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## **Welfare effects of partial and full liberalization of international trade on the agriculture in Uzbekistan**

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# ***Welfare effects of partial and full liberalization of international trade on the agriculture in Uzbekistan***

## **Abstract**

Agriculture sector plays crucial role in the economy of Uzbekistan. However, the reduction of the share of agriculture sector in national GDP can be explained by increasing the share of other sectors in national economy. There is growth in gross production of agriculture but, agricultural sector is still characterized by unsustainable production patterns and agricultural institutions of the country are controlled to a large extent through government intervention. Two crops have strategic significance for Uzbekistan: wheat for domestic consumption and cotton for export. The Government decides to grow cotton and wheat as well as fix the output prices. Uzbekistan Farmers receive lower prices for the main crops than world prices, but they also receive inputs such as fertilizers or fuel at cheaper prices.

The partial implementation of reforms such as privatization and liberalization of agricultural markets affect the development of agriculture and agricultural trade in Uzbekistan (UZB). This paper highlights the major effects of market and price liberalization (50% and 100%) on agricultural trade using the partial equilibrium model AGRISIM which is based on the "Static World Policy Simulation Model" (SWOPSIM) of the United States Department of Agriculture (USDA). With the help of this model, changes in general economic conditions, policy intervention in agricultural markets and foreign trade are simulated. This study suggests that the issues of sustainable agriculture development and food security in Uzbekistan can be achieved through, liberalization of agricultural markets and trade specially wheat and cotton.

**Keywords:** Uzbekistan, agricultural sector, agriculture trade, AGRISIM Model, liberalization.

## **1 Introduction and Research Questions**

Arable area comprises only 11% of total area of the Republic of Uzbekistan (UzCadastr 2012). While, agriculture has 19% share in national GDP and 20% share in employment as labor force in 2012 (FAO 2013). With such a small percentage of available land for farming, the inadequate soils management and irrigation facilities regarding unawareness to consumption of water or other natural resources, have adverse environmental effects such as salinization, erosion and waterlogging. These problems directly affect the quality of land as poor productivity.

The cotton is one of the most important crops in Uzbekistan. The cotton sector was strongly developed in past which accounted as about 40% of total agricultural output while currently it shrunk to 19% and only 3.5% contribution in national GDP (FAO 2011). Due to arid climatic conditions in the country, crop production is almost entirely dependent on irrigation. Currently, the area under cotton is 1.3 million ha which is higher than other crops area (MAWR 2012). Cotton is the main raw material for Textile industry. Therefore, agriculture also has significant influence on other areas of the economy (ADB 2012).

State procurement system is the main constraint for higher agricultural productivity for cotton and wheat. Most of the agricultural land belongs to the States. The government sets prices and production targets for the wheat and cotton. During the early period in transition, national accounting was done by the Soviet system of material product balances which is not so much reliable but still it continues (SPOOR 2005). At early 1990s, major objectives of the state quota policy were to supply sufficient agricultural products to protect people from food deficits, increase

agricultural productivity, rural employment, agricultural exports and decrease imports (SIRAJIDDINOV and KASIMOVA 2001).

To bring the agricultural potential in light, it requires providing more freedom and more incentives for farmers than under the existing state order system to decide about cotton and wheat. Pricing and marketing reforms in cotton sector must be accelerated and net burden of taxation on the cotton sector should be reduced in order to increase farm income (AHMEDOV 2006). At the same time, it should be forced to develop new trading relationships with other former Soviet states and the rest of the world, which led to the mandated expansion of the wheat area to meet local food needs (ABDULLAEV et al. 2009).

Thus, it is important to know about the development in Uzbek agriculture and its impacts on natural resource use. It is also important to know the impacts of liberalization on Uzbek agriculture and agricultural trade. Therefore, the main objective of this paper is to analysis the impact of liberalization on the development of agricultural production and trade in Uzbekistan.

## **2 Data and Methods**

To attain the main objective of the study, partial-equilibrium net trade model is used. The partial implementation of reforms such as privatization and liberalization of agricultural markets affect the development of agriculture and agricultural trade in Uzbekistan. For the empirical analysis the partial equilibrium model AGRISIM (Agricultural Simulations Model) is the most appropriate model for agricultural sector of Uzbekistan. This model is developed at the University of Giessen, and is based on the "Static World Policy Simulation Model" (SWOPSIM) of the U.S. Department of Agriculture (USDA). AGRISIM is a partial-equilibrium, multi-commodity, multi-region model. It is comparatively static in nature, deterministic and has non-linear isoelastic supply and demand functions (PUSTOVIT 2003; SCHMITZ 2002).

Trade is calculated as net trade. Policy interventions are generally considered with changes in nominal protection rates (NPR), price transmission coefficients, minimum producer prices, production quotas and subsidies. Through shift coefficients in the demand and supply functions, additional exogenous was taken into account and their impact can be simulated such as population, income growth and technical progress. The fifteen commodities are incorporated into the AGRISIM Model including nine vegetable and six animal products.

In general, this Model includes 19 countries and region, containing Central Asian countries, CIS countries, Asian countries, European countries, African countries, North and South American countries. In 2006, the database was updated with the projections year to 2016 based on above mentioned products as well as countries. The data from "FAOSTAT" FAO, PSE Statistics of OECD, USDA, World Bank, IMF data, State Statistical Committee of countries, central banks, ministries of economics, foreign trade ministries, ministries of agriculture, agricultural institutions, farms, and Institute of agribusiness (IAB), Giessen, has been compiled.

The main structure of the model follows the suggestions of RONINGEN (1997). It describes a multi-market multi-region partial equilibrium model and main structure of the model SWOPSIM (**S**tatic **W**orld **P**olicy **S**imulation **M**odeling Framework (RONINGEN et al. 1991). The regions are connected with each other through a market equilibrium mechanism. The world market price

which also belongs to market equilibrium mechanism, are influenced by domestic markets through domestic prices. Net trade is summed up from all regions, which is calculated as the difference between supply and demand. The model was programmed in General Algebraic Modeling System (GAMS).

On the basis of current macroeconomic and base data, especially current agricultural situation in Uzbekistan, the scenario is formulated. The formulation of the scenario is: Reduction of the Input subsidies in UZB + Reduction of the positive and negative NRPs in UZB (NPR/2 partial Liberalization and NPR=0 full Liberalization in UZB). It can be called as partial (50%) and full (100%) liberalization scenario.

### 3 Main Results and Discussion

The main simulation results (Table 1) show clearly the effects of partial and full liberalization on production, demand, price and trade. The results of the production effects show that production of cotton 5.07% (partial) and 8.98% (full), wheat 1.80% and 3.61%, coarse 36.04% and 82.71%, maize 5.46% and 13.44%, tobacco 17.96% and 27.29%, milk 3.40% and 5.90% has been increased as compared to the base year. While in case of soybean, sugar, beef, mutton-goat, pork, poultry, and eggs production, it has been decreased to 0.01 to 7.98% and 25.43% respectively.

The results also accept the demand theory. The demand of wheat, maize, oils, soybean, sugar, beef, mutton-goat, pork, poultry and eggs is significantly increased with the range of 0.07 to 8.37% (partial) and 0.38 to 13.63% (full). In case of cotton demand in partial and full liberalization, it is decreased by 4.32 and 6.95 percent whereas it is worse in case of tobacco i.e. 20.90% and 28.51%.

**Table 1: Effects of partial (50%) and full (100%) Liberalization on Production (PROD), Demand (DNAD), Farm Gate Price (FGP), Border Price (BP), and Net Trade (NTRA)**

Products	PROD (in %)		DNAD (in %)		FGP (in %)		BP (in %)		NTRA (Tsd. t)	
	50%	100%	50%	100%	50%	100%	50%	100%	50%	100%
COTT	5,07	8,98	-4,32	-6,95	38,85	77,19	-0,44	-0,76	1.019	1.072
WHEA	1,80	3,61	2,03	2,10	10,28	20,09	-0,02	-0,06	-445	-378
COAR	36,04	82,71	-5,90	-9,83	70,21	135,04	-0,04	-0,07	14,62	64,38
MAIZ	5,46	13,44	2,82	3,01	12,11	24,85	-0,04	-0,07	1,14	12,96
RICE	2,04	3,50	-5,26	-9,73	13,92	26,25	-0,01	-0,01	7,61	20,40
OILS	0,01	0,01	8,37	13,63	0,03	0,05	0,03	0,05	-103	-159
SOYB	-0,01	-0,01	6,22	9,78	-0,05	-0,08	-0,05	-0,08	-13,80	-15,08
SUGA	-0,49	-1,01	0,65	0,38	-2,90	-6,03	-0,00	-0,00	-452	-451
TOBA	17,96	27,29	-20,93	-28,51	199,65	397,72	-0,00	-0,00	11,43	14,39
MILK	3,40	5,90	-4,14	-8,06	23,99	47,74	-0,05	-0,09	312	590
BEEF	-1,07	-3,10	0,27	0,44	-9,27	-20,65	0,01	0,02	-8,21	-19,61
MUTG	-4,94	-10,22	3,11	6,94	-14,42	-28,73	0,08	0,19	-6,08	-12,98
PORK	-7,98	-18,08	0,73	3,28	-15,17	-35,56	-0,00	-0,00	-8,45	-10,65
POUL	-7,67	-25,43	0,69	9,42	-11,76	-41,38	-0,01	0,00	-9,21	-15,29
EGG	-2,32	-4,48	0,07	1,67	-4,19	-9,90	-0,00	0,00	-2,53	-6,60

Source: Own calculation using AGRISIM, 2014

In scenario, net-trade position for milk is changed from an import status of 8 thousand tons at base year to an export status of 312 thousand tons with partial and 591 thousand tons with full liberalization. The same trend is noticed for coarse grain, maize, and rice net-trade. Net imports of wheat, oilseeds, soybean, sugar, beef, pork, poultry, and eggs increase from 0.0003 thousand tons to a maximum of 452.32 thousand tons, while cotton net export increases from 949.0 to 1.019 (partial) and 1.072 (full) thousand tons.

Producer price effects show that the prices are declined for all products in the scenario except cotton, wheat, coarse grains, maize, tobacco, and milk. It is because of a huge gap between domestic and world market prices.

The international price decreases in the scenarios for all products, with the exception of oilseeds, beef, and mutton goat. World prices for cotton, wheat, coarse, maize, soybean, and milk slightly decrease because the nominal rate protection halved or corresponds to zero which increases worldwide competitiveness.

Table 2 presents the results as effects of partial and full liberalization on welfare indicators in Uzbekistan. The economic welfare for producers and total welfare has positive impacts of liberalization. In the partial and full liberalization scenarios, the state budget became near about -204 to -510 million US\$. On the other hand, total welfare is going very high because the producer rent is increasing more than 2000 million US\$.

**Table 2: Effects of partial (50%) and full (100%) Liberalization on Welfare, in Million US\$**

<b>Welfare Indicators</b>	<b>50% Lib.</b>	<b>100% Lib.</b>
Producer rent	<b>730</b>	<b>2004</b>
Consumer rent	-193	-326
State Budget	-204	-510
<b>TOTAL WELFARE</b>	<b>333</b>	<b>1168</b>

Source: Own calculation using AGRISIM, 2014

In general, the market liberalization has a positive effect on the regional state order quota crops cotton and wheat sector. Concerning the policy effect with regards to the location of producers and consumers, market and price liberalization, and reforms about input subsidies are more beneficial for producers. This process have need to be completed with exchange rate liberalization so that administered procurement prices are set at border price levels with the market exchange rate.

#### **4 Conclusions**

The agriculture is strongly limited due to the established state system of the low prices for end production. A full liberalization in the Uzbek agricultural sector has shown positive impacts which are following:

- ✓ A significant increase in production and producer prices, especially for products that previously had negative NPR.
- ✓ The elimination of administrative prices for the major crops (wheat and cotton) leads to an expansion of the cotton areas and reduction of wheat land.

- ✓ Demand is increasing by the import price reductions, especially for animal products.
- ✓ With the increase of production and prices, it comes with most products to a trade status change from import to export case.
- ✓ The foreign trade prices for the imported goods fall significantly.

The full liberalization brings more advantages than partial liberalization for the producers and it increases total welfare of the national economy of Uzbekistan. It can be concluded that Uzbek agriculture and agricultural trade can be developed well with liberalization. Agricultural markets liberalization is needed to provide appropriate incentives to farmers which motivate to farmers in processing of agricultural products. State procurement quotas for wheat and cotton should be reduced or vanished. The farmers should have the freedom to sale their products and prices for these products should be liberalized.

## 5 References

ABDULLAEV, I., CH. DE FRAITURE, M. GIORDANI, M. YAKUBOV and A. RASULOV (2009). Agricultural Water Use and Trade in Uzbekistan: Situation and Potential Impacts of Market Liberalization, *Water Resources Development* 25(1): 47-63.

ADB (2012). Asian Development Bank, Sustainable agriculture and climate change mitigation project. Manila.

AHMEDOV, K. T. (2006). Uzbekistan Economic trends and problems. Tashkent.

FAO (2013). Food and Agriculture Organization of the United Nations, Statistical Database of FAOSTAT.

UzCadastr (2012). Department of Land Resources and State Cadaster of Uzbekistan, <http://www.kadastr.uz/>

MAWR (2012): Statistical Report, Ministry of Agriculture and Water resources (MAWR) of Uzbekistan, Tashkent.

PUSTOVIT, N. (2003). EU-Osterweiterung und WTO-Liberalisierung aus Sicht der ukrainischen Agrarwirtschaft – Wirkungsanalyse und Bewertung mit Hilfe eines partiellen Gleichgewichtsmodells. *Agrarökonomische Monographien und Sammelwerke*, Kiel: Wissenschaftsverlag Vauk Kiel KG.

RONINGEN, V. O. (1997): Multi-Market, Multi-Region Partial Equilibrium Modeling, in: J. F. FRANCIOS and K. A. REINERT (eds.): *Applied Methods for Trade Policy Analysis. A Handbook*. pp. 231 – 257, Cambridge University Press, Cambridge.

RONINGEN, V. O., J. SULLIVAN and P. DIXIT (1991). Documentation of the Static World Policy Simulation (SWOPSIM) Modeling Framework. Staff Report Nr. AGES 9151, Economic Research Service, US Department of Agriculture, Washington D.C.

SCHMITZ, K. (2002): Simulationsmodell für die Weltagrarmärkte – Modellbeschreibung. In: SCHMITZ, P. M. (Ed.) *Nutzen-Kosten-Analyse Pflanzenschutz (Agrarökonomische Monographien und Sammelwerke)* Wissenschaftsverlag Vauk Kiel KG, Kiel.

SIRAJIDDINOV, N., S. KASIMOVA (2001). Development of rural entrepreneurship, Journal of Economical Review (in Russian), 5(6): 21–22.

SPOOR, M. (2005). Uzbekistan's Agrarian Transition, Institute of Social Studies Centre for the Study of Transition and Development (CESTRAD).