7	29	2.23	12.5
Tashkent	0.64	9	2.45	2	1.28	11	0.75	9	2.07	1	0.21	13	45	3.46	4
Fergana	1.12	4	3.45	1	6.05	1	0.90	8	0.84	11	0.78	4	29	2.23	12.5
Khorezm	0.48	12	2.58	4	2.80	7	2.12	1	1.89	3	0.47	8	35	2.69	9.5
Navoi	0.53	11	1.99	8	1.88	9	1.35	4	0.88	9	0.82	3	44	3.38	6

(Position indicates the state number in order of yield for each crop)

Source:- Computed from statistical abstract of Uzbekistan

The 13 states have been grouped into five categories in order of the ranking position as given in table 1.2 and depicted in fig.1.2. In the first and second category there are two states each, while as in the third, fourth and fifth category there are three state each. The purpose of ranking coefficient is to order any given number of state, country or region growing the same range of crops. High category states include Namagan, Syrdarya and Fergana, while as low ranked states are Karakalpakstan and Bukhara. Among the remaining medium category states Tashkent, Andijan and Navoi have slightly gone ahead as compared to Kashkadarya and Tashkent.

The spatial analysis of the agricultural productivity indicates that high yield of cereals is due to the impact of various forms of inputs operating in the country which helped in converting low productive areas to medium and even high productive areas. However, low productivity of certain crops requires attention of farmers and governmental agencies. Efforts should be directed towards the increase of area and production of cereal crops. It can be achieved through the adoption of new varieties of high yielding seeds by safe guarding the interests of farmers. The disparity can be solved through increased output, both in surplus, marginal and negative areas of crop production. The increased output of foodgrains can be achieved through, intensification, extensification and mechanization of agriculture and multiple cropping patterns. In order to reduce the food deficit, emphasize should be more on irrigation than any other input

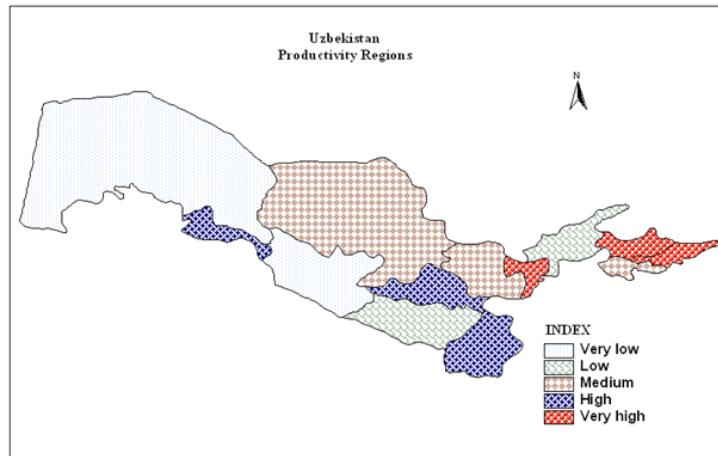
because on irrigated land higher productivity can be achieved through fertilizers only.

Although grown for hundreds of years in the region, the more recent expansion of cotton was made possible by two main factors: the extension of the irrigated area and Soviet central planning. While irrigation allowed increased crop production, central planning imposed cotton as the major crop. In exchange for cotton production, central planning provided Uzbekistan with water, energy and food from elsewhere in the integrated national system. The growth of irrigated agriculture, in particular for cotton, has been associated with a range of water related environmental problems, most famously the shrinking of the Aral Sea, but also including less publicized salinity and water-logging of irrigated lands. Since the disintegration of the Soviet Union and independence of Uzbekistan in 1991, the policies of Uzbek agriculture have simultaneously been subject to both inertia and change. On the one hand, the government has maintained significant aspects of the central planning system. The state still controls the area and quantity of cotton produced, as well as the purchase prices. On the other hand, it has allowed a shift towards increased farmer control of many aspects of production, in particular, those related to land and water management. At the same time, it has been forced to develop new trading relationships with other former Soviet states and the rest of the world, which has led to the mandated expansion of the wheat area to meet local food needs.

Table 1.2: Productive Regions of Uzbekistan (Rank Categories)

S. No	State	Ranking Coefficient	Rank Position	Category
01	Karakalpakstan	5.23	1	i
02	Bukhara	4.46	2	
03	Kashkadarya	3.69	3	ii
04	Tashkent	3.46	4	
05	Andijan	3.38	6	
06	Djizak	3.38	6	iii
07	Navoi	3.38	6	
08	Samarkand	2.84	8	
09	Surkhandarya	2.69	9.5	iv
10	Khorezm	2.69	9.5	
11	Namagan	2.30	11	
12	Syrdarya	2.23	12.5	V
13	Fergana	2.23	12.5	

Source: Computed from Statistical abstract of Uzbekistan



Source: Generated from Statistical abstract of Uzbekistan

Fig.1.2: Productivity Regions of Uzbekistan

## Conclusion

Agricultural productivity has shown marked regional variations in Uzbekistan. The study area has been divided into five regions on the basis of agricultural productivity. The highest productivity region consists of the states of Fargana and Sirdarya while the lowest productivity region consists of the states of Karakalpakstan and Bukhara. The disparity can be solved through increased output, both in surplus, marginal and negative areas of crop production. It can be achieved through the adoption of new varieties of high yielding seeds. The increased output of food grains can be achieved through, intensification, extensification and mechanization of agriculture and multiple cropping patterns. In order to reduce the food deficit, emphasis should be more on irrigation than any other input.

## References

- [1] World Bank, 1992. World Development Report, 1992. Oxford University Press, New York

- [2] Thirtle,C., D. Schimmelp and R. Townsend. 2002. Induced Innovation in United Staes Agriculture, 1980-1990: Time Series Tests and an Error Correction model. American Journal of Agricultural Economy, 84: 598-614.
- [3] Djalalov, S. 2001. Tendencies in Uzbekistan Farm Production. Review (Tashkent: Centre for Effective Economical Policy).
- [4] Dukhovniy, V and V. Sokolov. 2002. Lessons on cooperation building to manage water conflicts in the Aral Sea Basin, Technical Documents in Hydrology: PC-CP Series: 11, Tashkent.
- [5] Mirzaev, S. 1996. Problems of Aral Sea: causes and solutions, in: Proceedings of Conference on Aral Sea Problem, pp. 21-32 (Tashkent: Institute of Irrigation and Melioration).
- [6] UNFPA, 2006. State of the World Population,2007-Unleashing the Potential of Urban Growth. New York.