FOOD SECURITY PERSPECTIVES IN CENTRAL ASIA

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Abstract - This paper oriented to compare the socio-economic indicators of the Central Asian countries during the two decades of independence from the USSR. Central Asian Countries has been begun transitioning from planned economy to a market economy since collapsing of the Soviet Union in 1991. During the last 20 years of the transition period the socio-economic life of the region changed thoroughly. The main tasks of these countries were to stop declining of national economy, which accompanied with destroying economic cooperation among former socialist countries, to create new typical economic model for transition to a market economy, to improve the livelihood of the population and provide food security. This paper analysis the socio-economical potentials of the CAC, development of the agricultural sector and its response to population growth for purpose to meet the expected demand for food without significant increases in prices. The more detail in this paper analyzed the economic growth, population dynamics, human capital, agriculture`s response to demand growth.

Keywords - Central Asia, Transition, Market Economy, Food Security, Economic Growth.

I. INTRODUCTION

The Central Asian Countries (CAC) - Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan have many common historical and geographical characteristics. All of these countries belonged to the Soviet Union and were integrated into that country's division of labour. Geographical proximity and a rich history with a cultural mix of East and West created the basis for intensive trade and cultural links between the people of Central Asia (United Nations ESCAP, 2005).

After collapsing of Soviet Union in 1991 CAC chose various strategies for transition from central planning economy to market economy. These countries had no experience of nationhood before they were incorporated into the Russian empire during the eighteenth and nineteenth centuries (Pomfret, 2006). As a part of the Soviet Union the CAC had a deeper economic integration with other republics of the former socialist republics and were not active in the foreign economic relations and were not interesting for the world market. Malcolm Dowling &GaneshanWignaraja (2006) counted four reasons for political and economic significances of the CAC. There are: (1) huge reserve of the world's natural resources (including oil, natural gas, gold, and other metals); (2) strategically positioning as a gateway between Europe and Asia and offers extensive potential for trade, investment; (3) region`s large geographical area; (4) all the economies have had a legacy of socialist-oriented economic policies and several have embarked on market-oriented reforms emphasizing macroeconomic stabilization, trade openness, and private sector development (Svestnikov&Chaplinsky, 2010). At the beginning of independence, i.e. during the 1993-1995 all these countries created own financial systems and put into circulation their own national currencies. Furthermore at that period they became member of United Nations.

Territory of the Central Asia is about 4 mln. square km. Kazakhstan is the largest among CAC with territory 2.7 mln. square km (number 9 in the world), then follows Turkmenistan (488 thousand square km), Uzbekistan (447.4 thousand square km), Kyrgyzstan (199 thousand square km) and Tajikistan (143 thousand square km). According to the World Bank Statistics(2010) CAC population amount to 61.7 mln. people or less than 1% of the world population. Among CAC Uzbekistan has large population – 28.1 mln. people, next Kazakhstan – 16.3 mln. people, Tajikistan, Kyrgyzstan and Turkmenistan have population from 5 to 7 mln. people. Moreover, the population of the CAC has risen since the Soviet period and according the UN estimates in 2015 the population of Central Asia can exceed 65 mln. people.

According to the World Bank indicators CAC have GDP – 349.9 billion USD (0.45% of the world GDP for PPP), export is amounting to 69.2 billion USD (0.46 % of the world export). The biggest GDP belongs to Kazakhstan 56.2 % of all CAC (196.6 bln. USD), then Uzbekistan 25 % (87 bln. USD), then follows Turkmenistan 11.2%, Tajikistan 4.2 % and the last one Kyrgyzstan 3.4 %. The biggest exporter among the CAC is Kazakhstan 82.6 % (57.2 bln. USD) of all region`s export volumes, is the second biggest exporter, Uzbekistan 9.8 % (6.8 bln. USD), then follows Turkmenistan 3.8 % (2.6 bln. USD), Tajikistan 2.1 % (1.5 bln. USD) and the last one is Kyrgyzstan 1.6 % (1.1 bln. USD).

The regions is rich for mineral raw materials, especially such countries like Kazakhstan, Uzbekistan and Turkmenistan. These countries have an abundance of natural resources with oil and natural gas, uranium, chromium, lead, zinc, manganese, copper, coal, iron, and gold. Central Asia is the most

energy provided region in the world and it make more interesting of these regions for the world market. According to the data of BP Statistical bulletin oil reserves of Kazakhstan appreciates 39.8 billion barrels (3.2 % of all the world oil reserves), Uzbekistan and Turkmenistan respectively 0.6 billion barrels. Natural Gas proved reserves of Kazakhstan is amounted to 1.8 trillion m^3, Uzbekistan 1.6 trillion m^3 (0.8% of the all world reserves), Turkmenistan – 8 trillion m^3 (4.3%). In common, these countries have about 4.4 % of all oil proved reserves and 6.1 % of all natural gas proved reserves. Kyrgyzstan and Tajikistan have less volume of proven natural gas reserves – 6 and 80 billion m^3, respectively. As a perspective high income source for CAC may become export of uranium. All counties besides Turkmenistan have large volume of uranium reserves. But, at the present time only two countries of the region, like Uzbekistan and Kazakhstan are actively exploring and exporting of the uranium.

Since Soviet Union periodthe CAC considers as agricultural countries. Large areas of agricultural land resources of the CAC make its 10th place in the world for size of arable land. In production of vegetables and watermelons in the 16th position in the world economy, cotton 5th position, number of livestock 20th position. The great potential of agricultural land resources gives opportunity to the region to solve food security issues in the region, but today not all CAC efficiently uses of this potential.

With a large scale of resources CAC must become developed and self-sufficient region, provide high well-being of its population and play significant role in the world economy. The World Financial Crisis affected by the general socioeconomic conditions in this region. At the present time all these countries have a deficit budget, high level of inflation, problematic banking sector, strengthening of stagnation in the industrial sector, decreasing growth level of GDP (Svestnikov&Chaplinsky, 2010).

II. ECONOMIC GROWTH AND INCOME DISTRIBUTION

In the first decade of independence GDP growth level of the CAC decreased as other CIS countries due to collapse of economic integration in the USSR and average growth during the period 1991-1996 was negative. Thanks to carried out socio-economic reforms in cooperation with International Organizations, mostly all countries of the region achieved positive GDP growths after 1997. Process and results of reforms for transition to market economy were different in these countries due to various political, economic and social conditions (Table 1). Gradual reforms in Uzbekistan were associated with the best GDP performance of any Soviet successor state during the 1990s, but the outcomes in Uzbekistan have been less positive in the second decade. Kazakhstan, appeared to under reform in the 1990s, but in the second decade this country has been one of the best-performing economies in the world (Pomfred, 2010).

Table 1.Economic trends from 1991 to 2010, current per-capita incomes, and recent measures of income inequality

Countries	GDP growth (average annual percent) 1991-2010 (1)	GDP growth (average annual percent) 2010 (2)	Population growth (average annual percent) 1991-2010 (3)	Growth in GDP per capita (average annual percent) 1991-2010 (4)	GDP per capita (PPP $) 2010 (5)
Kazakhstan	3.2	7.3	-0.01	11.4	12169
Kyrgyzstan	0.7	-1.4	0.9	3.3	2239
Tajikistan	0.4	3.8	1.3	5.3	2163
Turkmenistan	6.4	9.2	1.6	9.7	8274
Uzbekistan	3.6	8.5	1.6	5	3106

Countries	Growth fixed capital formation (average annual percent) 1996-2010 (6)	Export growth (average annual percent)* 1995-2010 (7)	Income per capita (PPP $) 2010 (8)	Income inequality (Gini coefficient) 1991-2010 (9)	External debt stocks dynamics 1993-2010 (10)
Kazakhstan	3.8	21.5	10770	31	31.2
Kyrgyzstan	3.3	12.9	2100	33	18.5
Tajikistan	2.9	9.6	2140	34	15.4
Turkmenistan	4.1	14**	7490	41	9.2
Uzbekistan	0.5	11.8	3120	37	13.6

Source: World Bank (2011), *- www.cisstat.ru; ** - data for 2001-2003

Increase of GDP has helped to develop specialization and trade, it's proved with export growth (column 1 and 7). For example, Uzbekistan, which during the Soviet period was a fully agrarian country turned into an industrial developing country and largest exporter of industrial production. During the last two decades, GDP growth of Uzbekistan was amounted to 3.6% annually, and the average annual export growth for

the same period was amounted to 11.8%. Kazakhstan also achieved high results in GDP (3.2%) and export growth (21.5%). In contrast to Uzbekistan, Kazakhstan achieved high export growths thanks to the availability and active exploitation of huge reserves of oil, gas and other natural raw material resources. The current sector gave to Kazakhstan 78% of all income from international trade. For Kyrgyzstan, transition into a market economy, it was turning out very difficult. This country was confronted with difficulties, like the lack of raw mineral recourses, high rate of inflation, declining of industrial and agricultural output and etc. At the beginning of 1990s industrial production decreased to 27% and agricultural production declined to 14%. The inflation rate in 1993 achieved till 433% annually. As a result of privatization in the country which carried out with advices of International Organizations, the GDP of the country has begun increasing, in average annual increase for two decades was amounted to 0.7% and export growth in the country was higher than GDP growth (12.9%). Tajikistan, which one of the poorest country in the region at the beginning of 1990s turned out with declining of industrial production (60%) and with dangerous problem – Civil war. All these factors negatively affected to the GDP of the country and livelihood of the population. Only after 2000s in the country began increasing of GDP. During the period of 2000 and 2009 the average annual growth of GDP in Tajikistan was 8%. In total, including the declining at the first decade, annual average growth for the period of 1991-2010 was 0.4%, and this is the lowest figure among CAC. Turkmenistan also fell decline in its economy after collapsing of the Soviet Union, the main problems were violation of economic cooperation with former socialist countries, problems in exploring and exporting of oil and gas resources. Further liberalized foreign trade and improved condition for investment in Turkmenistan helped to increase of production and export of oil and gas resources. At the present time contribution of oil and gas sector in the GDP of the country is amounting to 40%. Reforms at the end gave positive results in Turkmenistan and the country achieved the highest rate of GDP growth among the CAC in 1991-2010 (6.4%). Large area and less population, rich reserves of oil and gas resources played a great role in achieving high results on GDP growth.

III. REGIONAL TRENDS IN GDP PER CAPITA

Economic growth, increases in trade, investment coincided in all countries of the Central Asia. The relation between GDP and population growth for the last 20 years were different in each country of Central Asia (Table 1, column 2 and 3). In some countries like Tajikistan and Kyrgyzstan average annual GDP growth is lower than the average annual growth of population for the current period, respectively 0.74 and 0.36% against 0.9 and 1.3%. In contrast to this, in Uzbekistan and Turkmenistan the average annual growth of GDP exceeded than average annual population growth, respectively 3.6 and 6.4% against 1.6% for each country. In Kazakhstan the situation absolutely different and it has negative growth of population (-0.01%) while average annual GDP growth is 3.2%. From 1991 through 2010, annual average growth of GDP per capita in CAC averaged 6.9% (column 4). The highest increasing rate of GDP per capita belongs to Kazakhstan (11.4%) and then follows Turkmenistan (9.7%), Tajikistan (5.3%), Uzbekistan (5%) and last one Kyrgyzstan (3.3%). The high growth of GDP per capita gives to Kazakhstan to double the living standard every 6 years (Rule of 72: that is, dividing 72 by the annual growth rate – Sothgateet all, 2011). Annual GDP growth of the CAC in 2010 was higher than average annual for last two decades, except Kyrgyzstan (column 2). In 2010 overall output decreased (-1.4%) due to the unstable political situation in the country - changing of government with revolution and South Kyrgyzstan riots.

With the increasing of overall production consequently increased the export volume of the CAC (column 7). Actually, during the Soviet period CAC did not participate in foreign economic relations and the region has begun increasing of their export incomes since mid of 1990s. For increasing of the export potential helped factors like trade liberalization, removing of state monopoly, efficient tariff reforms, unify exchange rates, simplify of the foreign trade through elimination of non-tariff trade restrictions and export duties and increasing of the prices for energy resources and for cotton. Increasing of the export potential gave opportunity for CAC to participate in the world economy and to begin the integration process. Average annual export growth of CAC from 1995 through 2010 (column 7): Kazakhstan - 21.5%, Kyrgyzstan – 12.9%, Tajikistan - 9.6%, Turkmenistan -14%, Uzbekistan -11.8%. At the present time the CAC export, especially natural gas, oil, coal, metals and other mineral raw materials. Data for 2010 from the International Trade Centre argues the large share of mineral fuels, oils, distillation products in total export of the region. The following data show the contribution of raw material export in total export of separate Central Asian countries: Kazakhstan – 71.6% (41 bln. USD), Turkmenistan - 70.6% (1.8 bln. USD), Uzbekistan - 23.1% (1.5 bln. USD), Kyrgyzstan - 7.8 % (117.4 thous. USD). Tajikistan is not an exporter of fuels, but the main export of the country is also raw material – aluminium (53% of total export). Moreover, Kazakhstan and Uzbekistan also export of agricultural productions like wheat, cotton, leather, fruits and vegetables. Uzbekistan is the largest exporter of cotton fiber in the world after USA and Kazakhstan is a main exporter of wheat in the CIS. Among CAC only Uzbekistan has changed its export

structure since beginning of independence. At the present time this country considers as actively exporter of vehicles, textile products, food and chemical products, which producing in a base of new organized production capacities. The Uzbek policy of industrialization allowed changing of the GDP and export structures. Other countries of the Central Asia like Turkmenistan, Tajikistan and Kyrgyzstan couldn`t create of their industrial sectors for production of high value added products, except the production of oil, gas and other fossils. Recovery of the world oil and gas prices in 1990s and also in 2000s helped to Kazakhstan and Turkmenistan to keep exchange rates stable in spite of domestic inflation.

Another macroeconomic indicator, the fixed capital formation (column 6) in CAC is different. Less capital formation belongs to Uzbekistan (0.5%) for the period from 1996 through 2010 and improvements in this sector lagged the highest number of growth of fixed capital formation belongs to Kazakhstan (3.8%). The CAC`s difficulties during the 1990s are negatively impacted to the economic conditions. In common GDP, GDP per capita and fixed capital formation growths were generally in line with economic expansion since the end of 1990s. Oil and gas exporter countries like Kazakhstan, Turkmenistan, and Uzbekistan benefited from higher prices improved performance of government tasks and accelerated economic reforms. Despite these recent gains in income growth, per capita income in Central Asia remains low by international standards as they are categorized as low income countries (except Kazakhstan, which is a middle income country).

IV. INCOME DISTRIBUTION DIFFERENCES AND ECONOMIC CONVERGENCE

Average annual GDP per capita (column 8) is varied among different parts of the world, income inequality, as indicated by Gini coefficient is different in the CAC. The Gini coefficient measures the inequality among the values of a frequency distribution. In these countries the distribution of income has become much more uneven during the last 20 years. The Gini coefficient is about 31-34% in Kazakhstan, Kyrgyzstan and Tajikistan. In Uzbekistan and Turkmenistan Gini coefficient is higher, 37 and 41%, respectively. Almost in all countries of the region the poverty is very widespread, except Kazakhstan.

Population Dynamics. When obliged by the facts to admit that GDP per capita has gone up, critics of the economic perspective on human progress often fall back on the argument that positive trends in conventional economic indicators do not really reflect an improvement in the well-being of people (Douglas, 2011). But when they make this contention, the critics are on unfirm ground. As pointed out by Fogel (2004a and 2004b) and Johnson (2000), many non-economic indicators of well-being, such as average food consumption and life expectancy, have improved markedly in poor countries, often without comparable growth in monetary earnings.

Increased Human Longevity.A puzzling pattern of mortality trends in former Soviet Central Asia is that the drops in life expectancy recorded in these republics after the break-up of the Soviet Union have not been as large as in Russia (Guillot et al, 2011). CAC`s life expectancy at birth declined by 3.3 years between 1990 and 1995. The main cause of worsening is related with declining of the regional economy with destroying cooperation with other countries of the Former Soviet Union. The CAC were the poorest among the all Soviet countries and all of them were subsidized countries, except Kazakhstan and were depended on a central budget of USSR. The most common explanation is that data quality may be lower in Central Asia and may have deteriorated since the break-up of the Soviet Union, while in Russia official mortality rates have reflected true patterns (Becker et al., 1998). This would have created a situation in which official mortality rates in Central Asia are too low and underestimate the scale of mortality deterioration. Indeed, data quality has always been described as problematic in Central Asia (Anderson and Silver, 1997).

Improvement of socio-economic situation in the region has influenced for increasing and stabilizing of the life expectancy in CAC (table 2, column 1, 2 and 3). Most increasing of the life expectancy at birth from 1991 through 2009 has happened in Tajikistan (4.3 years) and reached to 67 years, then follows Turkmenistan (2.1 years) and Uzbekistan (1.2 years). But the highest rate of life expectancy at birth is in Kyrgyzstan and Kazakhstan, in spite of less increasing during the considering period.

Furthermore, infant mortality in CAC is also different and this indicator directly related to socio-economic conditions in the country. For example, Tajikistan is the poorest country in the region has the highest rate of infant mortality – 56 of every 1000 infants from 2005 through 2010 (column 4), and in Kazakhstan, where economic growth is the highest in the region without any doubt the infant mortality is the lowest – 27 from every1000 infants. Childhood malnutrition of all children under 5 years of age in CAC considerable lower than in South Asia, East and Southeast Asia and Sub-Saharan Africa. Especially, in such countries like Kazakhstan, Kyrgyzstan and Uzbekistan, respectively only 4.9, 2.7 and 4.4% of all children under 5 years old were malnourished in 2000-2009 (column 5), but in Tajikistan this figure is about 15%. Living conditions are multitude and impoverished, as indicated by the high incidence of tuberculosis (column 6). The highest rate of incidences of tuberculosis we can see in the case of Tajikistan 209 people for per 100,000 people. As deficiencies of this

sort are remedied, more infants and small children will survive and end up living longer than their ancestors did (Douglas, 2011).

The prevalence of human immunodeficiency virus (HIV) is not wide spread in Central Asia. For example, in 2010, the number of people with ages 15-49 living with HIV was estimated from 0.1% to 0.3% of the population (column 7).

Table 2. Regional indicators of mortality, health, and poverty

Countries	Life expectancy (at birth)			Infant mortality	Malnutrition prevalence, weight for age (% of children under 5)
	1980	1991	2009	2005-2010	2000-2009
	(1)	(2)	(3)	(4)	(5)
Kazakhstan	66.8	68.1	68.6	27	4.9
Kyrgyzstan	63.0	68.7	69.2	36	2.7
Tajikistan	62.3	62.7	67.0	56	14.9
Turkmenistan	60.9	62.8	64.9	50	10.5*
Uzbekistan	65.4	66.6	67.8	49	4.4

Countries	Incidence of tuberculosis (per 100,000 people)	Prevalence of HIV, total (% of population ages 15-49)	Incidence of extreme poverty (percentage of population living on $1.25/day (PPP)
	2010	2010	2009
	(6)	(7)	(8)
Kazakhstan	151	0.1	0.1
Kyrgyzstan	159	0.3	6.2
Tajikistan	209	0.2	6.6
Turkmenistan	66	-	-
Uzbekistan	128	0.1	-

Source: World Bank (2011)

V. REDUCED HUMAN FERTILITY

Falling death rates set in motion a demographic transition. To begin, growth in human numbers accelerates, since the decline in mortality is not matched immediately by a fall in the number of births. But sooner or later, people recognize that the threat of mortal disease has receded, including for the very young, and respond by having fewer children. The resulting decline in the total fertility rate (TFR) eventually causes the population to stop increasing (Southgate et all, 2011).

The reducing of poverty also factors for diminished fertility. The poverty headcount ratio is compatible with changes of the GDP per capita. The percentage of people in CAC living on $1.25 for per day in Kazakhstan, about 0.1% - is the lowest in the region (table 2, column 8), in Kyrgyzstan and Tajikistan is more than 6% respectively. As far as data for Turkmenistan and Uzbekistan is not available, the better condition of GDP per capita in these countries than in Kyrgyzstan and Tajikistan allow us to consider that their poverty headcount ratio less than 6%. But, it`s important to pay attention that the unstable political situation in Kyrgyzstan in the last years, the dependence of the majority population of Uzbekistan, Tajikistan and Kyrgyzstan from money transfers from abroad by immigrants of those countries probably may dramatically increase the number of incidences of extreme poverty. The rising incidence of extreme poverty in Tajikistan, Kyrgyzstan and Uzbekistan shows that the transition from a command economy to market economy has been deeply troubled. Growth of population and worsening of political stability in the last years, again proved the difficult situation and further increasing of the number of population with income $1.25 per day.

Literacy is a fundamental human right, a foundation not only for achieving EFA, but also, more broadly, for reducing poverty and broadening participation in society (Regional overview). As living standards have risen and many people have emerged from poverty, more resources have been devoted to the formation of human capital. Especially when females benefit from this investment, TFRs move toward or even below the replacement level, of 2.1 births per woman (Southgate et all, 2011). In all Former Soviet Union countries the literacy was defined as an ability to read at least one language, therefore writing skills were not taken into account at all. Conventional measurement based on direct questions left much room for reading proficiency criteria also to be eased, especially since literacy was a politically sensitive topic (Didenko). Human resources with a high level of education, scientific and technical potential are the main advantages of the CAC. Economic expansion is

difficult in the face of persisting and high illiteracy, yet human capital formation does not guarantee economic progress (Easterly, 2001).

In Former Soviet Union, education spending was considerable, including at the tertiary level, under the communists. Since the end of 1990s CAC improved their high levels of school enrolment. All of these countries entered the 1990s with a widespread network of education services that enabled them to achieve almost universal coverage in compulsory education. According to the World Bank Report, the literacy rate in 1990 for Eastern Europe and Central Asia for adult females and males ages 15 and above was about 96% (table 3, column 1). Data for 2009 shows that high rate of literacy of adult females and males ages 15 and above were saved, steadily increased and exceeded 99% in all CAC (column 2). Almost there is no difference between literacy rate of males and females in Central Asia (column 3, 4) so far as males and females have equal right for getting educated.

Table 3 Regional indicators of human capital

Country	Females & Males		Females		Males	
	1990	2009	2010		2010	
	(1)	(2)	(3)		(4)	
(A) Literacy rate, adult total (percentage of people ages 15 and above)						
Kazakhstan	95.6*	99.7	99.5		99.8	
Kyrgyzstan	95.6*	99.2	99.1		99.5	
Tajikistan	95.6*	99.7	99.5		99.8	
Turkmenistan	95.6*	99.6	99.3		99.7	
Uzbekistan	95.6*	99.3	99		99.5	
Country	Primary		Secondary		Tertiary	
	1991	2009	1991	2009	1991	2009
	(4)	(5)	(6)	(7)	(8)	(9)
(B) School enrollment (percentage, gross enrollment ratio)						
Kazakhstan	117.2	111.7	97.8	93.9	38.9	40.0
Kyrgyzstan	97.6*	98.3	100.1	84.4	25.4	48.8
Tajikistan	91.0	101.9	102.1	86.4	22.1	19.8
Turkmenistan	97.6*	98.4*	85.1*	89.1*	21.7	55.1*
Uzbekistan	110.5	93.3	99.4	103.8	17.2	9.9

Source: World Bank (2011), ** data for Europe & Central Asia (developing only)*

Enrolment rates, which equal the number of students attending primary, secondary and tertiary school divided by the relevant age group is shown in table 3 (columns from 4 to 9). Education is a critical determinant of a population's productivity and capacity for innovation. The populations in the Central Asia have attained high levels of basic education. In 2009, most of the countries had 95 % or higher survival rates to the last grade of primary education (UNESCO, EFA Global Monitoring Report 2005: Regional Overview: Central Asia, UNESCO web site (www.unesco.org). Overall, there has been some progress towards primary enrolment rate in Kyrgyzstan, Tajikistan and Turkmenistan, especially more increase was in Tajikistan, by 10%. But in this country in 1990 primary enrolment rate was the lowest among CAC (91%). In Kazakhstan and Uzbekistan primary enrolment rate decreased to about 6%, respectively. Especially, primary enrolment rate of Uzbekistan became the lowest among the CAC (93.3%), but it's a still consider as a high indicator in the world level.

Central Asian countries experienced setbacks in their enrolment ratios during the 1990s because of the socio-economic upheavals in the region, and secondary education enrolments were particularly affected. Fortunately, enrolments are on the rise again. Even through the difficult transition years, the educational systems of the Central Asian countries did well at retaining students.

Between 1991 and 2009, the secondary enrolment rate (column 6, 7) decreased in all countries of CAC, except Uzbekistan. The secondary education rate in Kyrgyzstan and Tajikistan in 1990 were higher than 100%, but after the two decades, it reduced more than 15%, in Kazakhstan declining was about 5%. Uzbekistan made some progress in expanding the provision of secondary education during the period and secondary enrolment rate increased by 4% and reached 103.8%, the highest rate among CAC. There

are no data for Turkmenistan, but in this country reforms on education system was totally different than in other CAC and that reforms which very held during the President SaparmuratNiyazov were specific with low quality and it didn`t meet a demand of modern education system. Overall, the chances of receiving secondary education are still far greater in the CAC.

Tertiary enrolment education – the number of students enrolled in tertiary education, regardless of age, as a percentage of the five-year age group in the national population following the secondary-school leaving age. Compared with secondary education, the chances of receiving tertiary education depend even more on national income level.

Between 1991 and 2009, the enrolment rate in CAC changed variously and in common average enrolments in tertiary education increased (column 8, 9). The tertiary enrolment rate in Kyrgyzstan and Kazakhstan increased, especially increasing was higher in Kyrgyzstan (by 23.4%). Whereas tertiary enrolment rates were above 40% in these two countries, they were below 20% in Tajikistan and Uzbekistan. During this period in Uzbekistan registered the declining of the tertiary enrolment rate about two times, from 17.7 to 9.9%. Sharp decreasing of tertiary education rate in Uzbekistan related to high level of increase of population than national income or than GDP per capita.

In Eastern Europe and the Former Soviet Union, education spending was considerable, including at the tertiary level, under the communists. However, this investment did not result in the region's living standards converging toward to Western levels, which means that the economic returns to education were negligible. The absence of market incentives kept GDP per capita stagnant, even though most adults had many years of schooling (Southgate et all, 2011).

The total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates. The total fertility rate is a more direct measure of the level of fertility than the crude birth rate, since it refers to births per woman. This indicator shows the potential for population change in the country. A rate of two children per woman is considered the replacement rate for a population, resulting in relative stability in terms of total numbers. Rates above two children indicate populations growing in size and whose median age is declining. Higher rates may also indicate difficulties for families, in some situations, to feed and educate their children and for women to enter the labor force. Rates below two children indicate populations decreasing in size and growing older. The total fertility rate in Central Asia changed from 1980 through 1991 had changed little (Table 4, columns 1 and 2) and saved in high level. In 1991 the number of children per woman was lowest in Kazakhstan (2.6), the highest was in Tajikistan (5.1). The higher rate of fertility rate in this period explains with a strong social system in the former USSR (free education, medicine, low living costs). After the collapsing of the Soviet Union, has begun declining of economy in all Soviet countries, accompanying with worsening of the social situation. As a result, during the transition period from 1991 through 2009 the declining of the fertility rate was higher (column 3), except Kazakhstan. In Kazakhstan, the total fertility rate during this period saved unchangeable, 2.6 children per woman.

Table 4. Regional population trends

Countries	Total fertility rate (birth per woman lifetime)			Adolescent fertility rate (births per 1,000 women ages 15-19)	Population growth (annual, %)		
	1980	1991	2009	2009	1980	1991	2010
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kazakhstan	2.9	2.6	2.6	28.2	4.2	0.6	2.4
Kyrgyzstan	4	3.7	2.9	33.6	3.1	1.6	0.8
Tajikistan	5.7	5.1	3.4	27.3	3.4	2.2	1.4
Turkmenistan	5	4.2	2.4	18.5	3.4	2.8	1.2
Uzbekistan	5.1	4.2	2.5	13	3.5	2.1	1.4

Countries	Crude death rate, (per 1,000 people)	Crude birth rate (per 1,000 people)	Age dependency ratio (dependents/working-age population)*	
	2009	2009	1980	2007
	(8)	(9)	(10)	(11)
Kazakhstan	9	23	0.6	0.4
Kyrgyzstan	7	26	0.6	0.4
Tajikistan	6.3	28	0.6	0.4
Turkmenistan	7.8	22	0.6	0.4
Uzbekistan	4.7	23	0.6	0.4

Source: World Bank (2011)

VI. NATURAL INCREASE

Of the three immediate factors in the growth of the population of any area (fertility, mortality and migration), the chief factors in the rapid growth of Central Asia in recent decades have been a relative fertility rate coupled with a relatively low mortality rate. This has resulted in the highest rate of natural increase of any Soviet economic region (Rowland 1986). Such situation has signified that CA has, like underdeveloped countries, recently been in the middle or explosive phase of the demographic transition. This theory based on Western experience and maintains that with economic development and modernization societies pass from an initial stage of high fertility and mortality to a stage of low fertility and mortality, which results in a transition from slow to rapid to slow natural increase (Geographic Perspectives on Soviet Central Asia – 1992 http://www.docstoc.com/profile/P-TaylorFrancisRobert A. Lewis, Routledge, London, UK).

Human numbers do not stop growing once mortal disease has been contained and women are having just enough children to replace themselves and their male partners. Instead, population growth continues because of demographic momentum. Natural increase, which is the difference between the crude birth rate (CBR) and the crude death rate (CDR) and which comprises all but a tiny fraction of population growth in most regions (Southgate et all, 2011). In all countries of Central Asia the CBR is above than the CDR (Table 9.4, columns 8, 9). CDR per 1,000 people in 2009 was less than 9 in Kazakhstan, 7.8 in Turkmenistan, 7 in Kyrgyzstan, in 6.3 Tajikistan and less than 5 in Uzbekistan. The same period the CBR in CAC was more than 20 for per 1,000 people.

VII. AGRICULTURE`S RESPONSE FOR FOOD DEMAND

Agriculture plays important role in the CAC`s economy and this region is naturally ideal for agriculture. During the Soviet period this region was concentrated in cotton production. Moreover, they raised grains, fruits and vegetables and also meat and dairy products. Advantages of CA countries in the production of these agricultural products can provide self-sufficient in food, improve the livelihood of the population. Agriculture is a significant component of the Central Asian economies, accounting for between 10 and 45 percent of GDP, 20 and 50 percent of employment.

In the last two decades in the CAC social changes was happening, like privatization and public ownership of land, regulation of agricultural production for saving stability and development in the sector and release implementing of the market principles for improving productivity and stop subsidies for the agricultural sector. This process had considerable impact on land productivity, irrigation water use and management, as well as on the social situation of rural people. (Babu&Pinstrup-Andersen, 2000).

The republics have pursued substantially different degrees and types of reform. While certain countries (Kazakhstan, Kyrgyz Republic, and Tajikistan) aggressively enacted liberalization measures, the others (Uzbekistan and Turkmenistan) have been more inclined to preserve economic structures similar to those in place before independence. Despite movement towards a market-based system, agricultural performance has been weak throughout the region, characterized by low productivity, widespread farm losses and rising rural poverty (Ye, 1999). The more ambitious agricultural reform programs included measures aimed at liberalizing agricultural marketing, trade, and prices. Due to reduced trade resulting from the low level of foreign exchange reserves, countries of this region have focused on food self-sufficiency or "cereal independence" as the sectorial goal for agriculture, even at the expense of efficiency. Thus, the production of cereal crops to meet local food demands has taken precedence over the production of cash crops such as cotton. Cereal crops are also competing for resources that are traditionally devoted to livestock production. Research is needed on optimum allocations of land and water to crop production. The direction these countries should follow to attain food security and broad-based economic growth remains an issue for empirical investigation.

VIII. CHANGES IN THE MIX OF INPUTS

Changes in agricultural inputs made for the sake of raising farm output depend on the relative scarcities of different factors of production (Hayami and Ruttan, 1970). If labour is more scarce than land in this casethe mechanization will be used more intensive and it increases what each agricultural worker produces. Land scarcity, it means increasing of fertilizer, improved seeds, and other inputs for increasing yield.

The collapse of the Former Soviet Union led to the disappearance of all supply chains, including those for agricultural inputs. As a consequence, the use of agricultural inputs declined dramatically (FAO, 2011b). For Central Asia high density of rural population is more distinctive, except Kazakhstan (Table 5, column 1). Kazakhstan has large territory and less population and labour is scarcer than land, but mechanization, which measured with number of tractors per square kilometer of arable land (column 2 and 3) is not advanced. It`s related to not using of many arable lands and rainfall agriculture, which requires less inputs than irrigated agriculture and using agriculture machinery with high efficiency. Another paradox deals with labour scarcity in

agriculture of Uzbekistan and Tajikistan, in spite of the high density of rural population. The income of the rural population of these countries is a money transfer from abroad by its immigrants. Due to very less payment for labour many people in rural area prefer not to go to work.

During the Soviet period these countries had better supplement with agriculture machinery, as far as Soviet Union needed for agricultural products produced in that region and moreover it had developed machinery industry in the sector. In fact, Kyrgyzstan has fewer tractors, than most other countries in the region with a comparable farm structure. In 2002-2007, there were 187.5 tractors per 100 square kilometres, while in Tajikistan, Turkmenistan and Uzbekistan this was respectively 312.7, 270.3 and 395.4. In addition, most of the Kyrgyz machinery is outdated and not adapted to the current farm structure: only 9 % of the tractors and 14% of the combine harvesters had been replaced since 1990 (Guadagni and Fileccia, 2009). Except the number of agricultural machinery there were changes of the quality of machinery, in agriculture has been begun using of the more efficient tractors.

Table 5. Regional trends in the use of land and other agricultural inputs

Countries	Rural population density (rural inhabitants per sq. km of arable land)[1]	Agricultural machinery (tractors per 100 sq. km of arable land)[2]		Change in forest area (annual percent)[4]	Irrigated percentage of cropland[1]
	2005	1992	2007	1992-2007	1992-2003
	(1)	(2)	(3)	(4)	(5)
Kazakhstan	28.9	62.0	17.7	-0.17	13.4
Kyrgyzstan	257.2	189.4	187.5	0.26	75.9
Tajikistan	511.7*	415.4	312.7	0.03	70.2
Turkmenistan	115.8	464.7	270.3	0	90.3*
Uzbekistan	343*	402.3	395.4	0.52	88.1

Countries	Irrigated percentage of cropland[3]	Fertilizer consumption (kg per ha of arable land)[4]		Cereal yield[4]	
				average, kg per ha	change in percentage
	2003-2007	1992-1994	2002-2007	1992-2007	1992-2007
	(6)	(7)	(8)	(9)	(10)
Kazakhstan	15.6	87.6	59.3	997.7	99.1
Kyrgyzstan	75.1	221.4	204.6	2479.9	90.7
Tajikistan	82.4	1055.9	330.7	1524.3	239.3
Turkmenistan	95.1	1060.8	-	2346.4	134.6
Uzbekistan	89.6	1371.0	166.4	2767.2	247.6

*data for 2003

Sources: (1) Nation Master; (2) http://www.tradingeconomics.com; (3) FAO Statistical Yearbook for 2010; (4) EconStat

Also in Soviet period fertilizer was the most important input for increasing of the agricultural crop yield. Furthermore, fertilizer use declined dramatically in Central Asia following independence (column 7 and 8). Fertilizer use was considered to be very high, particularly in relation to output. Therefore, part of the subsequent decline may reflect adjustment in line with the relative scarcity of factors of production. Other reasons for lower input use are economic contraction; a shift from cotton production, which is more input-intensive; and problems with the marketing system.

As noted above, fertilizer application has declined dramatically over the past decade in Central Asia. Before independence, fertilizer application rates in Soviet Central Asian agriculture were very high, so the consequent decrease in usage may have been positive in mitigating soil nutrient balance. Bolstering the region's productivity, however, will require an adequate fertilizer supply and distribution system. In Turkmenistan and Uzbekistan, where the state continues to control the fertilizer supply, producers have not reported significant difficulties in obtaining it. Producers in Kazakhstan, the Kyrgyzstan, and Tajikistan, in contrast, frequently report inadequate supplies (Francesco Goletti).

In spite of decreasing of agricultural machinery and fertilizer use in Central Asia there were increasing of cereal crop yields (column 9, 10). For example, in Tajikistan and Uzbekistan from 1992 through 2007

cereal yield increased more than 2 times, in Turkmenistan about 35%. This sharply increasing of yield related with that these countries before 1992 were not specialized in producing of cereal crops and they used to produce of cotton. In Kyrgyzstan cereal yield decreasing was equal to about 10%, in Kazakhstan less than 1%. Kazakhstan has been specialized for cereal production since Soviet period and still main exporter of cereal crops.

IX. PRODUCTION TRENDS

Farmland in the temperate latitudes is well-suited to the production of corn, wheat, and other grains, which directly or indirectly comprise most of the human diet (Southgate et all, 2011). In CAC after the independence, agricultural land area has not changed, but the structure of cultivating agricultural crops changed significantly. Especially in Uzbekistan and Turkmenistan, where the irrigated land area is considered as a mainland source for production. Uzbekistan was a main deliverer of raw cotton in the former Soviet Union (about 90% of all cotton produced in the former USSR). All Central Asian countries, except Kazakhstan were importers of cereals, potatoes and other food products from other Soviet countries. After the collapsing of the Soviet Union, these countries have begun to increase the food production for achieving food independence. Economic crises and difficulties in transition period didn`t give opportunities to import of food product, which necessary for the demand of the population. Reforms in agricultural sector also were oriented for increasing of food products. Instead of unprofitable, inefficient kolkhozes – collective farmers have begun to organize private farms. In all countries of CAC, except Kazakhstan during the period of 1992-2009, the food production increased more than population growth (Table 6, column 1 and 2). Livestock production increased only in Uzbekistan and Turkmenistan. Declining of food production in Kazakhstan can be explainedby factors that until 1991 this country was a main supplier of food products to other soviet countries like Uzbekistan, Turkmenistan and with these importer countries has begun to increase food production. Actually, in all CAC (except Kazakhstan) number of population is continuing to grow up and according to this to provide food security.

Table 6. Regional trends in agricultural output during the period of 1992-2009

Countries	Population growth, %	Food production index 1999 - 2001 = 100	Livestock production index 1999 - 2001 = 100
	1992-2009	1992-2009	1992-2009
	(1)	(2)	(3)
Kazakhstan	96.9	89.0	79.2
Kyrgyzstan	117.1	132.1	95.5
Tajikistan	122.9	120.9	85.7
Turkmenistan	128.3	228.3	201.6
Uzbekistan	129.5	166.7	138.4

Source: World Bank Indicators (1991-2009)

A large share of the rural inhabitants of Central Asia relies on livestock production for their livelihood. Livestock production largely depends on rangelands, which are being degraded at a high rate. The traditional migratory system of ruminant management is disintegrating, with heavy losses of animals in some countries. As a consequence, the level of poverty in these areas is on the rise. Reversing this trend will require policies that encourage sustainable use of rangelands, provide livelihood for rural households, and reduce their migration to urban areas (Babu&Pinstrup-Andersen, 2000).

CONCLUSION

Central Asian countries during the former USSR were raw material base for the central government, and heavily depended from theCenter and damaging of economic relation between socialist countries after collapsing of the Soviet Union the socio-economic conditions of these countries dramatically declined. During the 1990s economic growth was negative, livelihood of population sharply worsened and transition to a new economic system was very difficult and terrible. The transition policy of these countries helped to stop the negative trends in the socio-economic life of these countries at the end of 1990s. Also, after the independence they oriented to producing of food products due to achieve food security and food self-sufficiency. Economic conditions of these countries didn`t allow to import food products for the needs of their population in the necessary volume. Achieving food security in the long run in Central Asia depends crucially on improving productivity of the agricultural production systems through enhancing the investments for

research (Pinstrup-Andersen et al., 1999). Furthermore, changing dynamics for the last 20 years of such key indicators, like GDP, export potential, capital formation, poverty reduction, population trends, agricultural production considers as results of transition policy in Central Asia and it helps to estimate present conditions of food security and make forecasts about food security issue for coming decades. Taking into account of heavily depending on the Central Asian economy from world prices for energy resources (Kazakhstan, Turkmenistan) and from migrants who working in abroad (Kyrgyzstan, Tajikistan and Uzbekistan) it`s difficult to assess the transition policy as a success. Any changing in above mentioned income sources can be catastrophic for the region, as far as most of these countries don`t have enough resources to recover this probably losses.

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