

FOOD SECURITY IN TAJIKISTAN, 1991~2010

*Dissertation submitted to the Jawaharlal Nehru University
in partial fulfillment of the requirements
for the award of the Degree of*

MASTER OF PHILOSOPHY

VANITA CHAWADHA



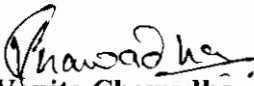
Central Asian Studies Programme
CENTRE FOR SOUTH, CENTRAL, SOUTH-EAST ASIAN
& SOUTH-WEST PACIFIC STUDIES
SCHOOL OF INTERNATIONAL STUDIES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI -110067
2012



July 21, 2012

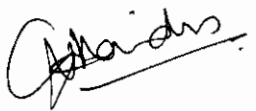
DECLARATION


I declare that the dissertation entitled “**Food Security in Tajikistan, 1991-2010**” submitted by me for the award of the degree of **Master of Philosophy** of Jawaharlal Nehru University, New Delhi, is an original work and has not been submitted so far in part or in full of any other degree or diploma of any other University.


Vanita Chawadha


CERTIFICATE

This dissertation may be placed before the examiners for the evaluation.


Prof. G.V.C.Naidu
(Chairperson)


Dr. Mondira Dutta
(Supervisor)

पुस्तक संख्या
दिनांक
[REDACTED]
110 067


Centre for South, Central, South East Asian
and South West Pacific Studies,
School of International Studies
Jawaharlal Nehru University
New Delhi - 110 067
Ph : (T) 26704350, (R) 26188817

Dedicated
To
My Parents &
Surendra Bhayia

TABLE OF CONTENTS

	Page No.
Contents.....	i-iv
List of Abbreviations.....	v-vi
Acknowledgement.....	vii-viii
CHAPTER -1-INTRODUCTION.....	1-35
1.1 Overview	2
1.1.1 Economy & Employment.....	4
1.1.2 Poverty and Food Security.....	6
1.1.3 Human Development Index.....	8
1.1.4 Millennium Development Goals.....	9
1.1.5 Food Insecurity & Human Security.....	10
1.1.6 Agriculture Growth and Land Utilization.....	11
1.2 Area of Study.....	12
1.2.1 Geography & Demography.....	12
1.2.2 Economy.....	12
A- Soviet Period.....	13
B- After 1991.....	13
1.2.3 History.....	13
1.2.4 Civil War.....	14
1.2.5 Peace & Development.....	15
1.3 Background.....	15
1.3.1 Security Issues.....	16
1.3.2 Regional & International Players.....	17
1.3.2.1 Russia.....	17
1.3.2.2 Uzbekistan.....	18
1.3.2.3 Afghanistan.....	19
1.3.2.4 Iran.....	20
1.3.2.5 China.....	20
1.3.2.6 India.....	21
1.3.2.7 Pakistan.....	21

1.3.2.8 United State of America.....	22
1.4 Literature Review.....	22
1.4.1 Food Availability.....	23
1.4.2 Food Accessibility.....	24
1.4.3 Nutrition and Health.....	24
1.4.4 Climate Change.....	25
1.4.5 Water and Energy Resources.....	27
1.4.6 Food Policy.....	27
1.4.7 Transport Linkages.....	28
1.5 Rationale and Scope of the Study.....	29
1.6 Objectives of the Study.....	30
1.7 Hypothesis.....	30
1.8 Date Base and Research Methodology.....	30
1.9 Organization of the Study.....	31
References.....	32
CHAPTER – 2- FOOD AVAILABILITY AND ACCESSIBILITY.....	36-62
2.1 Background & Concept.....	37
2.2 Indicators of Food Security.....	41
2.2.1 Prevalence of Undernourishment.....	42
2.2.2 Depth of Hunger.....	43
2.2.3 Critical Food Poverty.....	44
2.2.4 Food Availability.....	45
2.2.5 Food Accessibility.....	46
2.3 Major food insecure area in Tajikistan.....	46
2.3.1 Khatlon Oblast (Province).....	46
2.3.2 Leninabad Oblast.....	47
2.3.3 Regions under Republican Subordinations (RRS).....	47
2.3.4 Gorno-Badakhshan Autonomous oblast (GBAO).....	47
2.4 Dimensions/main elements of food.....	48
2.4.1 Food Availability.....	48
2.4.2 Food Accessibility.....	48
2.4.3 Regular Supplies of Food Material.....	48

2.4.4	Food Price Trends in Tajikistan.....	49
2.4.5	Effects of Global Food Price in Tajikistan.....	49
2.4.6	Food Utilization.....	51
2.5	Food Availability and Accessibility of Food.....	51
2.5.1	Availability of Food in Tajikistan.....	51
2.5.2	Accessibility of Food in Tajikistan.....	52
2.6	Impediments of Food Security.....	53
2.6.1	Agricultural Dependent on Climate and Irrigation.....	53
2.6.2	Agriculture in Tajikistan.....	54
2.6.3	Import-Export Mainly with Uzbekistan.....	56
2.6.4	Nutritional Aspects of Tajikistan.....	58
2.6.5	Lack of Energy Resources.....	59
	References.....	60

CHAPTER -3-RELATIONSHIP BETWEEN FOOD, WATER & ENERGY 63-90

3.1	Context.....	64
3.2	Water Resources in Tajikistan.....	65
3.2.1	River Basins in Tajikistan.....	66
3.3	Energy Resources in Tajikistan.....	67
3.4	New Strategies.....	68
3.4.1	Studies on Water and Energy by UND (2009).....	69
3.5	Uncertainties in Tajikistan.....	70
3.5.1	Natural Hazards.....	70
3.5.2	Regional Cooperation.....	71
3.5.3	Governments and the International Society.....	71
3.6	Reasons for Compound Crises.....	73
3.6.1	Seasonal factors.....	73
3.6.1.1	Winter.....	73
3.6.1.2	Summer.....	74
3.7	Impact on Food Production.....	76
3.7.1	Food.....	77
3.8	Relationship Between Food, Water and Energy.....	87
	References.....	89

CHAPTER – 4- POLICIES AND PROGRAMMES.....	91-112
4.1 Background.....	92
4.2 Food Security on National Level.....	93
4.2.1 Right to food	94
4.2.2 Agriculture Production Policy.....	95
4.2.3 Land Reform Policy.....	95
4.2.4 Improve Irrigation System.....	96
4.2.5 Impact of Taxation Policy	97
4.3 Motivation and Contribution of the Government.....	97
4.3.1 Poverty Reduction Strategy Programmes (PRSP).....	97
4.3.2 Programmes of Help for Food Security.....	98
4.3.3 The National Strategy.....	98
4.3.4 Co-operation of European Union (EU).....	98
4.3.5 International Trade and Food Security.....	98
4.4 Role of International Organisations.....	99
4.4.1 World Food Programme (WFP).....	99
4.4.2 International Fund for Agricultural Development (IFAD).....	99
4.4.2.1 Goal and Objectives of IFAD.....	100
4.4.3 Role of World Health Organization (WHO).....	101
A- UNICEF.....	101
B- IMF.....	101
4.5 World Food Summit.....	101
4.6 Role of Government and Future Challenges.....	104
References.....	108
CHAPTER-5- CONCLUSION.....	113-121
SELECTED BIBLIOGRAPHY.....	122-140

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AKI	AKI Press News Agency, Kyrgyzstan
ASSR	Autonomous Soviet Socialist Republic
CAR	Central Asian Republic
CFP	Critical Food Poverty
CIA	Central Intelligence Agency
CIS	Commonwealth of Independent States
DEC	Dietary Consumption
DFID	Department for International Development
EU	European Union
EUCAM	European Union Central Asia Monitoring
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
GAO	Gross Agricultural Output
GBAO	Gorno-Badakhshan Administrative Oblast
GDP	Gross Domestic Product
GNI	Gross National Income
GNP	Gross National Product
GOT	Government of Tajikistan
HDI	Human Development Index
HDR	Human Development Resources
HDR	Human Development Report
ICWC	Interstate Commission on Water Coordination
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Center
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
KR	Kyrgyz Republic (Kyrgyzstan)
MDER	Minimum Dietary Energy Requirement
MDG	Millennium Development Goals

MoC&T	Ministry of Communication & Technology
MOH	Ministry of Health
NAPA	National Academy of Performing Arts
NGOs	Non- governmental Organization's
NHDR	National Human Development Report
NPRS	National Poverty Reduction Strategy
OCHA	Office for the Coordination of Humanitarian Affairs)
OIC	Organisation of Islamic Cooperation
PDS	Public Distribution System
RPR	Realtors Property Resource
RRS	Regions under Republican Subordination
RT	Republic of Tajikistan
SCO	Shanghai Cooperation Organization
SPFS	Special Programme for Food Security
TLSS	Tajikistan Living Standards Survey
U.S.S.R.	United states of soviet Republic
UK	United Kingdom
UN	United Nation
UNDP	United Nations Development Programme
UNHCR	UN High Commissioner for Refugees
UNHCR	UN High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNODC	United Nations Office on Drugs and Crime
UNWPF	United Nations World food Programme
USA	United States of America
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics
UTO	United Tajik Opposition
WB	World Bank
WFP	World Food Programme

Acknowledgment

At every stage of my academic carrier it becomes clearer that learning is an interactive and interpersonal process. As much as I would like to believe that it is self will and motivation which derives as most of my achievements would not be possible without the guidance, inspiration, affection and support of my family, mentors and friends.

At the outset, I take the opportunity to thank the following for their unflinching support in making this dissertation a reality and success. In this long journey there are many individual, whom I owe my gratitude. First and foremost I am highly indebted to my supervisor Dr. Mondira Dutta for constant guidance provided to me at various stage of this Dissertation her comments and suggestions have helped me to look keenly and objectively into my sources and present theme with honesty without any prejudice for fear. As I hope to build a carrier in academic I look towards her with the expectation that she will provide her valuable direction as and when needed. What she has done for me cannot be described in just a paragraph, any exaggeration, Dear ma'am; I wish to express my sincere gratitude for all your guidance and criticism.

I cannot forget to thank my family members, especially my parents and my brothers and sisters for the faith and hope that they have kept in me. I never ever forget their role and place of in my life. They are forever and a day supporting and encouraging me with their invaluable thoughts, suggestions and best wishes. Their blessings have helped me wade through troubled waters. I am highly indebted to my parents for making me what I am today. I am beholden to them for their unquestioning total support in all my endeavors. Without their affection, blessing and emotion sustenance it would have been impossible for me to finish this work.

My deep sense of gratitude to Prof. Girijesh Pant (The Dean of the School of International Studies), Prof. G.V. Naidu (The Chairperson of the centre CSCSEA&LSWPS) I also extend my heartfelt thanks to Prof K. Warikoo, Dr. Ambrish Dhaka, Dr. Sharad K. Soni, Dr. Tsetan Namgyal, Dr. Mahesh Ranajan Debata and Dr. Mukesh Mishra without their help support and ever valuable guidance my research would not have been possible. I also extend my sincere thanks to other faculty members of the CSCSEA&LSWPS whose support and assistance during my research work is truly appreciable.

I want to express my gratitude to all my seniors, my friends and well-wishers who have given their heart whelming full support whenever I needed without whom this dissertation would have been a distant reality.

Last but not least, I also wish to express my gratitude to the officials, staff members of SIS, CSCSEA&LSWPS, JNU library, American Centre Library, British Council Library, Ratan Tata Library, Indian Council of Historical Research, National Science Library, Nehru Memorial Library, Delhi Public Libraries, Indian Council of Social Science Research, National Archives, Ramakrishana Mission Library for their support. I would never have been able to finish my dissertation without their help and support.

Date: 25.07.12

Vanita Chawadha

Place: New Delhi

Chapter-1
Introduction

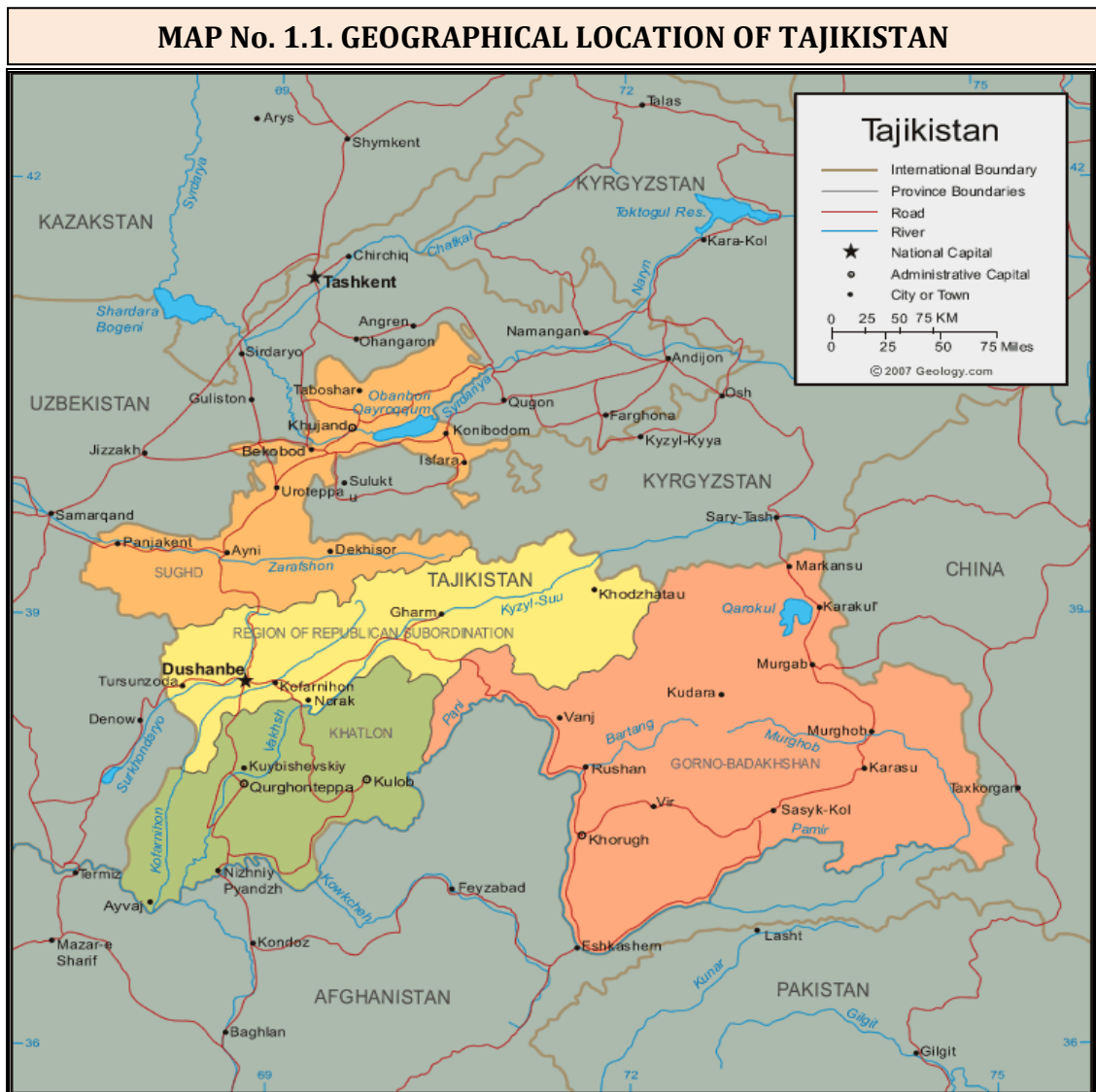
1.1 Overview

This introductory chapter makes an overview and an effort to reveal the food security as a non-traditional security threat to Tajikistan. The significance and rationale of the study gives a detailed background of the region highlight. The chapter introduces the theme of the present study, including literature survey. Objectives are listed along with type and source of the data used and methodology used for the present analysis. Tajikistan is a mountainous, landlocked country with limited space for agriculture. The country ranks among the world's poorest, 64% of the population lives under the poverty line (Warikoo et al, 2004). Tajikistan is vulnerable to multiple of hazards ranging from floods and droughts to avalanches and earthquakes. The civil war 20 years ago devastated institutions and civil society. The government is slowly building its capacity and is supported in this endeavour by humanitarian agencies (Kelly 2009). Extensive poverty and chronic natural disasters have rendered a major part of the population vulnerable to food insecurity. Food security is a major problem in Tajikistan (World Bank, 2003).

It shares 1,206 km of its borders with Afghanistan in the south, 406 km with China in the east, 871 km with Kyrgyzstan in the north east 1,161 km with Uzbekistan in the north west and west. Tajikistan occupies the western slopes of the Pamir Mountains and southern part of the fertile Fergana valley (Middleton and Thomas 2008). The rivers that begin in the glaciers of Tajikistan are important sources of water for drinking and irrigation not only in Tajikistan but also in neighboring Uzbekistan and Afghanistan (Wegerich, et al. 2007). Tajikistan has four major geographical regions that are quite distinct in terms of the landscape, climate and soil found there. These are (1) The Northern Region, (2) The Central Region, (3) The South-western Region, and (4) The Eastern Region.

In the early 1990s, after the dissolution of USSR, five independent states- Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan came into view on the map of Central Asia. They have experienced major socio-economic shocks that have resulted in increased food insecurity, malnutrition and poverty. The global rise in fuel and food prices is having a dramatic impact on the lives of millions in Central Asia. This is particularly-even if not exclusively - the case for Tajikistan's population of seven million, which has faced a combined series of natural calamities and

economic hardships over the past few years (Mohamed et al, 2011). Here we can see Tajikistan's and their neighbouring countries on map no. 1.1.



Sources: www.maps of world.com.

Tajikistan is a mountainous and landlocked country, home to very few industries (aluminum production continues to dominate the country's GDP) and the source of only limited exports. The mountainous nature of the small republic means that only 7% of the land is usable for agricultural purposes (Fumagalli, 2008). With no oil and hardly any production of natural gas, Tajikistan is entirely dependent on its neighbours for energy and food supplies. Even in pre-crisis assessments, Tajikistan performed poorly on most socio-economic levels. The United Nation Development Programmes ranks the country at the 122nd place in its 2005 Human Development Index. About 64% of their population lives below the poverty line (HDR, 2005). High unemployment and equally high underemployment imply that the population has

relied for a large part of the post-Soviet period on international aid and on remittances from labour migrants abroad.

Tajikistan a major importer of the basic commodities, due to limited availability of arable land (7% only) and low productivity makes it more vulnerable to rise in world, prices of food and fuel than remaining Central Asian Countries. The compound crises in Tajikistan cannot be attributed to a single cause. It has been affected by a series of shocks which have had a serious impact on the country, over the past couple of years. Cyclical floods, landslides, mudslides and droughts, a long and sever cold winter and steadily rise in food prices, all these has increased hardship and food insecurity in Tajikistan.

1.1.1 Economy & Employment

Tajikistan remains in a state of poverty. Low wages and high unemployment encourage migration of many Tajiks to Russia and other neighboring countries. It is estimated that between 800,000 and 1.5 million Tajiks have migrated to Russia, Turkey, Dubai, or other Central Asian countries (McKinney et al, 2004: 2). Of the five countries in Central Asia, Tajikistan is the most heavily reliant on labour migration as a source of employment and remittances- up to 1.5 million of its 7.5 million people works abroad. As the crises emerged in Tajikistan, deteriorating economic conditions in the country prompted more labour migration to Russia some migrant are displaced by natural disaster like floods and landslide. Other have to escape shower unset conditions like water shortages, desertification and soil depletion.

This has a huge impact on the economy of the individual households and the country's economy. Some estimates suggest that monthly income of 80% of the population fall below the minimum food basket cost. It is thought that 64% of the population is living below the poverty line while estimates suggest that between 20 to 33 percent of the population is extremely poor. Around 70% of the population lives in rural areas and the agricultural sector employ around two thirds of the total labour force (Falkingham, et al 2002: 13). Current issues in land reform and agriculture policies result in land use that is often not profitable to the food security of individual households, or for agricultural production and Tajikistan's economy as a whole.

During the growing seasons from 1999 through 2002, Tajikistan suffered from the same devastating drought that affected neighbouring Afghanistan. Families dependent on their own food production suffered most, but the whole nation was affected since the fragile economy is largely based on export agriculture. The situation remains fragile and many reports show concern for the high vulnerability of much of the country (McKinney et al, 2004: 2). The country has also experienced a variety of economic and social shocks since 2006 that have caused severe setback to the agricultural sector, reducing both the use of land and its productivity particularly in rural mountainous areas with limited or no access to irrigation systems. Nationally, the absence of adequate land, water management and sustainable use of the natural resources represent some of the major challenges in the agriculture sector. Lacks of appropriate agriculture sector policies and strategies and unresolved land reform issues have further contributed to the current setbacks (McKinney et al, 2004: 4).

- A. **Exports:** Aluminum, cotton, electricity, fruits, vegetable oil, textiles (UNWPF 2004: 18).
- B. **Imports:** Aluminum oxide, natural gas, oil products, electricity, machinery, foodstuffs (mostly wheat grain and wheat flour) (UNWPF 2004: 19).
- C. **Major crops/agricultural products:** Cotton, wheat, maize (sweet and feed), rice, potatoes, vegetables, fruits, grapes and livestock (cattle, sheep and goats) (UNWPF 2004: 20).
- D. **Transport:** Roughly 28,000km of road network, mostly in poor condition and not all paved with the main North-South road connecting Khujand to the capital closed in the winter because of snow. Railway system is small, about 480 km, connecting several of its main towns to the Uzbek and Turkmen railway networks. Air travel capacity is inadequate and waterways are limited to 200 km (along Vakhsh River). The first road to China was opened only in 2004 (UNWPF 2004: 21).

A timely policy response and generally good overall macroeconomic management supported by emergency loans from the IMF and World Bank helped Tajikistan recover from global crises. Economic growth fell to 3.9 percent in 2009 during the peak of the crises, but has since rises to 6.5 percent in 2010 and to 6.9 percent in the first half of 2011. However, despite of these achievements, the

countries to face challenges related to unemployment, food security banking sector weakness, unfavourable investment climate for the private sector, high dependences on remittances inflows and vulnerability to external shocks, (WB 2010).

1.1.2 Poverty and Food Security

The concept of poverty to include the inability to fulfil not only physiological needs (e.g. food, housing and hygiene) and basic human entitlements (e.g. education and health), but also important social and cultural needs and citizenship rights. In other words, individuals may be ineligible from formal and informal employment, land, agricultural inputs and livelihood opportunities, social services and infrastructure, housing, social security and public safety, organization and representation, family and social networks, and other spheres of economic, social and political life (WB Report 2005: 14).

Tajikistan remains the poorest country in the former Soviet Union and one of the poorest in the world. Although poverty incidence fell between 1999 and 2003, income poverty in Tajikistan is widespread and constant (John and Deborah 2011). According to the results of the 2003 Tajikistan Living Standards Survey (TLSS), 64% of the population was poor. Income inequality increased from 0.47 in 1999 to 0.51 in 2003 and it is one of the highest in the former Soviet Union. The inequality of consumption expenditures was 0.35 in 2003. This is comparatively high to other CIS-7 countries (CIS-7 countries- Armenia, Georgia, Azerbaijan, Kyrgyzstan, Tajikistan, Uzbekistan and Moldova) (WB Report 2005: 15). Although the country has experienced sustained economic growth over recent years neither availability of jobs is increased in Tajikistan nor sizeable increase in ways of majority of population. The review of poverty-related literature demonstrates that, in addition to the uneven economic growth, other factors such as poor governance and structural inequalities are important determinants of poverty in Tajikistan. Poor governance is one of the main constraints to pro-poor growth in Tajikistan. According to the 2004 Worldwide Governance Survey, the level of corruption control in Tajikistan is extremely low, and Tajikistan falls below some other former Soviet countries such as Armenia, Russia and the Kyrgyz Republic (WB Report 2005: 18).

Tajikistan's socio-political condition has improved but poverty is still widespread. It has especially in the largest agricultural Production regions of Khatlon

and Sugd, where the number of people are extremely poor (earning below \$1.08 per day) and continue increased poverty between years 1999 and 2003. However, the overall poverty level seems to have declined since 1999, from 80% to 64% (those living on less than US\$2.15 per day at PPP). Remittances from Tajik workers (mostly in the Russian Federation, Kazakhstan, and the Islamic Republic of Iran, accounting for 25% of the Tajik working population) have been the main factor for the reduction in poverty in recent years (WFP 2008: 3).

Tajikistan remains a poverty stricken and highly vulnerable food deficit country. It is landlocked with limited outlets to world markets and an inadequate internal transport infrastructure. Heavy dependence on aluminium and cotton as the first and the second largest sources of export revenues also contributes to the country's vulnerability to swings in world prices of these commodities. These factors raise legitimate concerns about the ability of the domestic market to cope with any unexpected interruptions in food supplies. The Government plays no direct role in food crop production or marketing and the agriculture sector suffers from over dependence on cotton production (Fortucci 2002). Crop production is also constrained by land entitlements and the slow pace of land reform. Over the past few years, wheat production has increased, driven by larger planted area rather than progress in yields.

Simultaneously, wheat flour imports have also surged due to high costs of production and poor quality of locally produced flour. Trade is relatively open with very little government intervention. The country is landlocked and mountainous with inadequate road and railway networks which also raise the cost of internal transport. All regions in Tajikistan are often in a food deficit situation and this problem is even more pronounced in remote parts of the country (Babu and Prabuddha 2009). For this reason, seasons (weather) play a critical role in the distribution and flow of food, especially to the mountainous areas, which are more vulnerable during the winter period. In each region of the country, there is at least one major food market but prices (of wheat flour in particular) always tend to be lower in those markets near the border with Uzbekistan where the main import and export routes are concentrated (Kreutzmann 2005). The difference in prices across the main markets is mainly due to transport (fuel) charges. Current domestic wheat flour prices are higher than during the last food crisis in 2000-01.

This background, addressing the root causes of the country's food security problems requires institutional initiatives, including major investment to improve transport systems, sanitation and diets. However, in Tajikistan, sound economic planning and suitable food policy strategies have established a long and painstaking process (IFPRI 2000). For this reason, continuous attention and careful analysis of the country's food situation through closer collaboration between multilateral agencies and NGOs could prove most valuable in avoidance of food crises. Poverty is a major contributor to food insecurity in Tajikistan. Chronic food insecurity was classified into high, medium and low risk categories. Ecological zoning into flat, hilly and mountain areas were computed. Three levels of chronic food insecurity were mapped across the three ecological zones offering a sub regional division of chronic food insecurity across the country.

1.1.3 Human Development Index

The Human Development Index (HDI) was proposed by Mahbub ul Haq and Amartya Sen in 1990 to measure development as enlargement of people's choices. This is a summary indicator, which has the main advantage to shift the attention of governments and public opinion from the Gross National Product of a country, to the real ends of development. The HDI is based on three components measures of human development, which is following:

1. Life expectancy, it is a measure of average people life in the country.
2. Education, it is measured by two variables related to education: adult literacy (with a weight of two-thirds) and mean years of schooling (with a weight of one-third).
3. Living Standard, measured by per capita income adjusted with the Purchasing Power Parity.

According to UNDP Human Development Report 2011, consist of Human Development Index (HDI) values and ranks for 187 countries and UN-recognized territories, along with the Inequality-adjusted HDI for 134 countries, the Gender Inequality Index for 146 countries, and the Multidimensional Poverty Index for 109 countries. The 2011 Report will be launched globally in November 2011. The HDI is an average measure of basic human development achievements in a country. Like all averages, the HDI masks inequality in the distribution of human development across the population at the country level.

The HDI is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. As in the 2010 HDR a long and healthy life is measured by life expectancy, access to knowledge is measured by: i) mean years of adult education, which is the average number of years of education received in a life-time by people aged 25 years and older; and ii) expected years of schooling for children of school-entrance age, which is the total number of years of schooling a child of school-entrance age can expect to receive if prevailing patterns of age-specific enrolment rates stay the same throughout the child's life. Standard of living is measured by Gross National Income (GNI) per capita expressed in constant 2005 PPP\$. Tajikistan's HDI value for 2011 is 0.607 in the medium human development category positioning the country at 127 out of 187 countries and territories. In the 2010 HDR, Tajikistan was ranked 112 out of 169 countries (UNDP HDR 2011: 2).

1.1.4 Millennium Development Goals

The Millennium Development Goals (MDG) (UN, 2005) are targets set by the international community at the Millennium Summit in 2000 to overcome poverty, exclusion and environmental problems by the year 2015. The Government of Tajikistan signed the UN Millennium Declaration in 2000 along with 191 other countries. In June 2004, President Rakhmonov conducted a videoconference with Millennium Project Director Prof. Jeffrey D. Sachs on the MDG Needs Assessment. In August 2004, five Working Groups were established by presidential decree for five sectors covered by the MDGs these are Education, Health, Water and Sanitation, Gender, Food Security and Nutrition. At the global level, the major Millennium Development Goal of 'reducing hunger, poverty and malnutrition by half by the year 2015' MDGs related to hunger and malnutrition is the lack of capacity for scaling up of food and nutrition interventions (WB 2005).

The MDGs offer a focused set of quantitative goals and targets for measuring and monitoring the world's success in achieving progress on key parameters. According to UN Millennium Development report (2012) has attested that the complete MDG framework comprises eight goals, 21 targets and 60 indicators. Most of the targets are to be reached over a 25-year period from 1990 to 2015 (table no. 1.1).

Table No. 1.1-The Millennium Development Goals	
Goal-1:	Eradicate extreme poverty and hunger
Goal 2:	Achieve universal primary education
Goal 3:	Promote gender equality and empower women
Goal 4:	Reduce child mortality
Goal 5:	Improve maternal health
Goal 6:	Combat HIV/AIDS, malaria, and other diseases
Goal 7:	Ensure environmental sustainability
Goal 8:	Develop a global partnership for development

Source: UNDP, *Millennium Development Report 2012*

1.1.5 Food Insecurity & Human Security

Food insecurity is defined as the probability that in any given year, actual food consumption falls below a minimum level necessary for survival and adequate health. The term food insecurity is complementary to food security and also referred to as degree of vulnerability. Food insecurity can be viewed in two dimensions namely, short term or transitory and long term or chronic. In the short term at the aggregate level, instability in cereal production, stocks, food prices, income, export-earnings and food imports in the short run give rise to instability in food consumption. Internally, food prices depends on cereal production and food imports. But the region with chronic food insecurity is primarily an internal problem. Instability and shortage in cereal production due to non-conducive agro - climate conditions can be attributed to the causing of chronic food insecurity (Rao et al, 1988).

At the household level food security refers to availability at the first instance. The household must be able to consume the required quantity of food grains - equivalent to approximately 2400 calories every day throughout the year (a norm set by Nutrition Expert Group of the planning commission). In determining the per capita availability the minimum food requirement is calculated converting food grains in terms of calories. According to FAO, 1 kg of food grains is equivalent to 3285 calories. Similarly, according to US Department of Agriculture, 1 kg of food grain is equivalent to 3350 calories (Sanderson et al, 1980: 79). Minimum calorie requirement as per the FAO is 2100 calories. It is intermediate value of 1900 calories, recommended by nutritionist and 1.5 times value of basal metabolic rate. Thus food security should be considered not in isolation but as a part of wider concept of human security. Food security touches on all seven dimensions of human security viz.

economic, health, social relation, community development and structures political power and environment issues.

1.1.6 Agriculture Growth and Land Utilization

The changes of farm structure, while consistent with the dominant mode in market agricultures, clash with the traditional Soviet philosophy of economies of scale. They also clash with the inherited ideology that views small family farms as an undesirable and even damaging deviation from the capital-intensive, highly mechanized and commercially oriented mainstream. Therefore an ongoing debate is witnessed both among CIS decision makers and within the academic community, as to the performance advantages of the two main organizational forms in agriculture – large corporate farms and small family farms.

Tajikistan has gone through three phases of agricultural development during the last 45 years. The first phase can be characterized as the Soviet growth period, which was sustained by the stable supportive environment that characterized the post-Stalin attitude toward agriculture in the USSR. The Soviet growth phase extended until 1990, when the Gross Agricultural Output (GAO) index had risen to 22.5% of its level in 1980 (Lerman et al, 2009: 2). The second phase is the transition collapse triggered by the dismantling of the traditional Soviet system and the disruption of all support services in level of 1975. The third phase is the recovery phase characterized by renewed agricultural growth after 1998, when the cumulative effect of sustained market reforms began to be felt (Lerman et al, 2009: 2).

It is important to note that individualization of land tenure is different from privatization of legal ownership of land. First, land can be privatized only in countries that legally recognize private ownership of agricultural land, i.e., Kazakhstan and Kyrgyzstan. In Tajikistan land remains state owned and it is transferred to farmers in use rights. Turkmenistan formally recognizes private land ownership (with severe transferability restrictions), but virtually all land in the country is owned by the state and is given to farmers in use rights, as in Tajikistan where no private land ownership is recognized. Second, new landowners may decide not to farm their privatized land individually and instead transfer it to others for farming through various lease or rental arrangements (Lerman and Sedik, 2009: 4).

1.2 Area of study

Tajikistan is an important country as area study in Central Asia by virtue of its geo-strategic location bordering China and Afghanistan and its ample water and other resources, but it faces ethnic and clan schisms, deep poverty, poor governance, and other severe challenges. Tajikistan was one of the poorest of the new states that gained independence at the end of 1991 after the break-up of the former Soviet Union. The new country was soon plunged into a devastating civil conflict between competing regional and other interests that lasted until a peace settlement in 1997. Former state chairman Rahmon rule has been increasingly authoritarian and has been marked by ongoing human rights abuses, according to many observers.

1.2.1 Geography & Demography

Republic of Tajikistan is located in Central Asia and has no outlet to the sea. Country's total territory is 143.100 km. It borders with China to the east, Afghanistan to the south and Uzbekistan and Kyrgyzstan to the west and north. Height above sea level on the territory of Tajikistan ranges from 300 to 7,400 m, which causes a sharp contrast in climatic conditions. Mountains and hills take 93% of the territory of Tajikistan. The climate of Tajikistan is continental, with hot summers and mild winters, from semi-arid to polar in Pamir Mountains (Lal 2011). Civil War (1992–1997) seriously affected already weakened infrastructure of the economy, which caused a strong decline of industrial and agricultural productions. The total population of Tajikistan is about 7.6 million people. Approximately 26% of the population lives in cities and district centres and 74% in rural areas.

1.2.2 Economy

As a result of serious economic collapse that occurred after the country gained independence from the Soviet Union, and a civil war in the 1990s, Tajikistan continues to struggle with aging, poor quality infrastructure and remains dependant on foreign aid (World Bank, 2000). Tajikistan's two major exports and sources of foreign exchange are cotton and aluminum (Library of Congress, 2007). The combination of poverty, poor health and education provision, weak infrastructure, and a shortage of private investment, along with exposure to natural hazards such as drought, flooding, mudslides, extremes of heat and cold, and earthquakes, results in frequent humanitarian crises (Falkingham, 2000).

A- Soviet Period

At the close of the Soviet phase of Tajikistan's history, the economy deteriorated rapidly, and the level of economic activity declined sharply in the early 1990s. In the first half of 1991, agricultural and industrial output dropped substantially, and construction, a chronic weak point of the economy, was especially sluggish. The state's revenues for the same period were half as large as its expenses. According to Soviet statistics, the generation of national income in Tajikistan had already declined 7.8 percent from 1988 to 1989 and 8.9 percent from 1989 to 1990. In 1990, the per capita generation of national income was the lowest by far among Soviet republics, and 17 percent below the 1985 level (Falkingham, 2000). Although Tajikistan was primarily an agricultural republic, in 1989 it imported more agricultural products, including foodstuffs, than it exported.

B- After 1991

Tajikistan possesses many elements that will be needed to diversify its national economy after decades of specialization within the Soviet system. Significant deposits of gold, iron, lead, mercury, and tin exist and some coal is present. Some regions have ample water for irrigation and the country's rivers are a largely untapped source of hydroelectric power generation. The labor supply is sufficient, provided Tajikistan can retain qualified workers in critical fields. The civil war of 1992-93, the collapse of the integrated Soviet economic system, and the lack of significant economic reform by the post-civil war government all have severely impeded economic performance, however.

1.2.3 History

The Tajiks, whose language is nearly identical with Persian, were part of the ancient Persian Empire that was ruled by Darius I and later conquered by Alexander the Great (333 B.C.). In the 7th and 8th centuries, Arabs conquered the region and brought Islam. The Tajiks were successively ruled by Uzbeks and then Afghans until claimed by Russia in the 1860s. In 1924, Tajikistan was consolidated into a newly formed Tajik Autonomous Soviet Socialist Republic, which was administratively part of the Uzbek SSR until the Tajik ASSR gained full-fledged republic status in 1929.

Tajikistan declared its sovereignty in August 1990. In 1991, the republic's Communist leadership supported the attempted coup against Soviet president Mikhail

Gorbachev. After independence, Tajikistan experienced sporadic conflict as the Communist-dominated government struggled to combat an insurgency by Islamic and democratic opposition forces. Despite continued international efforts to end the civil war, periodic fighting continued. About 60,000 people lost their lives in Tajikistan's civil war. The conflict ended officially on June 27, 1997, with the signing in Moscow of peace accords.

1.2.4 Civil War

Less than a year after independence, Tajikistan was completely surrounded in civil war (1992-1997). Between 20,000 and 60,000 people were killed in the first year of fighting when the war was at its peak. According to the UN High Commissioner for Refugees (UNHCR) 600,000 people-about one-tenth of the population were internally displaced and at least 80,000 wanted refuge outside the country, mostly in Afghanistan (Lynch Dov, 2001). The brutality of fighting in rural areas in the south shocked Tajikistanis and foreign observers. Many unarmed civilians were murdered, apparently in an effort to force them to run away their homes.

Since the treaty was signed (June 1997) there have been periodic skirmishes between government forces and renegade militia groups and continuing attempts (occasionally successful) to kill political opponents. Nevertheless, it appears that the danger of a return to civil war is now moving back and that a new political order has been established. As in many armed conflicts, the interests and actors that joined forces to fight the war were complex and changed over time. The main warring factions were composed of political groups allied with people capable of mobilizing armed militias, often through regional affiliations

The balance of power in this 'government alliance' shifted to the Kulobis as the war continued. The outcome of the civil war had both benefits and drawbacks; Tajikistan is facing serious challenges caused by the consequences of civil war and difficulties of the transitional period connected with economic decline, high poverty rate among population and labour migration, weak social protection etc. were the main driving forces for the conflict in 1992 (Olimova 2005). Civil war erupted as a result of a weak Tajik national identity, combined with disintegrating institutions in circumstances of economic collapse and political mobilisation.

1.2.5 Peace & Development

Tajikistan in recent years is maintaining peace and stability in the country and continuation of the national reconciliation policy. However, Tajikistan is not able to resolve numerous issues can be split into three groups global, regional, and countrywide. It is to be noted that international terrorism, radical religious extremism, separatism, illegal migration, drugs smuggling, arms smuggling, human trafficking, fight against AIDs and others are part of its global issues (Nygaard, et al. 2005). Among internal issues of the country, first of all reduction of poverty among more than 80% of the population, lack of employment opportunities as a result the outflow of labour force from the country varies within the limits of 400 thousand to 1 million people a year (Daly 2007). The issues of food supply and power supply over coming of communication deadlock, demographic environmental, information issues and others remain to be critical.

Tajikistan continues to struggle with aging, poor quality infrastructure and remains dependant on foreign aid (WB 2000). Tajikistan's two major exports and sources of foreign exchange are cotton and aluminum (Umarov 2012). The combination of poverty, poor health and education provision, weak infrastructure, and a dearth of private investment, along with exposure to natural hazards such as drought, flooding, mudslides, extremes of heat and cold, and earthquakes, results in frequent humanitarian crises (Falkingham, 2000).

1.3 Background

Tajikistan is a mountainous, landlocked country with limited space for agriculture. The country ranks among the world's poorest, 64% of the population lives under the poverty line. Food security is a major problem (World Bank 2003). It is H shaped nation. It shares 1,206 km. of its borders with Afghanistan in the south, 406km. with China in the east, 871km. with Kyrgyzstan in the north east 1,161 km with Uzbekistan in the north west and west. Tajikistan occupies the western slopes of the Pamir Mountains and southern part of the fertile Fergana valley. The rivers that begin in the glaciers of Tajikistan are important sources of water for drinking and irrigation not only in Tajikistan but also in neighboring Uzbekistan and Afghanistan (Wegerich, et al. 2007). Tajikistan has four major geographical regions that are quite distinct in

terms of the landscape; climate and soil found there- (1) The Northern Region, (2) The Central Region, (3) The South-western Region and (4) The Eastern Region.

1.3.1 Security Issues

Geopolitical location of Tajikistan is defined by diverse nature of interests of external forces towards it. Interests of super powers are mainly caused by availability of energy resources in Central Asia as a whole, large reserve of oil and gas as well as gold deposits, uranium and other occasional metals and fresh water. In this case, Tajikistan mainly with the exception of water reserves, electric power, coal and uranium plays the role of a transit state in which peace and stability have to be maintained for safe transportation of energy carriers and other natural resources of Central Asia via Afghanistan, Pakistan, China, Kyrgyzstan and Uzbekistan.

Effective border management has emerged at the forefront of Tajikistan's domestic and foreign political agenda, largely as a result of the increasingly unstable situation in Afghanistan, which is now moving through northern Afghanistan and already approaching Tajikistan. Tajikistan faces risks posed from international terrorist and religious-extremist, drug and weapons smuggling, and illegal migration (Umarov, May, 2012). However, present systems of border management are inadequate to address such issues and insufficient to meet the challenges of the future.

Tajikistan developed security cooperation with regional powers, above all on the 'soft security' issues of drug trafficking, terrorism, separatism, religious extremism and crime (Kumar 2006). India, Pakistan and Iran have no direct borders with Tajikistan. Even so they all share a common history, as parts of them once belonged to one and the same empire. India and Pakistan were eager to develop relation with Central Asian countries (Warikoo, 2004). After 9/11 India agreed to assist in restoring the military airport at Aini outside Dushanbe. Tajikistan's trade with India and Pakistan remained more or less insignificant. In November 2003 a friendship and cooperation agreement was signed. The same year a direct air flight from Delhi to Dushanbe started. Rakhmonov called for Indian participation in the construction of Tajik hydro-energy facilities, although without success (Babu and Rhoe, 2001). India was more interested in the prospects for energy transit across Afghanistan. During 2004 specific aspects of cooperation in the fight against terrorism and the drug trade were worked out between Tajikistan, India and Pakistan.

1.3.2 Regional & International Players

Tajikistan's geo-strategic location is the most important for regional and international players. It has huge natural resources and hydroelectric Powers. The security reason Tajikistan is important for China, India, Pakistan, Afghanistan, USA, Russia and neighbouring Central Asian countries. It can be look what kind of interest of regional and international powers. There are following countries:-

1.3.2.1 Russia

Tajikistan has had 140 years of close relations with Russia. The two countries understand each other well. Tajikistan also benefits from significant remittances from migrant workers in Russia. Interests of Russia in the Tajikistan are defined as military-political, economic and cultural both in bilateral format and in the framework of international agreements (EU Parliament 2011: 13).

- First of all, Tajikistan was the part Russia before 1991, now it is the CIS members, member of the Collective Security Treaty Organization and Customs Union. Russia is an important economic and military power in Tajikistan.
- Second, Tajik-Russian bilateral relations are mainly based on a set of agreements reached in 2004. In accordance with one of them, Russia has around 5,000 troops in a base near Kulyab (Russia's biggest base outside its borders) and a strategic space-surveillance centre at Nurek.
- Third, economic relations of the two countries during that period were tied up in the framework of common national economy complex of the USSR. Russia is Tajikistan's largest sponsor and creditor. Cooperation on construction of hydro-electric power stations has frequently been at the top of the agenda.
- Fourth, the mentality and the way of life of certain part of the population of the Tajikistan, city population in particular, was closer to Russian-Soviet than any other foreign ones. In addition, after collapse of the Soviet Union about 500,000 Russian-speaking populations were still dwelling in the Tajikistan, which were in need for material assistance and support from the land of their forefathers.
- Fifth, as noted in the previous section of this briefing, a huge number of Tajiks are working in Russia, many of them illegally. Tajikistan's dependency on its labour migrants in Russia gives the Kremlin strong leverage on the Tajik government.

1.3.2.2 Uzbekistan

Uzbekistan interests in Tajikistan are defined by historical, cultural and economic ties, they have close relation in term linguistic, ethnic and matrimonial between Tajiks and Uzbeks people and majority population of Sughd Oblast, western Hissor Valley and a part of Khatlon Oblast and they speak two languages. Uzbekistan gave military support to the Tajik government side in the civil war, but the bilateral relations have since been strained, partly due to personal hostility between the Presidents Rahmon and Karimov (Umarov 2012).

Uzbekistan has accused Tajikistan of harbouring Uzbek and Tajik terrorists' target on overthrowing the Uzbek government. In the summers of 1999 and 2000, the Islamic Movement of Uzbekistan (a US-declared terrorist organization) allegedly used Tajikistan as a staging ground for an insurgency campaign against the Uzbek government. The control of water resources plays a key role in the bilateral relations. Tajik ambitions to construct more dams cause tension (the main issue here is the planned Rogun dam) (EU Parliament 2011: 16).

In particular, Uzbekistan fears that it will receive less water during the growing season, when much is needed especially on the cotton fields. For Tajikistan, it could be advantageous to save water for the cold season, when electricity needs are bigger. It has been suggested that such a conflict could be attenuated through spring-time storing of water at lower levels in the cascade of dams to which Rogun would be an addition at the top. In addition, possibilities to sell electricity to Pakistan and India in summertime could provide an incentive to tap large volumes of water then (Umarov, 2012). There are, however, suggestions that Uzbekistan in addition has a wish to keep Tajikistan weak and dependent by hindering it from using the great economic development opportunities associated with its huge potential for hydro-electric power production (EU Parliament 2011: 16).

Tajikistan is highly dependent on Uzbekistan for its imports. In 2010, Uzbekistan for long periods held up railway cars at the border, to impede dam construction work and quite possibly also to cause other shortages in order to put pressure on the Tajik government. Tajikistan also imports Uzbek gas, the price of which in the beginning of 2009 was raised by USD 100 per thousand cubic metres to USD 240 (Umarov, 2012).

1.3.2.3 Afghanistan

Tajikistan and Afghanistan are on friendly terms since the fall of the Taliban, helped also by the role that ethnic Tajiks now play in the Afghan capital Kabul. These countries are also linked by the transit of illegal Afghan narcotics through Tajikistan on their way to Russian and European markets. This transit leaves widespread violent crime, corruption, and economic distortions in its wake. Drug trade is virtually the only source of income for large shares of the population in the South and East of Tajikistan and it is according to the Economic Intelligence Unit likely that Heroin is a major source of income in the country.

Afghanistan is responsible for more than 90 percent of the world's illicit opium production and fifteen percent of the opiates produced in Afghanistan are smuggled through Central Asia-mainly Tajikistan-en route to Russia, Eastern Europe, and China (Kumar 2006). Furthermore, twenty percent of Afghan heroin, which accounts for more than ninety percent of world supply, is trafficked through Central Asia. Tajikistan, however, is not just a transit route for drug smugglers, but has a higher-than-average rate of opiate abuse: 0.5 percent of the population aged 15 to 64 or 22,200 people (Umarov 2012). Moreover, the lucrative drug trade provides funding to the Taliban, their allies the IMU, and other terrorist and criminal elements that threaten to destabilize the country.

Tajikistan's drug trafficking problem is compounded by weak security along the Afghan border and the proximity of poppy-growing regions in northern Afghanistan, although the rise of southern Afghanistan as the main area of opium poppy cultivation has alleviated some of the pressure on Tajikistan (Kumar 2006). Much of the porous Afghan-Tajik border lies in incredibly rugged mountains, and it has been very difficult for the Tajik authorities to police it. Outposts and checkpoints on both sides of the border are being constructed and equipped with advanced technology, and the training of counternarcotics teams is underway. Furthermore, Afghanistan and Tajikistan have agreed to cooperate in combating illegal drugs and organized crime in the region.

Since the fall of Taliban in 2001, Tajikistan has sought to establish greater economic ties with Afghanistan. In addition, Tajikistan, Afghanistan, and Iran agreed to form the Economic Council of the Persian-Speaking Union in 2008, and work is

underway to improve transportation links ‘road and rail’ and thus trade between the three countries. Afghanistan has also sought to import energy from Tajikistan. Other projects agreed upon included construction of Tajikistan-Afghanistan-Iran highway, a railway linking Tajikistan to Iran via Afghanistan and power grids that connect Tajikistan to Pakistan and Iran via Afghanistan.

1.3.2.4 Iran

Iran wants to support on nuclear issues in front of international community. So, the Tajikistan have done always support them in United Nation on nuclear energy. The two countries have cooperated in a number of development and industrial projects and enjoy a reasonably strong level of economic cooperation. Bilateral trade between the two has risen from \$40 million in 2000 to \$140 million in 2007, making Iran one of Tajikistan’s top five trade partners (www.imfstatistics.org: 2008). Iran has also helped Tajikistan with the construction of the Sangtudeh-2 power plant project, contributing \$180 million for the project, which it was completion in 2011. The Tajikistan lacks the hydrocarbon resources of its neighbours and Iranian said that the importance of Tajikistan’s hydroelectric potential (www.imfstatistics.org: 2008).

The two countries have also cooperated in the field of transportation, with Iran and Tajikistan agreeing in February 2009 on the construction of a rail line that would link the two via Afghanistan. In May 2010, during the OIC ministerial meeting, both state head met to discuss the expansion of economic ties, particularly in the sectors of trade, transportation, water, energy, and infrastructure. The two countries have worked to establish ties in the realm of defense and regional security. During their March 2009 meeting in Afghanistan, Iran and Tajikistan affirmed their commitment to working together to restore peace and security to that country.

1.3.2.5 China

Chinese interest behind in Tajikistan for two reasons: *first* are security issues and *second* one strategic importance. Having seven thousand kilometres of border with Central Asia China could not remain indifferent to the development of circumstances in the region. Therefore, China is expanding cooperation with the states of the region in bilateral and regional formats in order to promote security, stability and the development of the region. China also used to have territorial claims towards

bordering countries, which in the range of issues of delimitation and demarcation of borders were awaiting their resolution.

China has become the most important sponsor of infrastructure projects in Tajikistan and overall an important creditor. The influx of cheap commodities from China has helped reduce poverty. A new road link facilitates the trade between the countries, although the border crossing at an altitude of more than 4 000 meters is far from always kept open. China is investing generously in the Tajik light industry as well in reconstruction of old factories (EU 2011: 17).

1.3.2.6 India

Tajikistan is separated from the Indian sub-continent by the Wakhan Corridor (Afghanistan) which is 200 km long and varying from only 16 to 65 km in width. India-Tajikistan relations are cordial and friendly. At present, India-Tajikistan bilateral relations is based on mutual respect, convergence of interests and similarity of views. On the Jammu & Kashmir issue, Tajikistan holds the view that, it is a bilateral dispute and may be resolved amicably by India and Pakistan (Aina-I-Hind, 2009).

The high level visits had special focus to forge closer relations and enhanced bilateral cooperation. Notably, both sides agreed to jointly combat terrorism, expand defense cooperation as both the countries share close defense and security relations. India has upgraded the Aini airport near Dushanbe, which is fully operational now and identified other strategic areas of cooperation including building of highway. Cooperation in Hydroelectric power is yet another important sector of cooperation between India and Tajikistan (Umarov 2012). Another significant area of cooperation between the two countries is to fight against terrorism and drugs trafficking. Both the countries have together fought against the Taliban and there is already a joint working group on counter terrorism. Terrorism and extremism is a common threat faced by both India and Tajikistan.

1.3.2.7 Pakistan

The Islamic Republic of Pakistan, established diplomatic relationship with the Republic of Tajikistan in 1992, but cooperation between these two countries started from 1991. Pakistan and Tajikistan have actively advanced their partnership in the energy, trade and transport spheres in recent months. The three pillars of cooperation

are crucial components of the national strategies of these countries in bilateral and multilateral formats as they seek to break their relative isolation from regional and global markets and influence security trends unfolding in Central and South Asia.

Tajikistan is the only Persian speaking country and the inhabitants of this mountainous country have deep cultural, linguistic and religious ties with Pakistan. Thus the bilateral relations between the two brother countries started developing in different fields. Both sides work on countering regional terrorism, drug trafficking, religious extremism and ensuring stability and security in Asia (RIA Novosti, 2010).

1.3.2.8 United States of America

The United States' interests in relation to Tajikistan are to a great extent determined by the fact that Tajikistan is a neighbour of Afghanistan, where much is at stake for the US. This should open opportunities for Tajikistan both to earn money for helping the US with the logistics and for gaining more international attention which could be beneficial in various contexts. At the same time, poor infrastructure and a less than reassuring outlook for the stability of Tajikistan itself no doubt limit the US readiness to rely on Tajik facilities and support. The US military campaign in Afghanistan would clearly expose the country to a much higher risk of becoming a target for terrorist and perhaps also other forms of attacks.

The USA and Tajikistan intensified their cooperation after 9/11, in the context of the US launched "War on Terror". After the Russian border forces withdrawal from the Tajik-Afghan border in 2005, the US Government led an international donor effort towards Tajikistan. Related to this is a US interest to curb drug trafficking over this border and further on. The US assisted Tajikistan's economic development through some important infrastructure projects, including the construction of a bridge over the Pyanj River that separates Tajikistan and Afghanistan. The volume of trade between the two countries reportedly tripled after the opening of the bridge, in 2007 (Peace Pipeline, 2007).

1.4 Literature Review

The review of literature for this research proposal being with analyzing the view of theory experts on the widely studied phenomena on the notion of food security and co-relation with food insecurity dilemma, how do effect human development in

Tajikistan. For this purpose, the review presents the concept of " Food Security in Tajikistan, 1991-2010" and the nature of its relationship with threat to human security of many dimensions i.e. socio-economic, political- environment security in this region. Many scholar write about regional and international institution taken step eliminate poverty and hunger in this area. The important point that the weakness of the state and administration do not functioned in Tajikistan. Further, it will also give emphasis on the view of the various points like that agriculture policy of the state, poverty, corruption, lack of communication and transportation, food grain production and consumption issues and the role of regional and international organizations policies beside food security in Tajikistan. In order to have an appraisal of the development work carried out previously and to consolidate hypothesis and objective for the present study, necessary literature survey was carried out. The review of literature for this research divided into thematically.

1.4.1 Food Availability

Availability refers to the physical presence of food as a result of domestic production or market operations. On country level availability of food is determined by combination of food stocks, commercial imports, food aid and domestic production. The availability is also determined by the following elements: weather conditions, crop yield, livestock and productivity, producer prices for food, food prices in neighbouring countries, as well as national policy defining production, trade, distribution and pricing. The availability of food per capita is calculated using a food balance. A food balance shows for each basic food commodity, the total physical availability and utilization of that foodstuff over a given period of time, usually 1 year.

Food availability usually comes from national, regional and sub regional food balance sheets. This is obtained from the FAO it is database for individual countries and regions .It provide information on consumption patterns and relate only to the supply or availability of food at the national level. They represent annual production of food, changes in food stocks and imports and exports and describe national dietary patterns in terms of the major food commodities. While they are useful to understand, aggregate indicators (such as macroeconomic and demographic factors) on food consumption, using the national food balance data, do not provide information on food security at the household level (Babu and Prabuddha 2001). Availability is also

refers to the physical presence of food as a result of domestic production or market operations. On country level availability of food is determined by combination of food stocks, commercial imports, food aid and domestic production. It also determined by the following elements: weather conditions, crop yield, livestock and productivity, producer prices for food, food prices in neighbouring countries, as well as national policy defining production, trade, distribution and pricing.

1.4.2 Food Accessibility

It could be physical access to food in the market or economic access to food at the household level. While food availability at the national and regional levels and the associated infrastructure such as roads and market outlets to buy food determine physical access to food, economic access depends on the purchasing power of the household and the existing level of food prices which could depend on the physical access to food. A household's ability to spend on food is a good indicator of food access at the household level (Babu and Prabuddha 2001). Access to food refers to the ability of households to obtain adequate safe and appropriate foods to meet their needs for a healthy and active life. Access can be through production for own consumption, market purchases (Van Lieshout et al., 2004).

1.4.3 Nutrition and Health

Scholars such as Ivanic and Martin (2008) have detailed picture gives that the Tajikistan is the poorest of the five central Asian republics. Since the ending of the Soviet-Union in 1991, Tajikistan has experienced economic collapse and civil conflict. Tajikistan has one of the lowest per capita incomes of the former 15 Soviet Republics, and almost half of the labour force is working abroad supporting their families via remittances. During the 1990s, the infant mortality rate was much higher than it had been previously. According to Babu and Reidhead (2000) has explained that in 1998, the mortality rate for infectious and bloodsucking diseases (60 per 100,000 populations) and the mortality rate for respiratory diseases (185 per 100,000 populations) were the highest among the countries in the region. The incidence of malaria increased extremely, reaching a peak of 519.9 per 100,000 populations in 1997. As a result of the major food emergency in 1999-2001, malnutrition rates rose significantly; these have been explained substantially by Falkingham, J. et al (2002).

Several Reports FAO (2005), WFP, (2008) have shown that the limited intake of fresh fruits and vegetables was likely to affect the intake of vitamin C, thus also affecting the absorption of non-haem iron, folate and pro-vitamin A carotenoids. Furthermore, the low iodine content in water and in the food chain made it difficult to meet the requirements for this nutrient. Low iron and folate lead to anaemia, which is responsible for impaired physical and cognitive development in children, poor mental and physical performance in adults and increased risks of infectious disease. Iodine deficiency leads to the insufficient production of thyroid hormones, which affects muscles, the heart, the liver and the kidneys, as well as the developing brain (Sibrian 2006). Malnutrition is being addressed within the public health sector in Tajikistan. The related health issues, however, persist and need to be tackled as a public health priority. Although breastfeeding is practiced among families, exclusive breastfeeding is not sufficiently widespread. Effective childcare practices are crucial for the healthy development of children (Kassam 2008). Children can achieve optimal physical and mental health when their development is followed at home, in rural and urban communities and at school.

1.4.4 Climate Change

The importance of the various dimensions and the overall impact of climate change on food security will differ across regions and over time and, most importantly, will depend on the overall socio-economic status that a country has accomplished as the effects of climate change set in. Scholars like Dyurgerov and Meier (2000) have focused that impacts on Food Production and Availability, Climate change affects agriculture and food production in complex ways. It affects food production directly through changes in agro-ecological conditions and indirectly by affecting growth and distribution of incomes, and thus demand for agricultural produce. According to Lobell and Burke (2010) has explained that impact of Climate Change on Access to Food, Access to food refers to the ability of individuals, communities, and countries to purchase sufficient quantities and qualities of food. Over the last 30 years, falling real prices for food and rising real incomes have led to substantial improvements in access to food in many developing countries (Idrisova 2010). Increased purchasing power has allowed a growing number of people to purchase not only more food but also more nutritious food with more protein, micronutrients, and vitamins.

Scholars Madramootoo and Dukhovny (2008) has been explained that the impact on the Stability of Food Supplies, Global and regional weather conditions are also expected to become more variable than at present, with increases in the frequency and severity of extreme events such as cyclones, floods, hailstorms, and droughts . By bringing greater fluctuations in crop yields and local food supplies and higher risks of landslides and erosion damage, they can adversely affect the stability of food supplies and thus food security. Dyurgerov and Meier, (2000) have explained that the impacts of Climate Change on Food Utilization, Climate change will also affect the ability of individuals to use food effectively by altering the conditions for food safety and changing the disease pressure from vector, water, and food-borne diseases. Climate change will increase the dependency of developing countries on imports and highlight existing focus of food insecurity (Yokubzod 2008:57). Within the developing world, the adverse impacts of climate change will fall disproportionately on the poor.

Due to the effect of the mountains, Tajikistan's topography and climate, especially with respect to rain, vary dramatically across the country. Indeed, subtropical, semi-arid, and even desert conditions can all be found. Most generally, climatic conditions are continental, with extreme temperature differences between seasons. Tajikistan is also home to a number of glaciers, including Fedchenko, the largest non-polar glacier on earth (Library of Congress, 2007). According to UN and WFP has demonstrated that the large and complex river systems that drain numerous glaciers throughout the country provide water for irrigation, and are the primary source of energy in the form of hydroelectric power (UN, 2004). The geography, history, patterns of human settlement, and socioeconomic conditions in Tajikistan combine to create considerable vulnerabilities to a number of natural hazards including floods, droughts, avalanches, and earthquakes (WFP, 2008).

United Nation has focused on Tajikistan faces considerable climate change challenges. Food production in Tajikistan already faces many serious challenges. There is limited space available for crops and livestock due to the steep slopes and high elevations, and unsuitable micro climates resulting from the country's mountainous topography for agriculture (Lal 2011). Average arable land per person is 0.14 hectares per person, which when compared with the global average of 0.26 ha/person, is quite low (UN, 2003). Production of food on this limited land base is also made more difficult by a number of natural and human factors. Land degradation

is an ongoing problem as a result of land use changes such as logging, overgrazing, and cropping practices; and other processes such as soil erosion, heavy rainfall events, flooding, salinization and desertification contribute yearly to limits in production.

1.4.5 Water and Energy Resources

According to Madramootoo and Dukhovny (2008) has posed picture that the most important issues in this regard are the management of water and energy resources and leverage of significant long term investment in hydro energy projects. Most critical for Central Asian countries and is a key source of conflict between the upstream countries (Kyrgyzstan and Tajikistan), which exploit the energy potential of the rivers, and the downstream countries (Kazakhstan, Turkmenistan and Uzbekistan), which need water from the rivers for agriculture; same quote is attested by Mustaeva (2009). Agriculture is the biggest consumer of water, so the water utilization model in the upstream countries not only affects farmers in the downstream countries, but also all other related sectors: food, light industry, etc (UN News Centre 2004). The World Bank is known to have tried to intervene in the resolution of disputes and in encouraging cooperation on the shared utilization of international watercourses in various parts of the world (ADB, 2008).

1.4.6 Food Policy

Several researchers Baris and Haberli, (2010) have make clear that the Agrarian Policy includes activities aimed at providing economic, financial and political framework conditions in the agrarian sector and realized by affecting economic processes taking place in this sector by forms and methods mostly efficient in the sphere of the agrarian economy. In addition Bigman (1985) has attested that the Agrarian policy provides for increasing effectiveness of the resources using, the rational allocation of farming industry, improved provision of the population by food and provision of the industry by raw materials, stabilization of markets of agricultural production and food, support and protection of commodity producers of the agricultural sector, improvement of living standards of the rural population.

The Government of Tajikistan (2008) has given details that the agrarian legislation and agrarian structure are formed within the frames of the agrarian policy. Under the agrarian legislation those legal norms are understood which along with dominating morals and customs define ongoing processes in agriculture and life of the

rural population. The agrarian structure is a correlation of economic, technical and social elements in the agrarian sphere, conditioned by the agrarian legislation, mobility of production factors, specificity of the agricultural production and also by working and living conditions of the population. Tashmatov et al, (2000) have given that the Land reform and its success in allocating land to individual farm households will determine the success of agrarian reform in Tajikistan. Since 1990, a legislative base regulating agrarian reform has been enacted. All the laws, decrees, and resolutions regarding agrarian reform are aimed at resolving two issues: (1) the transfer of land and property of agricultural enterprises from the state to collective farming units, and (2) the restructuring of agricultural enterprises.

1.4.7 Transport Linkages

Tajikistan is a landlocked country with restricted access to world markets. Internally, there is a lack of proper transport system for distribution of food. Investment has resulted in an extremely inefficient and costly transport network, an added obstacle to the smooth flow of trade. Scholar like Pomfret, (2003), have focused that the domestic cargo traffic is characterized by highly competitive small operators and food is generally transported on private (driver-owned) medium-sized trucks. Government role in domestic trucking is relatively small although, legally speaking, trucks are subject to safety controls and the drivers must pay a special government grant fee for driving trucks. Neither the Government nor any group of transport companies currently appear as enjoying a dominant role in the domestic trucking network.

The main North-South road connecting the *Sugd* region (the city of *Khujand* in the north where most of agro-processing output originates), to where most people live (in the capital city *Dushanbe* and in the southern parts) is closed in the winter because of snow. During this period, goods must be transported through Uzbekistan, a factor that adds substantially to transport costs. Trucks are the main mode of food transport across the country. According to WFP report (2005) has Quoted that Most trucks can carry up to 13 tonnes of food or about 260 bags of wheat flour (in bags of 50kg) but they are old and inefficient (with very high fuel consumption between 60-70 liters of diesel per 100km) and this also raises the cost of transport – the estimated cost of transporting one fully loaded truck containing wheat flour from *Istravsha* (the main

market in the north) to *Dushanbe* was estimated at about \$1200 (or roughly US \$ 400) per truck.

The railway system is small, less than 500 Km, but it connects several of the main towns to railways network in Uzbekistan. A recent review of the country's railway system demonstrates its vital role in the Tajik economy with over 80% of trade (exports and imports) using trains and a large portion of food imports (grains and flour) relying on the railway system. According to WFP report (2005), ADB report (2006) have pointed out that the most predominant routes are the central line from Patahabad at the Uzbekistan border to *Yangibazar* (via *Dushanbe*) which represents around 48% of total import-export goods traffic, the northern line from *Bekabad* to *Kanibadam* (via *Kudjand*), which covers 33%, and the southern line from *Hashidy* at the Uzbekistan border to *Kulyab* (via *Kurgan Tyube*), which handles 19%. This pattern also reflects the location of the main industrial and agricultural activities. The main industrial site the aluminium smelter, is located in *Tursunzoda*, west of *Dushanbe*, while the main cotton growing areas are located in central and northern parts of the country.

1.5 Rationale and Scope of the Study

Food insecurity currently affects populations throughout Tajikistan. In early May 2008, the U.N. issued a revised Compound Crisis Flash Appeal for nearly \$27 million for Tajikistan. The appeal notes that the compound crisis in Tajikistan reflects the effects of a combination of shocks on existing vulnerabilities that evolve and amplify each other. Numerous shocks-including an unusually severe winter resulting in critical energy shortage, frozen crops, and a loss of seed stocks and livestock; sudden rise in temperatures in March; cyclical floods, landslides, mudslides, and droughts; locust infestation; failed harvests; and rapidly rising food prices-have left rural populations with few remaining coping mechanisms. According to the U.N., assessment results indicate that 2 million people (USAID 2008: 2) in Tajikistan have been affected by the current crisis and require urgent emergency assistance, including health and livelihood interventions.

Civil wars may be caused by complex inter-linkages between economic, environmental, social, political, cultural and religious factors. Civil wars may be rooted in hunger as opposing interests for resource wealth, or ethnic hatreds that

manifest themselves in terms of nationalism, separatism, or a fight for an ethnic identity. The more fundamental, indirect causes create the economic, political, social and environmental conditions which lead to war. The lack of power sharing, centralization of political administration, economic growth, high levels of poverty, an unequal income distribution, lack of basic infrastructure and social services, wide regional differences, lack of access to agricultural land, and reduction of natural resources are the notable economic factors responsible for the emergence of civil wars.

1.6 Objectives of the study

The main objective is to update the knowledge base on the food security, livelihoods, agriculture and nutrition situation in Tajikistan. Specific objectives of the study are:

- To examine food availability.
- To study accessibility of food.
- To study the relationship between food insecurity and poverty.
- To assess government policies and programmes related to food security.
- To study the energy-water-food security axis.

1.7 Hypotheses

The present study has the following hypothesis:

- ❖ Whether Food Insecurity has been a triggering factor for the civil war in Tajikistan.
- ❖ Tajikistan is the worst sufferer of the energy-water-food security nexus in Central Asia.

1.8 Data Base and Research Methodology

The study based on secondary sources of information. The data collected from the secondary sources of information, it is classified and presented in the form of simple tables for easy understanding. Statistical tools like graphical representation of data, Correlation coefficient and flow maps are utilized to analyze the data. In addition to the literature collected through journals, books, articles, seminar reports, it has also included the published as well as the unpublished research reports and doctoral thesis. All relevant information through UN sources, laws, acts and treaties existing for food security and relevant information from the concerned ministries, websites and relevant embassies has also be studied.

1.9 Organization of the Study

The study consists of five chapters.

Chapter 1: Introduction: The introductory chapter makes an overview and an effort to reveal the food security as a non-traditional security threat to Tajikistan. The significance and rationale of the study giving a detailed background of the region is emphasize. In this chapter introduces the theme of the present study, including literature survey. Objectives are listed along with type and source of the data used and methodology used for the present analysis.

Chapter 2: Food Availability & Accessibility: This chapter investigates that food availability and accessibility in Tajikistan. It give the impression, first and important point is that availability of food at regional & state level is rarely the problem and more important for nourishment than food production is **access** to food in Tajikistan.

Chapter 3: Relationship between Food, Water and Energy: This chapter third is highlighting current trends in food-water-energy in concerned region focusing on the vulnerable areas. This chapter provides an evaluation of the current food security crisis in Central Asia and links it to the broader water crisis experienced by Central Asia forming an 'energy-water-food security nexus'.

Chapter 4: Policies & Programmes: This chapter fourth is focusing on Tajikistan food policy and programmes conduct national and international organisations. Evaluate the role of regional and international organizations and NGOs initiatives for food security policies.

Chapter 5: Conclusions: Chapter fifth is finally explaining the overall study of my research. Based upon the overview of the previous chapters, it look for the food insecurity dilemma how to threats the non-traditional security of Tajikistan.

References

(*Indicate Primary Sources)

- Acharya, Amitav, (2001), "Human Security East versus West", *International Journal*, Vol. 56 (3) 442-460.
- *ADB, (2006), "Trade Facilitation and Customs Cooperation," Financed by the Asian Development Bank, *Prepared by: Adil Cubukgil*, for the Asian Development Bank, January.
- Babu, S. C. and W. Reidhead, (2000), "Poverty, food security, and nutrition in Central Asia: a case study of the Kyrgyz Republic," *Food Policy*. 25 (6): 647-660.
- Babu, Suresh and Sanyal Prabuddha, (2009), *Food Security, Poverty and Nutrition Policy Analysis*, New York: Library of Congress.
- Babu, Suresh and Valerie Rhoe, (2001), "Food Security in Central Asia: Economic Opportunities, Policy Constraints, and Future Challenges", *International Food Policy Research Institute*, Washington DC.
- Baris, Karapinar and Christian Haberli, (2010), *Food Crises and the WTO World Trade Forum*, Cambridge: Cambridge University Press.
- Bigman, David, (1985), "Food Policies and Food Security under Instability: Modelling and Analysis.
- Daly, J.C.K., (2007), "Unlocking the Hydroelectric Potential of Tajikistan", *Terra Daily*.
- Dyurgerov, M. B. and M. F. Meier, (2000), "Twentieth Century Climate Change: Evidence from Small Glaciers", *Proceedings of the National Academy of Sciences* 97(4): P.P. 1406–1411.
- *Eurasian Developments Bank,(2008), *Water and Energy Resources in Central Asia Utilization and Development Issue, Industry Report*, Republic of Kazakhstan, Almaty.
- Falkingham, J., (2000), "A Profile of Poverty in Tajikistan", *Centre for Analysis of Social Exclusion*, London School of Economics.
- Falkingham, J. et al, (2002), *A Profile of Poverty in Tajikistan*, London School of Economics and World Food Program, *Pre-Crop Assessment Mission Report and Cereals Yield Forecast for 2002: Tajikistan*, Dushanbe, WFP
- *FAO, (2005), "Measuring hunger at sub national levels from household", *Food and Agriculture Organisation*, Statistics Division Working Paper Series, Number ESS/ESSA/005e www.fao.org/es/ess/faostat/foodsecurity.
- *FAO, (2005), "Aquastat FAO's Information System on Water and Agriculture", <http://www.fao.org/nr/water/aquastat/countries/tajikistan/index.stm>.
- Fortucci, P., (2002), "The Contribution of Cotton to Economy and Food Security in Developing Countries", *The Food and Agriculture organization of the United Nations (FAO)*, International Cotton Advisory Committee.

- Fumagalli, Matteo, (2008), “The ‘Food-Energy-Water’ Nexus in Central Asia: Regional Implications of and the International Response to the Crises in Tajikistan”, *European Union -Central Asia Monitoring*, 2(3).
- Goodson, L. P., (2001), *Afghanistan’s Endless War*, Seattle, University of Washington Press
- *Government of Tajikistan, (2008), “Food Security and Poverty in the Republic of Tajikistan,” *State Committee on Statistics Republic of Tajikistan*, Information Bulletin, Dushanbe.
- *Government of Tajikistan, (2008), “The Concept of The Agrarian Policy of The Republic of Tajikistan”, Approved by the Resolution of the *Government of the Republic of Tajikistan*, 31 December.
- Idrisova, A., (2010), “Climate change impacts on biodiversity and its implications on Protected Areas Management in Tajikistan,” Central European University, Budapest.
- *International Crisis Group, (2009), *Tajikistan: On the Road to Failure*, Asia Report, No. 162, 12 February.
- *IFPRI, (2000), *Food Policy Reforms in Central Asia: Setting the Research Priorities*, International Food Policy Research Institute, Washington, D.C.
- Ivanic, M. Martin, (2008), “Implications of Higher Global Food Prices for Poverty in Low-Income Countries”, *World Bank Policy Research*, Working Paper, No. 4594.
- John, T. Cook and A. Frank Deborah, (2011), *Food Security, Poverty and Human Development in the United States*, Boston: Boston University Press.
- Kassam, K. A., (2008), “Diversity as if Nature and Culture Matter: Bio-cultural Diversity and Indigenous Peoples,” *International Journal of Diversity in Organizations, Communities and Nations* 8: 287–95
- Kelly, Charles, (2009), “Field note from Tajikistan Compound disaster - A New Humanitarian challenge”, *Journal of Disaster Risk Studies*, 2(3).
- Kreutzmann, H., (2005), “The Significance of Geopolitical Issues for Development of Mountainous Areas of Central Asia”, *Strategies for Development and Food Security in Mountainous Areas of Central Asia*, International Workshop, Dushanbe, Tajikistan.
- Kumar, Sanjeev, (2006), “Drug Trafficking in Central Asia: A case Study of Kyrgyzstan,” M.Phil Dissertation from *School of International Studies*, Jawaharlal Nehru University, New Delhi.
- Lal, Rattan, et al, (2011), *Climate Change and Food Security in South Asia*, New York : Library of US Congress.
- Lerman, Zvi and David Sedik, (2009), “Agricultural Recovery and Individual Land Tenure: Lessons from Central Asia,” FAO Regional Office for Europe and Central Asia, *Policy Studies on Rural Transition No. -3, October*.
- Library of Congress, (2007), “A Country Study: Tajikistan”, *Federal Research Division*, <http://lcweb2.loc.gov/frd/cs/tjtoc.html>.

- Lobell, David, (2010), “Climate Effects on Food Security”, in Marshall Bruke and David Lobell (eds.) *Climate Change and Food Security Adapting Agriculture to a Warmer World*, New York: Springer.
- Madramootoo, Chandra A. and Viktor A. Dukhovny, (2008), *Water and Food Security in Central Asia*, Springer, London, New York.
- Makhmud, F. Shavmarov, (2008), *Peasants’ Perspectives towards Development Interventions: Case studies of Community Agriculture and Improvement of Household Food Security Project*”, in Zarafshan valley of Tajikistan reported.
- McKinney, Philip and Matthew Parnaby, (2004), “NATIONAL NUTRITION SURVEY, TAJIKISTAN”, Survey Implemented by: Action against Hunger, *Republican Centre for Nutrition Issues, Ministry of Health*, October.
- Middleton, R. and H. Thomas, (2008), *Tajikistan and the High Pamirs*, New York: Odyssey Books.
- Mohamed, Behnassi et al, (2011), *Global Food Insecurity Rethinking Agricultural and Rural Development Paradigm and Poverty*, New York: Springer.
- Mustaeva, N.,(2009), “Challenges and Opportunities for Sustainable Energy End-use in Urban Residential Sector of Tajikistan”, *Central European University*, Budapest.
- Nygaard, D. et al., (2005), “Seizing Opportunities to Promote Development and Improve Food Security in the Mountainous Regions of Central Asia”, *International Workshop*, Dushanbe, Tajikistan June 6-10, 2005.
- Olimova, S., (2005), “Impact of External Migration on Development of Mountainous Regions: Tajikistan, Kyrgyzstan, Afghanistan, and Pakistan”, *International Workshop*, Dushanbe, Tajikistan, June 6–10, 2005.
- Pomfret, Richard, (2003), “Central Asia since 1991: The Experience of the New Independent States”, *OECD Development Centre Working Paper no. 212*, Formerly Technical Paper no. 212.
- Rao, C.H.H., Ray. S. K. and K. Subbarao, (1988), “Unstable Reforms and Poverty Alleviation in India,” *Indo-Dutch Studies on Development Alternatives*; 17, New Delhi, Sage Publications.
- Sanderson, Fred.H and Roy, Shyamal, (1980), *Food Trends and Prospects in India*, Allied Publishers, New Delhi.
- Sibrian, R., (2006), Indicators for monitoring hunger at global and sub-national levels, In *First World Congress of Public Health Nutrition Congress Proceedings*, Barcelona, Spain.
- Sorokin, Anatoly, (2008), “Scenarios of Future Development in the Aral Sea Basin”, (ed.), Madramootoo, Chandra A. and Viktor A. Dukhovny (2008), *Water and Food Security in Central Asia*, Springer, London, New York.
- Tashmatov, A., et al,(2000), “Food Policy Reforms for Sustainable Agricultural Development in Uzbekistan, the Kyrgyz Republic and Tajikistan”, *Food Policy* 25, 719–732.
- Umarov, (2012), “Development of Hydro-Energy in Tajikistan, problems and prospectus”, Lecture delivered on June, 2012 in *International Seminar* at School of International Studies, JNU: New Delhi.

- Umarov, (2012), “Foreign Trade and Investment Trends in Tajikistan, 1991-2011”, Lecture delivered on May, 2012 in *International Seminar* at School of International Studies, JNU: New Delhi.
- Umarov, (2012), “Russia’s Policy towards Tajikistan, 1991-2011”, Lecture delivered on June, 2012 in *International Seminar* at School of International Studies, JNU: New Delhi.
- Umarov, (2012), “Socio-economic Development in Tajikistan”, Lecture delivered on March, 2012 in *International Seminar* at School of International Studies, JNU: New Delhi.
- Umarov, (2012), “Tajikistan’s Regional Trade and Transport Potential”, Lecture delivered on June, 2012 in *International Seminar* at School of International Studies, JNU: New Delhi.
- *UN News Centre, (2004), “UN Monitors Water Quality in Tajikistan after Floods Erode Supply,” *UN Office for the Coordination of Humanitarian Affairs*, August 4th, 2004.
- *UNDP HDR, (2005), “Bringing down barriers: Regional Cooperation for Human Development and Human Security,” *Central Asia Human Development Report, United Nations Development Programme*, <http://hdr.undp.org/en/reports>.
- *UNDP, MDGs, (2012), “The Millennium Development Goals Report 2012”, *United Nations Development Programme*, June.
- *USAID, (2008), “Global Food Insecurity and Price Increase”, May 21, 2008, http://pdf.usaid.gov/pdf_docs/PNADL352.pdf.
- Van Lieshout, et al, (2004), “Climate change and malaria: analysis of the SRES climate and socio-economic scenarios,” *Global Environmental Change*, 14: 87–99.
- Warikoo, K. and Mahavir Singh, (2004), (ed.), *Central Asia since Independence*, Delhi: Shipra Publications.
- Wegerich, K. Olsson, and J. Froebrich, (2007), “Reliving the past in a changed environment: Hydropower ambitions, opportunities and constraints in Tajikistan”, *Energy Policy*, 35(7): 3815-3825.
- *World Bank, (2005), “Tajikistan Poverty Assessment”, *Update*, The World Bank, Washington D.C.
- *World Bank, (2010), “Index insurance and climate risk: Prospects for development and disaster management”, International Research Institute for Climate and Society, World Development Report.
- *World Food Programme, (2005), “Tajikistan: Market Profile for Emergency Food Security Assessments, Emergency Needs Assessment”, Branch (ODAN), *World Food Programme*.
- *WFP, (2008), “Integrated Food Security and Humanitarian Phase Classification Pilot in Tajikistan”, *World Food Programme*,
- Yokubzod, Said, (2008), “Food Security and the Improvement of Water Use Efficiency,” (ed.), Madramootoo, Chandra A. and Viktor A. Dukhovny (2008), *Water and Food Security in Central Asia*, Springer, London, New York.

Chapter~2

Food Availability and Accessibility

2.1 Background & Concept

In this chapter, it is examined that food availability and accessibility in Tajikistan. It observes, first and important point is that: Availability of food at regional & state level rarely creates any problem. The most important is the access to food availability rather than food production in Tajikistan. The concept of food security is complex, multidimensional. We can see at international, national, regional, household and even at individual levels. The world food conference of 1974 was mainly concerned with global food security and believes that world food crisis was a common responsibility of all nations and international approaches are necessary to achieve world food security (Sarris, A et al. 1976). Fluctuations in food supplies over time and unstable food prices are the basic problems of food security which require international and national solutions such as inter-regional grain reserves of buffer stocks, grain insurance and others (Johnson, 1976).

Food security is generally understood to imply arrangements whereby the people would be assured of a minimum level of food grains supply in a year with both normal as well as poor harvest, implying the physical supply of a minimum level of food grains during all periods including those of harvest failures (Reutlinger, 1977). Subsequently, it was realised that physical availability alone would not ensure economic access to food for all population but satisfactory production levels and stability of supplies should be matched by reduction in poverty and an increase in the effective demand to ensure economic and physical access for the poor (FAO, 1997).

As such the concept of food security at the individual and household levels was taken up (Frankenberger, et al. 1998). Hence, according to (FAO, 1997) the basic concept of food security implies that “people at all times have both physical and economic access to the basic food they need” but the (WB, 1986) has modified it indicating that “food security is access by all people at all times to enough food for an active and healthy life”. Its essential elements are availability of food and the ability to acquire it. The World Bank has made a distinction between chronic and transitory food insecurities (Alamgir et al. 1991). The former refers to persistent inadequate diet caused by the inability to acquire food either by purchase or by produce of their own, while the latter refers to a temporary decline in the household’s access to enough food due to instability in food prices, food production and household income.

However, the most comprehensive and perhaps, largely acceptable definition came out of the World Food Summit at Rome in 1996. Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. This definition emphasizes three critical dimensions of food security-

- Physical supply of desired food in sufficient quantity.
- An economic access indicating close link of purchasing power to food security.
- Stability in supply which include access to global food market (Bhattacharya, 2001).

A more comprehensive explanation of food security includes livelihood security for each household ensuring both physical and economic access to balanced diet, safe drinking water, environmental sanitation, primary education and basic health care (George, 1999). Chng and others have summarised the diverse determinants of food security status in a general conceptual framework focuses on the links between resources commanded by the household, levels of farm and non-farm production, household income, household and individual consumption and individual nutrition. The above review of the studies and the explanation given clearly reveals that the concept of food security is complex and multidimensional (Vades, 1981).

There are many Definitions of Food Security. Maxwell and Smith had counted more than 200 definitions of security. The food security concept has gradually been developed as a guiding concept for FAO's evolving food policy by FAO. The general definition of food security that was inspired by FAO is related to the personal right to sufficient food for a person and a nation, discounting no food uses. According to the food Security concept gradually emerged in the mid 1970's when the initial focus was on food supply problems. Food Security was defined in 1974 as: 'availability at all times of adequate world food supplies of basic food stuffs to sustain a steady expansion of food consumption and to balance fluctuations in production and prices'.

In 1983, FAO expanded its concept to include securing access by vulnerable people to available supplies, implying that attention should be balance between the demand and supply side of the food security equation: 'ensuring that all people at all times both physical and economic access to the basic food that they need' . The

commoditization of inputs and food markets widened the existing social gap, giving support to large scale industrial agriculture and expelling millions of peasants from their land. An influential report (World Bank, 1986) on poverty and hunger addressed the temporal dynamics of food insecurity and introduced the ‘distinction between chronic food insecurity, associated with problems of continuing or structural poverty and low incomes, and transitory food insecurity, which involved periods of intensified pressure caused by natural disasters, economic collapse or conflict’ (IFPRI, 2011).

In the mid 1990’s this definition was widened as to incorporate food safety and also nutritional, balance, reflecting concerns about food composition and minor nutrient requirements for an active and healthy life. Food preferences socially or culturally determined now became a consideration. The potentially high degree of context specificity implies that the concept had both lost its simplicity was not itself goal, but an intermediating set of actions that contribute to an active and healthy life. In UNDP’s 1994 human security concept, food security was one of its seven aspects. In 1996, the World Food Summit adopted an even more complex definition, food security at the individual, household, national, regional and global level is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

In 2001, the FAO again refined this concept in: The state of Food Insecurity 2001. Food Security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. This definition comprises of four key dimensions of food supplies these are availability, stability, access, and utilization. The new emphasis on consumption was influenced by (Sen, 1981) who stressed entitlements of individuals and food security.

A study of (CIA, 2008) described, Food security as a phenomenon relating to individuals. It is the nutritional status of the individual household member that is the ultimate focus and the risk of that adequate status not being achieved or becoming undermined. The latter risk describes the vulnerability of individuals in the context. Food Security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food

preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concerns.

Confronted with new models of fast food, people began to suffer more from fatness, cardio-vascular accidents, diabetes and cancer. Thus the concept of food security shifted again, now to healthy and harmless food, able to maintain a person energetic and active by reducing the intake of animal fat, sweet beverages, and junk food. But when confronted still with 825 million hungry people, food insecurity was addressed, together with the fact that 80 percent of the poor live in rural areas and agriculture employs almost 50 percent of them rural development is critical for improving food security (Schmidhuber, et al. 2007). The traditional agriculture sector has low productivity due to the lack of investment, inadequate water supply and scarce arable land. Rapid reduction of groundwater resources may be the most serious problem facing the countries

USAID defined 'food security' as all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. Achieving food security requires that the aggregate availability of physical supplies of food is sufficient, that households have adequate access to those food supplies through their own production, through the market or through other sources, and that the utilization of those food supplies is appropriate to meet the specific dietary needs of individuals.

The US Food and Drug Administration defined 'food security' as the daily balanced intake of proteins, carbohydrates, vitamins and minerals required for a healthy life. The disequilibrium in quantity and polluted food, or with toxins, could generate illnesses and limit the physical and mental development of children. Finally, food security is also related to food safety such as hygiene and prevention of illnesses caused by food in bad condition or food borne sicknesses. According to WHO, bacteria are the main threat for harmless food that are present in the domestic and professional food chain.

2.2 Indicators of Food Security

The major food security indicators are following:

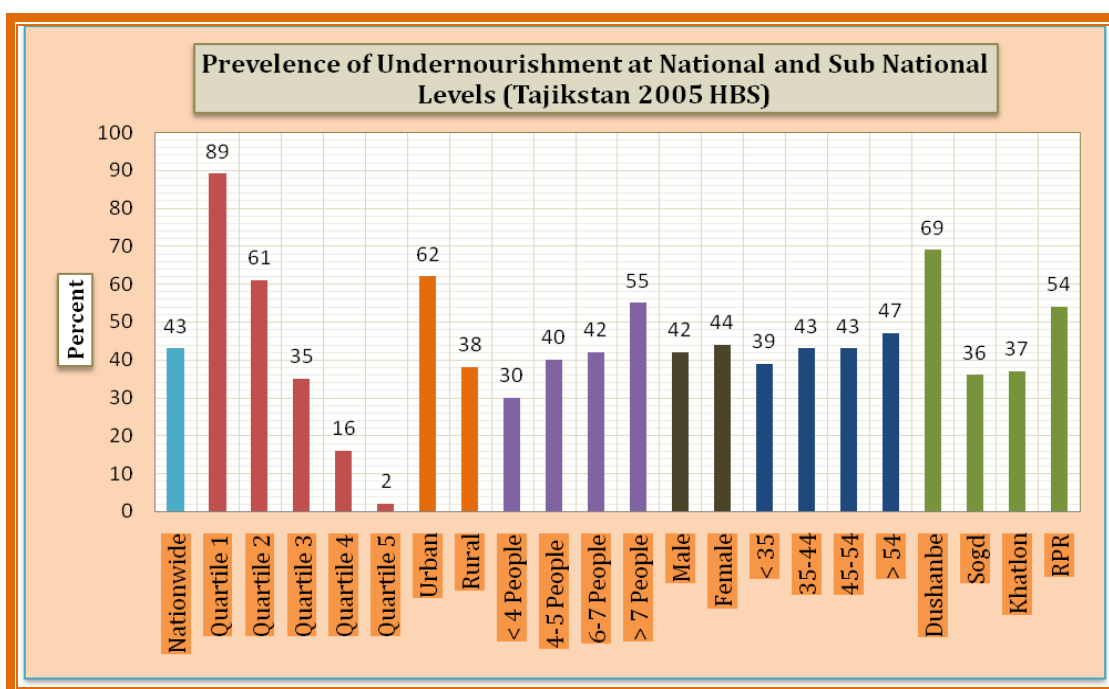
- Prevalence of undernourishment
- Depth of hunger
- Critical food poverty
- Food availability
- Accessibility of food

As the concept of food security is complex and multidimensional and its various variables are interlinked with one another, it is difficult to evolve a single indicator for it. According to (Chung et al., 1997) have taken a number of socio-economic indicators such as owning poor quality land or no land, holding distress sales of livestock productive and valued assets, taking loans, substitution of inferior quality staple food and vegetables, migration for search of work, working of pregnant and lactating mothers, etc. for measuring household food insecurity (Barun et al., 1992) have suggested demand and supply of food at country level, direct comprehensive surveys of dietary intake at household level and anthropometric information at individual level to measure the food security. In some studies poverty has been taken as the main determinant of chronic food insecurity as most of the qualitative and quantitative indicators of food security are linked to poverty issues. The poor do not have adequate means or entitlements to secure their access to food, even if it is available in local and regional markets (Sen, 1981).

Hence, the household income contributes to the access of food but it may not improve the nutritional level of all the individuals of the households. Hendry, agreeing the poverty as most effective indicators of food security has added that the extent of access to gainful employment, arable land, suitable technologies and other impotent factors to be reckoned with in this context. The above review of all these studies and suggested indicators clearly indicates the complexity of selection of precise indicator and methodology to measure food security at larger scale (SCS Report 2007: 10-12).

2.2.1 Prevalence of Undernourishment

Food deficiency as measured by the prevalence of undernourishment. In 2005 more than two people out of five were undernourished in Tajikistan (State Committee of Statistics Tajikistan, 2007). About 43% of the population had food consumption below the minimum dietary energy requirement (MDER) of the average Tajik. The Minimum Dietary Energy Requirement (MDER) is the amount of dietary energy of an average individual that is considered adequate to meet his daily energy needs for a minimum acceptable weight for attained height, light physical activity and in good health given his/her age and sex. The daily MDER for the average Tajik was estimated on the minimum dietary energy needed to maintain body weight and perform an active light physical activity taking account of the age and sex structure of the population. The MDER was 1880 kcal per person per day at national level in 2005. The national MDER was also used to estimate the prevalence of undernourishment estimates of the population groupings of area, regions, size of household, gender and age of heads of households (SCS Report 2007: 15-19).



Data Sources: State Committee of Statistics Tajikistan, 2007.

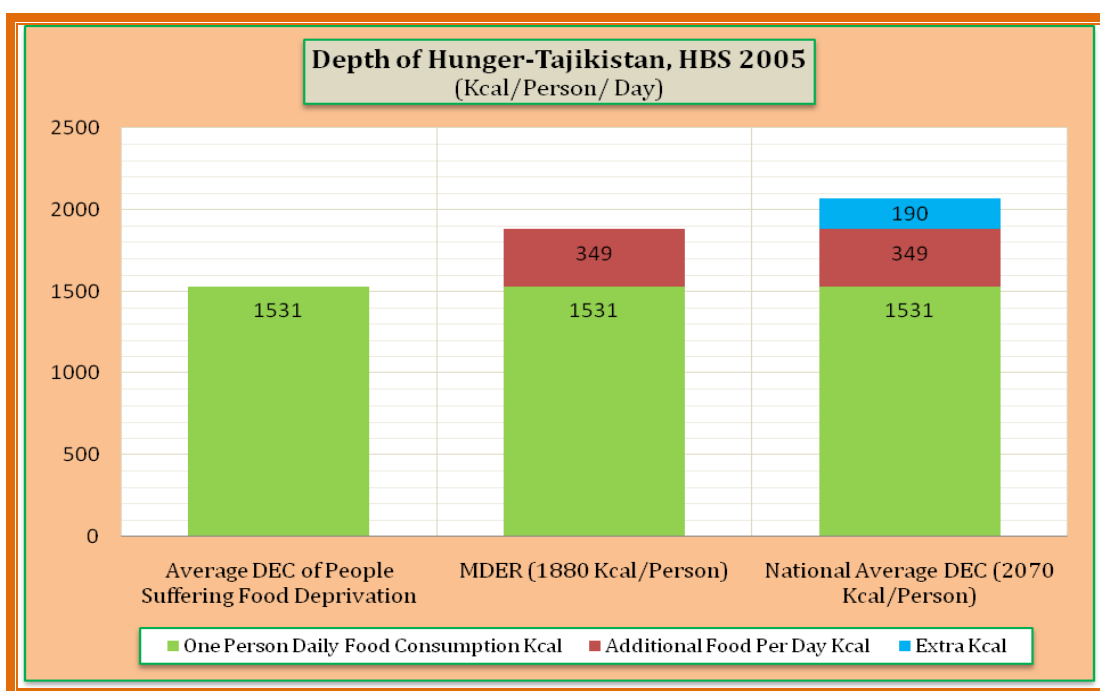
Figure No. 2.1

In figure 2.1 shows that Levels of food deficiency decreased with income levels, with a food deficit of 89% for the lowest income group to a low level of 2% of undernourished people in the highest income group. Urban areas have a significantly high prevalence of undernourishment of 62% compared to a level of 38% in rural

regions where more than 70% of the population are living. Among regions, the capital city of Dushanbe and RPR had respectively high levels of food deprivation of the order of 69% and 51%. Large households in terms of members, i.e. with seven or more members had a level of undernourishment of 55%. The other population groupings showed also relatively high values of frequency of undernourishment in the range of 30 to 47%. The food deprivation levels were marginally different between gender and age of the household-head (SCS Report, 2007).

2.2.2 Depth of Hunger

The 43 percent of undernourished people of Tajikistan had on average, a daily per person food consumption of only 1531 kcal, which was well below the Minimum Dietary Energy (MDE) of 1880 kcal/person/day and the national average Dietary Energy Consumption (DEC) of 2070 kcal/person/day.



Data Sources: *State Committee of Statistics Tajikistan, 2007.*

Figure No. 2.2

Figure no. 2.2 shows that the depth of hunger-Tajikistan, 2005. It was then required an additional daily per person of 349 kcal (19 percent MDER) for these people to reach the MDER value. It was required an additional 539 kcal (35% DEC) to reach the national average dietary energy consumption. The rural food deprived people had higher average daily dietary energy consumption than in the urban areas. Thus, the urban Tajik has a higher daily food deficit of 401 kcal than 335 kcal for the

rural Tajik. The population of urban regions had a lower daily average DEC of 1796 kcal than rural 2161 kcal and even lower than 1880 kcal MDER. Urban population consumed 274 kcal less than the national 2070 kcal DEC.

Map No. 2.1 Important Wheat-Producing Areas in Central Asia



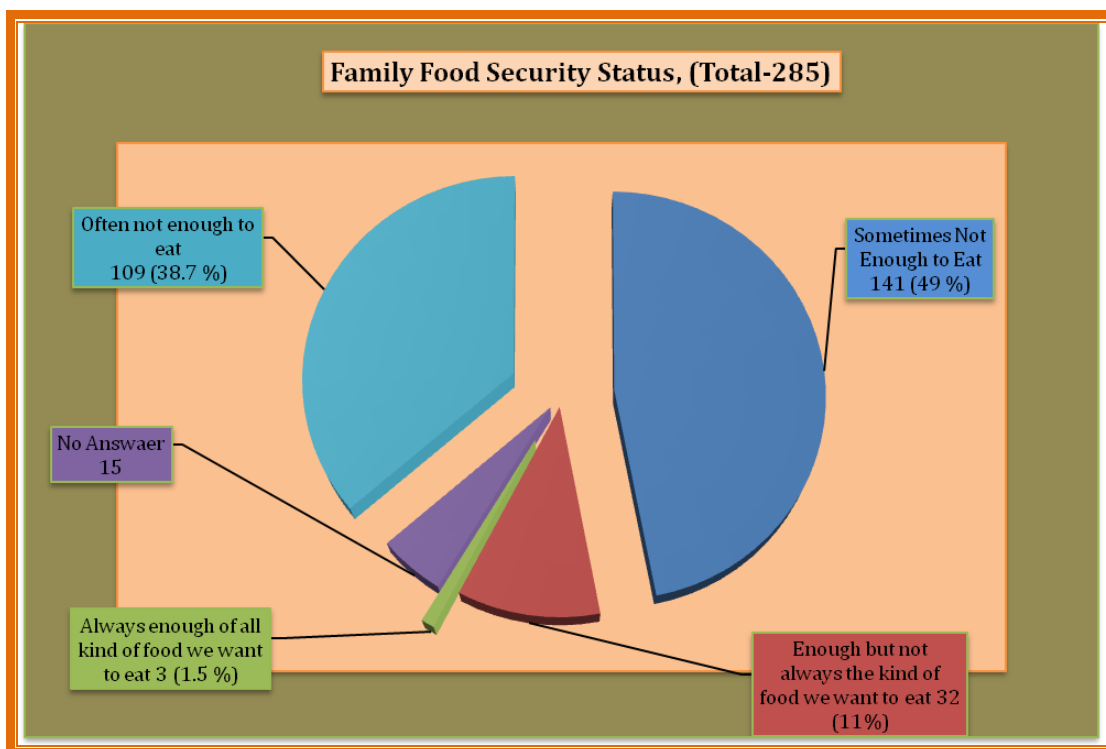
Source: FEWS NET, 2011 (It has been Modified)

2.2.3 Critical Food Poverty

The Critical Food Poverty (CFP) is the part of the population whose income is lower than the cost of a macronutrient-balanced food basket equivalent to the minimum dietary energy requirement (MDER). Macronutrient balance is a key to healthy weight management and loss. Food essentially contains two kinds of nutrients macronutrients, which provide energy, and micronutrients, such as vitamins and minerals, which help the body use the energy. The prevalence of critical food poverty estimated was 19% national level. It was different at sub national levels the highest levels of critical food poverty were observed in Dushanbe (43%) and the lowest levels were observed in the industrial area of Sogd (13%) and in households of small size with less than four people (11%). The prevalence of undernourishment was

greater than the prevalence of critical food poverty in at national and sub-national levels (SCS Report, 2007).

It is important to note that the prevalence of food deprivation is based on the distribution of energy consumption, while the prevalence of critical food poverty is based on the distribution of income.



Data Sources: *State Committee of Statistics Tajikistan, 2007.*

Figure No. 2.3.

The figure no. 2.3 shows the 285 families survey of status of food security in Tajikistan. About all of them 49% families are not sometimes enough to eat, 38.7% are often not enough to eat, 15% gives no answer, 11% families enough but not always the kind of food they want to eat and 1.5% families are always enough of all kind of food they want to eat.

2.2.4 Food Availability

Food availability is an integral part of the food security chain and is a function of domestic production of food grains and imports/ exports. Domestic production is the main source of food availability in an agrarian economy and imports can be used to ensure that prices of food do not escalate if the domestic food production falls short of the requirement.

There are a number of aspects of food availability and these not only include current level of production, percentage contribution of food grains and cash crops to total production, changes in yield, but also the procurement and the existing buffer stock norms. More over environmental degradation affecting long-term production and disasters disrupting food availability temporarily also needs to be factored in the impact of exports and imports also has a role in the overall food availability situation. The role of agriculture has always remained crucial for the economy and in order to ascertain the impact of agriculture on food availability (Gurgen et al, 1999).

2.2.5 Food Accessibility

Food availability by itself does not ensure adequate access to food, through adequate food availability is necessary for food accessibility. If people have access to livelihood, they would in general have access to food and nutrition. Food accessibility does not mean just physical accessibility, which is provided to people by the government supported PDS (Public Distribution System) ,but more importantly it means economic accessibility i.e. purchasing power to buy the food. Agriculture provides food accessibility as majority of people is employed in agriculture and it helps in influencing the incomes and hence the purchasing power. Therefore we need to look at the aspects of rural employment, rural poverty and the sources of livelihood (land and non-farm sector) in order to assess the second parameter of food security i.e. food accessibility.

2.3 Major Food Insecure Area in Tajikistan

There are four food deficit areas in Tajikistan. These are following:

2.3.1 Khatlon Oblast (Province)

Khatlon accounts for about 35 percent (2.15 million) of the country's total population. The area under food crops in Khatlon is the largest among the four regions. This province planted to wheat 56 percent of the total area. Twelve out of 25 districts are severely affected; and several others are also food insecure. Khatlon constitutes the south-west region of the country and mostly consists of lowland areas. It has very hot summers and cold winters, and depends on irrigation on a large scale for agricultural production. But the province's irrigation systems are generally in poor condition due to pump breakdown, silted or breached canals and problems relating to electricity

supply. Soils in many parts of the province are relatively poor in organic matter. Salinity of top soil is also a problem in this province (GOT, 2008).

2.3.2 Leninabad Oblast

The area under wheat in this province accounted for about 20 percent of the total area. This northern province contains about 30.5 percent of the country's population. Nine out of 18 districts in this province have been severely drought affected. Except the extreme north which contains low land areas, this province is mountainous with varying levels of elevation. This province is economically better off compared to the other regions as more industries exist here than elsewhere. But many industries are now in decline, due to problems relating to management and the markets (lost following the collapse of U.S.S.R.).

2.3.3 Regions under Republican Subordination (RRS)

A region under Republican Subordination is in the central part of the country. This region accounts about 22 percent of the country's population. Including Dushanbe City, the population reaches 31 percent of the official total. The effect of drought in this region is similarly severe as elsewhere. The estimated area planted to wheat in this region was down by about 9 percent. The numbers of people are most affected by drought and those among them who are critically in need of food assistance in this region.

2.3.4 Gorno-Badakhshan Autonomous Oblast (GBAO)

Gorno-Badakhshan Autonomous Oblast is located in the east. It is mountainous, where the Pamir's reach a peak of 7,400 meters. Only a small part of this region is arable and that too is mostly terraces. It is a very thinly populated region accounting for only about 3.4 percent of the country's population. Its cereal production is also small. Drought has substantially reduced the yields of cereals, particularly of wheat, the production of wheat is estimated to be significantly down and the area planted is estimated to be about 17 percent up. The numbers of people are most affected by drought and those among them who are critically in need of food assistance in this region.

2.4 Dimensions/Main Elements of Food Security

There are four dimensions/elements of food security:

1. Food Availability
2. Food Accessibility
3. Regular supplies of food material
4. Food Utilization

2.4.1 Food Availability

The first dimension relates to the availability of sufficient food, i.e., to the overall ability of the agricultural system to meet food demand. Its subdimensions include the agro-climatic fundamentals of crop and pasture production and the entire range of socio-economic and cultural factors that determine where and how farmers perform in response to markets. This is also refers to sufficient quantities of food of appropriate quality, supplied through domestic production or imports including food aid.

2.4.2 Food Accessibility

The second dimension accessibility it covers access by individuals to adequate resources to acquire appropriate foods for a nutritious diet. Resources are defined as the set of all those commodity bundles over which a person can establish command given the legal, political, economic, and social arrangements of the community of which he or she is a member. Thus a key element is the purchasing power of consumers and the evolution of real incomes and food prices. However, these resources need not be exclusively monetary but may also include traditional rights such as to a share of common resources (Odling, 2002).

2.4.3 Regular Supplies of Food Material

Stability of food supplies are relates to individuals who are at high risk of temporarily or permanently losing their access to the resources needed to consume adequate food either because these individuals cannot ensure ex ante against income shocks or they lack enough raw materials to smooth utilization ex post or both. An important cause of unstable access is climate variability like landless agricultural labours that wholly depend on agricultural wages in a region of unpredictable rainfall and have few savings, would be at high risk of losing their access to food.

However, there can be individuals with unstable access to food even in agricultural communities. Where there is no climate variability like landless agricultural labours that fall sick and cannot earn their daily wages would lack stable access to food if, for example, they cannot take out insurance against illness. In short the stability of food is to be secure food for a population, household or individual and they must have access to adequate food at all times. And also they should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security (IMF, 1994).

2.4.4 Food Price Trends in Tajikistan

There are many factors behind the food price instability and food price increases in Tajikistan. Tajikistan's food markets are fed by two sources like imported and domestic food price instability. The conduction of global prices to Tajikistan's domestic market is reflective, largely to the country's high dependency on food and other imports (fertilizer, fuel, seeds, etc.) (Asimov et al, 1987). Tajikistan can only produce 30 % of its own food consumption requirements. Its main food imports are wheat, wheat flour and wheat-flour products, potatoes, sugar, vegetable oil, vegetables, fruit and eggs. About 50 – 60 % of Tajikistan's annual wheat requirement is imported (Jalolov, et al. 2010).

The trend of rising food prices was poorer by a substantial increase in fuel prices, which affects not only transport costs but also food production costs, as fuel is required for irrigation pumps and tractors. Tajikistan is highly dependent on food imports, and it also has very few import partners a condition that exposes food prices to a higher risk of instability and makes it more difficult to buffer a production shortfall. For its supply of cereals, Tajikistan relies heavily on three countries such as Kazakhstan, Russia and Ukraine. Kazakhstan supplies 94.5% of the total cereal import (IMF, 1999).

2.4.5 Effects of global Food Price in Tajikistan

Khatlon is one of Tajikistan's main agricultural areas, both in terms of output and area. It accounts for 37 % of the country's gross agricultural output and is the leading producer of wheat, on 30 % of the available area. However, the prime irrigated land is

devoted largely to cotton, which is produced on about 50 % of the area. Thus smallholders basically rely on rain-fed cultivation for wheat production and hence farm primarily on less productive land (SCS Report, 2007). Khatlon was affected by heavy rains and flooding in 2010 that significantly decreased wheat output to an amount falling far below expectations. Those smallholders who principally sell agricultural products could benefit from high food prices, especially when given the opportunities to expand or intensify production, which would make both farming and marketing more viable.

The income situation and the agricultural constraints mentioned by the households show that it is beyond the means of most farmers to intensify or expand production in order to benefit from increasing food prices. The majority of those 35 % of the smallholders surveyed who are producing for the market are not in the position to take advantage of increasing and unstable food prices because of their inability to sell strategically (Vades, 1981). Half of the respondents producing for the market cannot sell their products when prices are favourable because they lack appropriate storage facilities. Those who have storage facilities are urged to sell their surplus production immediately in order to pay back debts or buy food. The smallholder who produces a surplus enjoys only very limited market access due to a lack of transportation coupled with long distances to markets, which implies high travel costs and high time expenditures. For 89 % of respondents, the only means of transport was via donkey, only 11 % own or rent trucks (Umarao, 2012).

As a result, the majority of producers sell locally, either at the farm gate to local trader (10 %), in the village to friends and neighbours (20 %) or at the local bazaar (30 %). Producers required to sell locally have few options and little bargaining power. Rural producers who sell only locally are excluded from the price dynamic of a supply-demand driven market and hence also from the potential benefit of favourable prices. In fact, there are indications those smallholders who are less integrated in markets profit even less from price increases than those who enjoy more market participation. Smallholders in more remote villages often sell their surplus to middlemen: mobile traders who travel by lorry (Kamiljon et al, 2012) to villages to buy agricultural produce and to supply the local community. Farmers seem to have an ambiguous feeling towards those traders: On the one hand they know the middlemen

enable them to sell their goods in the first place; some explained that they had managed to build up excellent relationships with their trading partners over time.

On the other hand, smallholders stated that they have no market power and are forced to sell even if they know that the offered price is not appropriately reflecting the current market dynamics. Though most farmers are relatively well informed about prices (either through visits to the bazaar, through the radio or through relatives or friends who live near markets), 40 % indicated that this information does not help them to get a better price and 30 % of all interviewed farmers even stated that they could not negotiate prices at all. However, 60 % of the producers indicated that marketing information did help them to get better prices for their food products (Christiansen et al, 2002).

2.4.6 Food Utilization

Finally the fourth dimension is food utilization, encompasses all food safety and quality aspects of nutrition its sub dimensions are related to health, including the sanitary conditions across the entire food chain. It is not enough that someone is getting what appears to be an adequate quantity of food if that person is unable to make use of the food because he or she is always falling sick. In other words utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security (GOT, 2008).

2.5 Food Availability and Accessibility of Food

2.5.1 Availability of Food in Tajikistan

Here we are focusing on the outlook of agricultural production in Tajikistan, producer prices, trade in basic food stuffs, and the availability of food per capita in the country. The value of gross agricultural output in all farms in GBAO amounted to 191.5 mln. somoni (increased by 7.7% as compared to 2006), Khatlon oblast 1984.7 mln. somoni (by 6.9%), Soghd oblast amounted to 1448.7 mln. somoni (increased by 8,4%) and regions of the republican subordination 988.1 mln. somoni (by 3.1%) (SCS Report, 2007). It depends on climate influence on crop production. During the month of October and November decrease the water level of rivers due to dry weather. In November cold wave was observed in the south-western part of the republic in

Khatlon Oblast and RRS (Regions of the Republican Subordination) it was accompanied by dust storms and fog these all are directly affected the agricultural production in Tajikistan.

The main winter crops are cereal crops and in spring crops are wheat, barley and cereal crops. The major industrial crops are potatoes, vegetables, melons, grapes etc. The trade of basic foodstuffs are wheat, flour, sugar, vegetable oil, fruits, flour products (macaroni, noodles, bread, cakes, pastries), eggs, tea and others are the major food products imported to the Republic of Tajikistan. The availability of food per capita is calculated using a food balance. Food balances usually reveal a trend in total availability, imports, exports, and the availability of food for human consumption and for feed use. A food balance shows for each basic food commodity, the total physical availability and utilization of that foodstuff over a given period of time usually 1 year. Dividing the annual amount of food available for human consumption by the population gives a key indicator of availability, the average availability of food per capita per year. This measure of food availability is a national average (Sinha, 2005).

2.5.2 Accessibility of Food in Tajikistan

Here we are focusing on consumer prices like incomes and expenditures, poverty, food insecurity and poverty reduction strategy in Tajikistan. In December 2007 consumer's prices of most basic foodstuffs increased significantly as compared to December 2006, except of prices for potato and onion. During 2007 the highest increase in prices was registered for cotton oil (100%), light wheat flour (78.7%), cabbage (by 40.2%), bread made from light wheat flour (35.8%), condensed milk (by 34.0%), eggs (by 28.0%), pearl barley (by 25.2%), beef (by 24.3%), milk (by 22.9%), chocolate sweets (by 20.8%), mutton (by 20.7%), pasta (by 20.1%) at the same time the highest decrease in prices was registered for onion (39.9%), potato (32.0%), carrot (13.1%), apples (4.6%), pea and rice (0.5%) (SCS Report, 2007).

The most important sources of cash incomes of households in 2007 continued to remain labour incomes 49.9% and receipts from sales of agricultural products 10.6%. In 2007 the gap between the average incomes of the highest and the lowest deciles amounted to 12.7 times. In 2006 and 2007 average expenditures of population have risen mainly due to increase in prices. The results of the Household Budget Survey show that the share of expenditures for food in the structure of total

household's expenditures in 2006 accounted for less than 60% and decreased by 5.9% as compared to 2005. The share of expenditures for food in urban area decreased by 8.8%, and in rural area - by 1.4%. The same situation was observed in 2007, when share of expenditures for food in urban area increased from 59.0% to 61.8%, and in rural area decreased from 60.0% to 56.3%. However, share of expenditures for food among vulnerable groups of population increased up to 70.7 % (Parikh et al, 2005).

2.6 Impediments to Food Security

2.6.1 Agriculture Dependent on Climate and Irrigation

Climate and irrigation is directly related to the agriculture .They affected to the food availability, access, and utilization. The agricultural productivity likely affect the incomes earned and the food prices faced by poor households, with the net effect on food security a function of each household's particular set of livelihood strategies. Over the last two decades, the country has experienced sharp increases in the intensity and frequency of climate-induced the extreme events include dramatic fluctuations in the hydrological cycle especially from glacial retreat and unseasonal flash floods and the consequential downstream impacts on water resources for hydro power, potable water, irrigation, food security, and rural livelihoods (Braun et al ,1995).

The irrigation system in many areas has ceased functioning due to poor maintenance and breakdowns far beyond the capacity of farmers to repair them. Where water exists and irrigation system has been maintained, lack of power supply and absence of alternative energy to operate irrigation pumps limit farmers' access to water to 1-2 hours per day. Water shortage has caused severe setbacks especially in horticulture, fruit and vegetable production, the most attractive cash crops that helps the households keep a nutritious balance in the food intake, but is also considered as a source of income when surplus is sold in the local and national markets (Rao, et al. 2005).

The main agricultural products are cotton, grain, fruit, grapes, and vegetables. The main industrial products are aluminium, zinc, lead, chemicals and fertilizers, cement, vegetable oil, machine-building equipment, refrigerators and freezers. Tajikistan is rich in such natural resources such as hydropower, and also has a few resources of oil, uranium, mercury, coal, lead, zinc, antimony, tungsten, silver and

gold. The main export products are electricity, cotton, fruits, vegetables and textile products (Umarov 2012).

Human resources are 2.1 million people, of whom 67% are involved in agriculture, 7.5% in industry and 25.3% in the service sector. Population growth rate is very high and is about 21 per 1,000 people. Despite the measures taken by the Government for family planning in the next 5 years, reduction of the birth rate lower than 1.5% per year is not expected. The expected population by 2025 is 8.7 million people. Population growth leads to increased demand for food that requires immediate action to improve food security. In recent years, consumption of food production per capita, especially animal husbandry products sharply declined all across the country (WB, 1994).

2.6.2 Agriculture in Tajikistan

Agriculture is one of the most important sectors of the economy. The share of agricultural sector in the GDP was estimated is to be 18.7 % in 2010. Agricultural products make up 30% of official exports and the agricultural sector employs most of the economically active rural population, many of whom are women. The arable land in Tajikistan is only 7% (around one million ha), which is very small in area for agriculture production (Odling et al, 2002). Tajikistan's many rivers, which feed the irrigated sector not only of Tajikistan but also of Uzbekistan to the west. Arable agriculture is confined, primarily, to river valleys where 68% of the farmed land is usually dependent on irrigation to provide a harvestable crop (Swaminathan, 1996). There are four main valley systems which are following -:

- The Ferghana Valley in the north of the country along the Syr Darya, the south-western part of the valley that stretches from Uzbekistan into Tajikistan.
- The broad Khatlon lowlands in the south-west are extending from Kulyab in the east to the border with Uzbekistan in the west.
- The Hissor Valley between Dushanbe and Tursonzode it is just north of Khatlon.
- The Zarafshan Valley which is narrow strip it is extending east to west between Ferghana and Hissor valleys.

The agriculture sector plays a vital role in the Tajikistan economy contributing about 25% of the country's export revenues mostly from cotton and 35% of the

Government's tax revenue in 2004. Cotton accounts for almost 32% of the planted area, grown mostly on irrigated lands, while some 50% of the arable used for food crops, mainly wheat, followed by maize, vegetables and fruits. Over two-thirds of the population are dependent on agriculture for their livelihood and employs about 67% of the working population. Tajikistan is focused by migration from the urban to rural areas, contrary to other developing countries, due to the search for jobs in the agriculture and mining sectors (WB, 1996).

Wheat was cultivated for the food production and grown mostly on marginal lands with limited inputs and poor seed quality. The poor quality seeds, weakening machinery, inadequate access to credits and other inputs, as well as the fact that country occasionally faces severe bad weather conditions limited the growth in wheat production. Most of the local wheat consumption is imported. Tajikistan still imports more than 50% of its food mostly wheat and access to foreign markets, for imports as well as for exports, is still mainly through neighbouring Uzbekistan and Kyrgyzstan. Most of the regions in Tajikistan are often in a food deficit situation, particularly the remote parts of the country, the mountainous areas, which are most vulnerable during the winter period. However, access to food remains a major problem (Fajgenbaum, 2003).

Kazakhstan suffers from a high rate of poor production conditions. Shocks affecting this country or the whole region can have a severe impact on the food supply and food prices in Tajikistan. The cereal price development in Tajikistan follows the Kazakh market, a phenomenon that was observed in the food price crisis of 2007/08 as well. Russia is another influential player in Tajik trade relations. On the one hand Tajikistan imports 92.9% of its petroleum products from Russia; on the other Russia is the major purchaser of fresh fruit and especially dried fruit from Tajikistan, a chief product of many rural households. After a polio outbreak in April 2010, Russia banned the import of fruit, causing losses and a considerable decrease in household income (Cheneviere et al, 2010).

Tajikistan's weakness due to its lack of diversified trade became clear in 2010, when Russia banned wheat exports and Kazakhstan saw a contraction of its own wheat export supply due to a production shortfall. These circumstances are regarded as the driver of the 2010 price hike of wheat (Djalili, et al, 1998). In addition to a high

pass through of global food price developments, several domestic factors contribute to the instability of the Tajik food market. The weakness of food production to climatic conditions and to shocks like extreme weather or cockroaches is high, given the low capacity to cope with bad growing conditions, resulting in unstable domestic food supply. Wheat production in Tajikistan shows high variability when considered in global and regional comparison (FAO, 1997).

2.6.3 Import-Export Mainly with Uzbekistan

Among Central Asian countries, Tajikistan's biggest trading partners are Uzbekistan and Kazakhstan. Exports to Uzbekistan were \$4.2 million in 1991, \$7.7 million in 1993, \$190.7 million in 1996, and \$65.9 million in 2004. Exports to Kazakhstan were \$7.2 million in 1991, \$12.5 million in 1993, \$24.3 million in 1996, and \$3.5 million in 2004. Exports to Kazakhstan fluctuate considerably (Umarov, 2012). From 1991 to 2004 Tajik imports from Uzbekistan increased. The primary cause of such drastic fluctuations remains the unstable political climate between the two countries.

Tajik imports of all products from Turkmenistan is all but guaranteed, although this could be impeded by Uzbekistan's obstructionist policy of inhibiting transport and not allowing pipelines from other countries to cross its territory. By 2005 Tajikistan was export to Uzbekistan 2,200 tons of aluminium hydroxide, 4,700 tons of cotton fibre and power. Tajikistan relies more heavily on imports from Uzbekistan than Uzbekistan does on Tajikistan (Hiro, 2009). The main motor roads connecting Tajikistan with the external world pass through Uzbekistan.

All current methods of transporting goods and people along these corridors involve serious obstacles. The normalization of economic and political relations with Uzbekistan will therefore increase significantly Tajikistan's trade and economic links with other Central Asian countries, Tajikistan's small and medium sized businesses have a particular interest in the Uzbek market, especially in agriculture. Eliminating obstacles to the transport of Tajik goods will allow the increased production of vegetables, fresh and dried fruits, and non-perishables, and the demand for these goods will significantly increase in Uzbekistan.

Tajikistan and Uzbekistan have great potential for a rapid increase in their mutual trade. If Uzbekistan were to remove its undeclared economic blockade on

Tajikistan, and if visa restrictions were abolished between the two countries, as well as landmines cleared along the shared border, then the potential for growth would be impressive (Umarov, 2012).



Data Sources: World Development Indicators 2010, World Bank.

Figure No.2.4

Table No. 2. 1- GDP Growth in Central Asia, 2005-2009 (Focus on Tajikistan)

Central Asian Republics	2005	2006	2007	2008	2009	Average 2005-2009
Tajikistan	6.7	7.0	7.8	7.9	3.4	6.6
Kyrgyzstan	-0.2	3.1	8.5	8.4	2.3	4.4
Kazakhstan	9.7	10.7	8.9	3.3	1.2	6.8
Uzbekistan	7.0	7.3	9.5	9.0	8.1	8.2

Data Sources: World Development Indicators 2010, World Bank.

Figure no. 2.4 and table no.2.1 shows the GDP growth in Central Asia from 2005-2009 a special focus on Tajikistan. In 2005 to 2008 the GDP growth rate was constantly risen which is 6.7 percent in 2005, 7 percent in 2006 and in 2007 its growth rate is 7.8 and 7.9 in 2008. But it fall down in the year 2009 which is 3.4 it is almost half compare to last four year. The economy was strike by food crises in Tajikistan. The main elements are agriculture production, industry, trade and commerce getting effect by food crises in Tajikistan. So, the economic growth decreased in year 2009. It

is clear that the 2008 economic crises and food crises serious impact on population in the region. If it is compare with other republics, Tajikistan and Kyrgyzstan economic growth decreased.

2.6.4 Nutritional Aspect of Tajikistan

Malnutrition in Tajikistan has been influenced by the after effects of civil conflict, by drought, and by socio-economic factors. Cotton production occupies much of the women's time in Tajikistan. Up to 60% of all cotton production in Tajikistan originates from the Khatlon Oblast. Removed from the household these women are less able to care for their children at key stages in their development. Thus food quality and quantity given to children is likely to be affected. The National Nutrition Survey, 2004 (NNS) was mainly focused on gathering information about the nutritional status of the children surveyed (NNS, 2004).

Under nutrition among women and children in Tajikistan are a serious public health problem contributing to maternal and child mortality and perpetuating the cycle of poverty and hunger. Feed the Future will invest in a combination of food-based inputs and high-impact nutrition interventions, targeted health services, and social and behaviour change communication, as well as activities to improve access to safe drinking water and improved sanitation and hygiene. For example, the Department of Defence is funding a nationwide de-worming program to help reduce the high rates of anemia. Every child has the right to have access to safe and nutritious food, the right to adequate food, and the right to be free from hunger (Falkingham, 2000).

As well as good nutrition being a basic right in it, sound nutrition leads to improved life chances for infants and children and increases the likelihood that children will complete primary education and benefit from the learning experience. Conversely poor nutritional status early in life may have long-term developmental consequences (ADB, 2000). Malnutrition or hunger is therefore an important indicator of the presence of severe child deprivation. The nutritional status of children in Tajikistan is a major cause for concern. According to data from the 2005 MICS, 17 percent of children under age 5 in Tajikistan are underweight compared with 11 percent in neighbouring Kyrgyzstan, 12 percent in Turkmenistan and 8 percent in Uzbekistan. Seven percent of young Tajik children are wasted and 27 percent are stunted (NNS 2004).

2.6.5 Lack of Energy Resources

Lack of energy resources slows down economic growth, affects employment, and access to education, medical services and pure drinking water. Its inefficient use may cause environmental disasters. During the Soviet period, the structure of the energy sector in Tajikistan was divided into two isolated parts: south and north. The south energy system had energy surpluses, while the north had deficits. The north subsystem receives 85% (about 3.5 billion kWh per year) of consumer electricity from Uzbekistan. In its turn, Tajikistan gives the same amount of electric energy to Uzbekistan in the south and to Surkhandaryinskaya oblast.

As a result, there is simply an energy exchange (Ritohie, 1999). The fuel and energy sector of Tajikistan did not only help the country to survive during the independence years but also provided a foundation for its sustainable socio-economic development. The consumption of natural gas decreased at present, the deficit of electricity during the fall-winter period, there is a limited electricity supply mode, and that has a significant impact on the economy of the country. During the summer time, the country has the same amount of excessive electricity supply (Barun, 1992).

References

(*Indicate Primary Sources)

- Alamgir, Mohiuddin (1991), *Providing Food Security for All*, London: Intermediate Technology.
- *Asian Development Bank (2000), *Women and gender relations in Tajikistan*, Manila.
- Asimov, Mukhamed (1987), *Tajikistan*, Moscow: Novosti Press.
- Barun, J.et al, (1992), *Improving food security of the poor. Concept policy and programme*, International food policy research institute, Washington.
- Bhattacharya, B., (2001), "Food security, NPA and Nato", *Yojana*, Vol.45 (1).
- Braun, Joachim Von (1995), *Employment for poverty reduction and food security*, Washington: International Food Policy Research Institute.
- Broca, Sumiter S.,(1998), *Agricultural Trade Liberalisation, Food Security and Poverty: a preliminary survey*, New Delhi: National Council of Applied Economic Research.
- Cheneviere, Alian (2007), *Central Asia the son's Timberline: Turkmenistan. Uzbekistan. Kazakhstan. Kyrgyzstan. Tajikistan. Xinjiang*, Turkmenistan: Vilo Publishing.
- Christiansen, Robert (2002), *Republic of Tajikistan: Selected Issues and Statistical Appendix*, Washington.
- Chung, K.et al. (1997), *Identifying the food insecure: the application of mixed method approaches in India*, International food policy research institute, Washington.
- *CIA, (2008), "World Fact Book," [Online: web] Accessed on 21 Sep 2011, URL: <https://www.cia.gov/library/publications/the-world-factbook/geos/ti.html>.
- Djalili, Mohammad Raza et al. (1998), *Tajikistan: the trials of independence Area of Responsibility*, Surrey: Curzon Press.
- *SCS Report, (2007), "Food Insecurity Assessment based on food consumption statistics derived from Tajikistan 2005 Household Budget Survey" State Committee of Statistics Tajikistan, Preliminary Summary Report *Dushanbe, Tajikistan*.
- Fajgenbaum, Jose (2003), "Republic of Tajikistan: First Review" under the Three-Year Arrangement under the Poverty Reduction and Growth Facility, and Request for Modification and Waivers of Performance Criteria, Washington.
- Falkingham, Jane (2000), *Women and Gender Relations in Tajikistan*, Manila: Asian Development Bank.
- *FAO, (1997), Food and Agriculture Organization, United Nations, *Reforming FAO: the challenge of world food security*, Rome.
- *FAO, (2008), Tajikistan "Reducing the Impact of Price Surge and Agriculture Rehabilitation Programme", (8-9).

- Frankenberger, T.R. and McCarton (1998), “The Household Livelihood Security Concept”, *Food, Nutrition and Agriculture*, F.A.O., Rome.
- George, P.S., (1999), “Some Reflection on Food Security in India”, *Indian Journal of Agricultural Economics*, Vol.54 (2).
- *GOT (2008), *The Concept of the Agrarian Policy of the Republic of Tajikistan*, Government of the Republic of Tajikistan, Dushanbe.
- Gurgen, Emine (1999), *Economic Reforms in Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan*, Washington.
- Hiro, Dilip (2009), *Inside Central Asia: a Political and Cultural History of Uzbekistan, Turkmenistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, and Iran*, New York: Overlook Duckworth.
- *IFPRI (2000), International Food Policy Research Institute (2000), *Achieving urban food and nutrition security in the developing world*, Washington: International Food Policy Research Institute.
- *IFPRI (2011), International Food Policy Research Institute (2011), *Water for Food: Innovative Water Management Technologies for Food Security and Poverty Alleviation*, New York: United Nations.
- *IMF Economic review; (1994), *Tajikistan*, Washington DC: International Monetary Fund.
- *International Monetary Fund, (1999), *Economic Reforms in Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan*, Washington DC.
- Jalolov, Aziz (2011), *Tajikistan The Impact of Volatile and Increasing Food Prices on Small Holders*, Bonn, Germany.
- Johnson, G. (1976), “Increased Stability of Grain Supplies in Developing Countries, Optional Carry. Overs and Insurance”, *World Development*, Vol.4 (12).
- Kamiljon, T.Akramov and Shreedhar, Ganga, (2012), IFPRI Discussion Paper 01163 March 2012, Economic Development, External Shocks, and Food Security in Tajikistan, IFPRI.
- *NNS, (2004), “National Nutrition Survey, Tajikistan (12-14),” Funded By the United States Agency for International Development (USAID).
- Odling-Smee, John, (2002), “Republic of Tajikistan”, Staff Report for the 2002 Article IV Consultation and Request for a Three-Year Arrangement Under the Poverty Reduction and Growth Facility, Washington.
- Parikh, Kirit S., (2005), *Food Security, Poverty and Employment Guarantee*, Mumbai.
- Rao, C.H. Hanumantha Rao, (2005), *Agriculture, Food Security Poverty, and Environment*, New York: Oxford.
- Reutlinger, S., (1977), *Food Insecurity: Magnitudes and Remedies*, Washington, U.S.A.

- Ritohie, Mark et al., (1999), *WTO and the Globalization of Food in Security: How Globalization undermines Food Security, Food Safety and Sustainability*, New Delhi: Research Foundation for Science, Technology and Ecology.
- Sarris, A. and Taylor, L., (1976), "Central Stock, Food Aid and Food Security", *Food, Nutrition and Agriculture*, vol.4, no.2.
- Schmidhuber, Josef and Tubiello, Francesco N., (2007) , "Global Food Security under Climate Change," *Proceedings of the National Academy of Sciences of the United States of America*, Vol. (104): 19703-19708.
- Sen, A.K., (1981), *Poverty and Famines: An Essay in Entitlement and Deprivation*, Clarendon press, Oxford.
- Sinha, Mukesh Kumar, (2005), *The Persian world: understanding people, polity and life in Iran, Afghanistan and Tajikistan*, Gurgaon: Hope India.
- South Asia Initiative Conference, New Delhi, India, April24-25, 2002(Conference Papers), *Economic Reforms and Food Security: The Role of Trade and Technology*, New Delhi: ICRIER.
- Swaminathan M.S., (1996), *Sustainable Agriculture: Towards Food Security*, New Delhi: Konark.
- Umarao, (2012), "Socio-Economic Development in Tajikistan", Lecture delivered on March, 2012 in International Seminar at School of International Studies, JNU: New Delhi.
- *World Bank, (1986), *Poverty and Hunger: Issues and Options for Food Security in Developing Countries*, Washington DC.
- *World Bank, (1996), *Food Security for the World*, Washington: World Bank.
- *World Bank Country Study, (1994), *Tajikistan*, Washington: World Bank. *Turkmenistan*, Victoria: Lonely Planet.

Chapter~3
**Relationship Between Food,
Water & Energy**

3.1 Context

This chapter highlights current trends in food-water-energy in concerned region focusing on the vulnerable areas. It provides an evaluation of the current food security crisis in Tajikistan and links it to the broader water crisis experienced by Central Asia forming an 'Energy-Water-Food Security Nexus'. Central Asia's poorest countries find themselves particularly vulnerable to water, energy, and food insecurities. "Water, food and energy security are chronic impediments to economic growth and social stability. These are tightly interrelated: food production requires water and energy; water; extraction and distribution requires energy; and energy production requires water. Food prices are also highly sensitive to the cost of energy inputs through fertilizers, irrigation, transport and processing" (World Economic Forum 2012).

Tajikistan experienced a "Compound Crisis" during the winter of 2008, when exceptionally cold weather caused breakdowns in the country's energy infrastructure, damaged winter crops and reduced livestock herds. Significant increases in water, energy, and food insecurities resulted. These were subsequently exacerbated by higher global food prices and by the onset of drought conditions in the spring and summer, which particularly affected Central Asia's southern and eastern regions, as well as parts of the Ferghana Valley and the Aral Sea Delta. The effects of these problems were magnified by the difficulties the government and humanitarian organizations working in Tajikistan faced in responding to this acute cold-weather emergency, the roots of which were deeply intertwined with Tajikistan's chronic development challenges.

Water-food-energy nexus in the Tajikistan find themselves particularly vulnerable to water, energy, and food insecurities (water-food-energy nexus). A series of factors such as drought, in combination with higher food and fuel prices culminated in what can be considered a food crisis in broad parts of the country in 2007-2008. In the spring of 2008 World Food Programme (WFP) estimated that roughly 2 million Tajikistan is experienced food insecurity. Tajikistan experienced a compound crisis during the winter of 2008, when exceptionally cold weather caused break downs in the country's energy infrastructure, damaged winter crops and reduced livestock herds.

Drought conditions declines for the 2008-2009 wheat harvest ranging from 3 percent in Uzbekistan to 25 percent in Tajikistan and Turkmenistan. Water levels in hydropower stations and reservoirs across the Aral Sea Basin reached unprecedented low levels, and posed the real risk of Toktogul and Nurek reservoirs falling below “dead levels”, extending energy cutbacks. The situation was subsequently exacerbated by higher global food prices and by the onset of drought conditions in the spring and summer, which particularly affected the country.

Central Asia’s exceptionally cold winter of 2007-2008 caused breakdowns in Tajikistan’s energy infrastructure, reducing winter crop yields and livestock herds. According to the National Bank of Tajikistan, winter-related damages reached \$250 million, (www.nbt.tj.) some 7 percent of 2007 GDP. Economic growth slowed, and food and energy security were adversely affected. Despite a history of annual appeals for donor assistance, the response to these developments by the government of Tajikistan, United Nations agencies, and the international community was unable to prevent millions of people from spending weeks without access to heat and electricity in severe winter conditions.

These problems were exacerbated by global food and energy price trends and subsequently by the onset of drought in the spring and summer, across Central Asia. The drought conditions in turn exacerbated the low water levels in the hydropower stations that generate the bulk of the electricity consumed in Tajikistan where generation capacities had been under great strain by high winter demand for heat and electricity. Developments during the second half of 2008 have regrettably shown that concerns about the possible repeat and spread of Tajikistan’s compound crisis have not been misplaced. It has instead become clear that water, energy, and food insecurities remain significant in Tajikistan.

3.2 Water Resources in Tajikistan

Water is an increasingly strategic resource in Tajikistan for economic and social development. Water cuts across critical issues such as food and fibre production, energy generation, environmental sustainability and human security. Tajikistan’s water resources mainly arise due to glacier melting and rain. Total freshwater reserves in Tajikistan’s glaciers and snowfields are estimated at 550 cub km. Many of them are located in the basins of Obihingou, Gunt, and Muksu rivers as well as in other high-

mountain areas. There are nine water reservoirs containing from 0.028 to 10.5 cub.km of water. The largest reservoirs are Kairakkum on the north of Tajikistan, and Nurek in the central part of Tajikistan.

They are mainly used for electric power generation, irrigation, fish breeding, water supply, and mudflow protection. More than 95 percent of gross electricity in Tajikistan is generated due to hydroelectric power plants. However, use of hydropower potential does not exceed 10 percent. Principal water reservoirs and hydroelectric power plants are situated in the Vakhsh River basin. Two new stations such as Rogun and Sangtuda will be constructed to produce clean electric power. Reservoirs greatly influence the river flow. For example in natural conditions water discharge in Vakhsh river near the Nurek dam varied between 100 to 5,000 cub.m/sec, and currently it has essentially changed and makes from 300 to 2,000 cub.m/sec (see the website enrin.www.in).

3.2.1 River Basins in Tajikistan

Tajikistan can be divided into four major river basins:

- The Syr Darya basin. The northwest of the country forms part of the Syr Darya basin. About 78 percent of the flow of the Syr Darya River is generated on the territory of the Kyrgyz Republic. Only percent of the total flow of the Syr Darya River is generated within Tajikistan by the shallow rivers Khodzhabakirgan, Aksu, Isfara and Isfana, with a total flow of 0.4 km³/year.
- The Amu Darya basin. About 82.5 percent of the flow of the Amu Darya River is generated on the territory of Tajikistan by the Vakhsh, Pyandzh and Kafirnigan rivers. The Vakhsh River is the largest river in Tajikistan, crossing it from the northeast to the southwest. It rises in the Kyrgyz Republic, where it is called the Kyzyl Suu, and its catchment area lies in the highest part of Tajikistan at over 3 500 meters.
- The Pyandzh River forms the border between Tajikistan and Afghanistan for almost its entire length. After the confluence with the Vakhsh River, it becomes the Amu Darya River and about 100 km further downstream it leaves Tajikistan to become the border between Afghanistan and Uzbekistan. The Kafirnigan River is another large tributary of the Amu Darya River. It rises in Tajikistan and

flows into the Amu Darya River about 36 km downstream of the confluence of the Pyandzh and Vakhsh rivers.

- The Zeravshan basin. This basin rising in Tajikistan was once the largest tributary of the Amu Darya River. At present its flow is almost fully used, mainly for irrigation.
- The basin draining to China. In the extreme northeast of the country, a small area drains towards China.

3.3 Energy Resources in Tajikistan

The energy sector of Tajikistan includes several entities. The electric power is the responsibility of the State owned joint stock company Barqi Tojik, which entirely controls production, transportation and distribution of electricity in Tajikistan. Tajikistan consumes 29,000 b/d of oil products, almost all of which are imported. The main source is Uzbekistan, which provides 70 percent of Tajikistan's oil product imports (WB, 2007:7). In July 2001, Tajikistan brought its first small oil refinery. The refinery has a capacity of 400 b/d, and produces gasoline, diesel fuel, kerosene, and fuel oil. The production is far too small for the country's needs, however; Tajikistan still imports almost all its oil as refined petroleum products. Tajikistan has 200 billion cubic feet (Bcf) of natural gas reserves, comprised of several fields. The total natural gas production for Tajikistan in 2000 was 1.4 Bcf. With its small domestic production, Tajikistan must rely on imports for 95% of the natural gas it consumes (ADB, 2010). Tajikistan has had continuing problems in paying for the gas it imports.

There is an intergovernmental agreement with Uzbekistan for a fixed annual quantity, but consumption has been running ahead of schedule. An additional problem is that only 18 percent of the gas consumed in 2001 was paid for by users (Feigenbaum, 2007). As a result of these issues, Tajikistan has had to cut off non paying customers and negotiate with suppliers for more gas. There is a greater hydroelectric power capacity in Tajikistan than any other country in Central Asia. Tajikistan has the potential to produce more than 300 billion kilowatt hours electricity per year, but currently produces only 16.5 billion kilowatt hours (WB, 2010:101). The majority of Tajikistan's hydroelectric energy is produced by the hydroelectric stations on the Vakhsh River. Tajikistan has two separate electrical networks, both linking to Uzbekistan

3.4 New Strategies

Despite a relatively quick response by the international community the crisis revealed the need for new perspectives and strategies in the region regarding similar situations. Such strategies require linking food, energy and water supply chains within and beyond the country. The effects of these problems were magnified by the difficulties the government and humanitarian organizations working in Tajikistan faced in responding to this acute cold weather emergency, the roots of which were deeply intertwined with Tajikistan's chronic development challenges.

The design of new strategic planning and donor coordination frameworks in the form of poverty reduction and country development strategies in Tajikistan respectively, and of the new joint country support strategies and UN development assistance frameworks in this country presents government and the international community with important opportunities to respond to the water, energy, and food security risks facing Central Asia. They also offer opportunities to devise more effective responses to other disaster-related risks particularly those associated with earthquakes, flooding, landslides, and uranium tailings (and other hazardous wastes). When appropriately linked to donor monitoring, these actions could facilitate better management of the links between disaster prevention, humanitarian response, early recovery, and development programming.

Representatives of the international community met in July 2008 in Almaty, in order to proactively help Tajikistan and other Central Asia's governments to better manage these risks, and to alleviate their negative impact on vulnerable regions and social groups. Along with the United Nations' appeals that were launched in Tajikistan during September-October, this consideration which was supported by UNDP and USAID and benefitted from in-kind sustain from these organisations as well as from the World Bank, the Water Agency of Japan, and many other associate organizations (Martino et al , 2009). It focuses on:

- Assessing the degree and implications of water, energy, and food insecurity in Tajikistan in the winter of 2008-2009; and
- Developing proposals to improve governments' and international organization's immediate preparedness to respond to these insecurities.

Longer term, reducing water, energy, and food insecurities in Tajikistan and other Central Asian Republics depends on:

- Prospects for regional cooperation during the Bishkek CIS Summit meeting in October, Central Asia's five presidents promised a cooperative response to the water and energy tensions facing the region;
- Hydrological and meteorological trends in the region, starting with hopes that the drought of 2008 will become a fleeting memory, and extending to uncertainties concerning the effects of climate change on Tajikistan's glaciers;
- Combining political and macroeconomic stability particularly in light of the global economic crisis on the one hand with the more aggressive pursuit of institutional reform, particularly in the energy, water, and agricultural sectors, and in public administration more generally and
- The emergence of more effective links between disaster prevention, humanitarian response, early recovery, and longer-term development programming, particularly in terms of better early warning mechanisms and more sophisticated disaster preparedness activities closer links between the responses to water, energy, and food insecurities on the one hand, and the design and implementation of national disaster preparedness strategies and other high-level international risk-mitigation initiative(WFP,2008) .

3.4.1 Studies on Water and Energy by UNDP (2009)

- Water levels in the Nurek (Tajikistan) hydropower stations remained well below historical levels throughout 2008. According to data from the Scientific Information Centre of the Interstate Commission on Water Coordination (ICWC), water volumes at Nurek ended last year some 9% below historical averages, respectively. These low levels reflect the continuing importance of drought conditions in the Aral Sea basin, which constrain "upstream" winter electricity production in Tajikistan and raise uncertainties about the availability of irrigated water for agriculture in the "downstream" Central Asian countries (Uzbekistan and Turkmenistan) during the spring and summer of 2009 (Middle East, 2008).
- Low water levels in Central Asia's hydropower stations have socio-economic consequences, depressing electric power generation and industrial production, and reducing household access to heat and electricity. Official data for 2008 show electric power generation dropping by 8% in Tajikistan for the year as a whole

(UNDP 2009: 6). This “electric shock” essentially stopped industrial growth in Tajikistan. In Tajikistan, the volume of industrial production was reported down 2.5% during the first nine months of 2008.

- In this country, electricity users are suffering from planned and unplanned electricity cut-offs. Electricity and water tariffs for households and other users have either risen sharply, or are expected to do so in the next 12-24 months. Despite efforts to reduce and rationalise electricity demand, water volumes at the Nurek, and other hydropower stations were well below normal levels during 2008 trends that are continuing into 2009. Difficulties in concluding an agreement in the New Year between the governments of Uzbekistan and Tajikistan on the transmission of Turkmenistani electricity through Uzbekistan to Tajikistan, which led to the cessation of these transmissions in late January 2009, have heightened “dead level” fears about Nurek as well (IMF Report 2008).
- Water and energy insecurities in 2008 were exacerbated by growing concerns about food security. While Tajikistan seems to have avoided declines in food production in 2008, prices for foodstuffs (and consumer goods in general) rose sharply last year. In Tajikistan, consumer prices rose by nearly 21%, thanks to a 26% increase in food prices. While physical availability is not an issue generally, rising prices have made food affordability an increasing concern.
- Food security monitoring conducted by WFP in October-November 2008 found that 1.5 million in Tajikistan were food insecure, while 650,000 were severely food insecure. Concerns about the possible continuation of 2008’s drought conditions have led the US Department of Agriculture to forecast 25% declines for the 2009 winter wheat harvest in Tajikistan (MFA, 2009).

3.5 Uncertainties in Tajikistan

3.5.1 Natural Hazards

Somewhat surprisingly, GDP growth close to 7% was reported in Tajikistan for the first three quarters of 2008. This seems to have been due largely to continuing inflows of remittances from Russia, which during the first three quarters of 2008, were nearly double year-earlier levels. The industrial slowdown was apparently offset by growth in agriculture (increases in acreage planted seem to have offset declines in yields due to drought conditions and locust infestation), construction (due in part to large investment outlays to construct new hydropower stations) and Global food and energy

prices have fallen sharply since their mid-2008 peaks; and while these price cuts were not fully passed on to consumers, annual inflation rates in Tajikistan dropped sharply in the second half of the year.

3.5.2 Regional Cooperation

This seems to have come back into focus - the Central Asian heads of state used the CIS Summit meeting in Bishkek in October to announce an expanded regional cooperation programme, with a special focus on “hydro-energy support, fuel resources supply, water accumulation in the Toktogul (Kyrg) and Nurek (Tajik) reservoirs” Tajikistan was able to boost electricity imports by some 18% in 2008, limiting the decline in electricity consumption to just 3%. On the other hand, these trends may not bring immediate relief to hard-pressed tajik households. For one thing, Tajikistan’s under-developed transport and trade infrastructures can deprive isolated communities of access to foodstuffs, fuels, and other necessities even when central stock piles are full (Kazinform ,2008). Significant deterioration in Tajikistan’s external position combined with drought-induced bad harvests and continuing electricity shortages in 2009, significant socio-economic dislocation has brought about much of the hardships.

3.5.3 Governments and the International Society

With support from the international community, the governments of Tajikistan have introduced programmes to respond to these threats, with a focus on energy security. In particular:

- In rural areas across Tajikistan (except for Gorno Badakhshan), households only have access to electricity (provided by the Barqi Tojik utility) for six hours per day. Access is further reduced for other users (businesses, schools, hospitals) who don’t have their own generation systems. This is despite the introduction of an additional 670 megawatts in annual generation capacity from the Sangtuda-1 hydropower plant, elements of which came on line in January, July, and November 2008 (UNDP 2009: 8). In addition to improving food stocks for health facilities, kindergartens, retirement homes and boarding schools, the response in Tajikistan has emphasised the repair of irrigation systems, drainage systems and pumping stations. Contracts for increased imports of gas (from Turkmenistan and

Uzbekistan) and electricity (from Turkmenistan, transmitted via Uzbekistan) have been concluded.

- However, while the power agreement allowed Tajikistan to significantly increase electricity imports in 2008 (they rose by some 39% in the fourth quarter alone), Turkmenistani electricity exports via Uzbekistan stopped in January 2009, due to the failure to conclude an electricity transit agreement with Uzbekistan for the New Year (MOI, 2008). This halt in electricity imports from Turkmenistan exacerbated pressures on water levels at the Nurek hydropower station, and led the authorities in Tajikistan to tighten electricity rationing in late January 2009 (GOT, 2009).
- Longer term, in Tajikistan anticipate significant additions to power generation capacity, in the form of power stations running both on hydro and fossil fuels. The expansion of the Sangtuda-1 hydropower plant on the Vakhsh river cascade in 2008, which increased Tajikistan's electric power generation capacity by some 10%, is symbolic of both countries' emphasis on more hydropower generation assets, rather than on encouraging energy efficiency or other forms of renewable energy (e.g., small hydro) (FAO et al, 2008). Reconciling this increased reliance on fossil fuels with longer-term imperatives of reducing carbon emissions may also prove difficult.

Unfortunately, the energy sector measures that have been introduced have been unable to push the water levels at the Nurek hydropower stations back to historical averages. While energy imports were well above average levels in 2008 (USAID et al 2008), they were not able to offset declines in domestic power generation and consumption. Neither country has yet robustly pursued reforms that have been successfully introduced in many other transition economies, which have both rationalised energy demand and significantly increased energy supply, while shielding low- and middle-income households from the worst impact of the higher tariffs that come with progress toward longer-term energy security.

There is a risk that energy tensions will force government in Tajikistan to significantly raise electricity (and water) tariffs, without putting in place the accompanying measures needed to increase energy supplies and improve household access to energy especially for poor households (WB, 2005). Tariff hikes without

improvements in access could lead to significant investments in expensive generators for the businesses and households who can afford them and to more heating with firewood and animal dung for those who can't with well known unfortunate deforestation and health consequences. Government actions have played the most important role in the response in the energy sector, with support from the World Bank and other donors, largely outside the UN humanitarian response framework.

3.6 Reasons for Compound Crises

This section discusses the causes and consequences of the compound crisis of water, energy, and food security that took control in Tajikistan during the winter of 2008. It links the causes of the humanitarian dimensions of the crisis the acute energy and food insecurity resulting from the cold winter and then hot, dry spring and summer to the chronic development issues that preceded the winter of 2008. This section also offers a forward looking view on the difficulties this republic face in the winter of 2009 and beyond.

3.6.1 Seasonal factors

Climatic conditions and internal factors are most important role play for food production any region. Tajikistan is most of land mountainous and rivers basin. There are two seasons: winter and summer.

3.6.1.1 Winter

The winter of 2007-2008 may be remembered as the coldest in decades in Central Asia, and especially in Tajikistan. Heavier-than-normal snowfall and colder-than-normal temperatures disrupted life throughout the country, isolated remote communities, and severely limited travel between urban centres. Tajikistan's Hydro-Meteorological Agency reported that in December 2007 snowfalls were 245% above the average (Tajikistan, 2009). In January 2008, daytime temperatures averaged -15°C (instead of the average of -1° to 3°C); rural areas reported lows of -25°C , while Dushanbe experienced ranges of -8°C during the day to -15°C at night. Abnormally cold weather continued until the end of February (AKI, 2008).

Much of Tajikistan's electrical and water infrastructure broke down under the impact of the cold and surging demand for heat and power in urban centres. Public health and education structures were severely hit: attendance rates dropped by half

(WFP 2008) as many schools had to close or operated at below freezing temperatures. Health institutions could not function normally “as many hospitals and health centres closed or worked during restricted hours, and in some cases discharged patients as the severe weather further limited the availability of electricity and running water” (OCHA, 2008c). Orphanages, facilities for street children and homes for the elderly struggled to maintain minimal service levels. Agricultural assets and stocks (farm animals, seeds) were destroyed or damaged, particularly affecting vulnerable rural households.

3.6.1.2 Summer

The low water levels in the hydropower reservoirs remaining after the cold winter were then exacerbated by abnormally low precipitation levels and hot weather in the spring and summer of 2008. Data from Tajikistan’s meteorological agency also show precipitation dropping to 23-46% of long term average levels during 2008. This data is generally consistent with information provided by the World Meteorological Organisation, and by the US Department of Agriculture (www.pecad.fas.usda.gov). According to these sources, precipitation levels in the upper Amu-Darya basin (Tajikistan and Afghanistan) were only 50% of average levels or in 2008 (UNDP 2009: 19). This dry trend was accompanied by higher-than- average temperatures, particularly during the second quarter of the year. On the whole, for many of Central Asia’s southern and eastern regions, as well as for parts of the Ferghana Valley and the Aral Sea Delta, the spring and summer of 2008 were significantly hotter and drier than average. Which is affected the agricultural crops in Tajikistan.

Table No. 3.1

2008 River Outflows in Tajikistan (Compared to 2007, Historical Averages)					
River	Average Outflow (Cubic Metres/Second)			2008 Outflows Relatives to:	
	Jan-Sep, 2008	2007	Hist. Averages	2007	Hist. Averages
Ghund	80	115	92	69%	86%
Vakhsh	364	540	539	67%	67%
Amu-Darya	257	269	345	95%	74%
Varzob	12	19	236	61%	52%
Yohsu	8	7	7	109%	109%
Kofarnihon	47	72	61	59%	75%
Syr-Darya	244	313	323	77%	75%
Obihingov	236	209	192	112%	122%
Isfara	10	22	14	45%	71%

Data Source: *Hydro Metrological Service of Tajikistan*

The food grain production decreased in this Valley and most of population affected by drought in Tajikistan. This factor is most important for promoting food insecurity in Tajikistan. Not surprisingly, this warm dry weather was accompanied by below-normal river flows. The statistics in table no. 3.1 shows that the flows in those portions of the Amu-Darya and Syr-Darya (Central Asia's two major river systems) lying in upstream Tajikistan was below historical averages in 2008. These low water levels have depressed electric power generation and industrial production in 2008. This "electric shock" is most apparent in Tajikistan, where the official statistics show that electric power generation dropped 8%. While 18% growth in electricity in 2008 imports helped cushion this blow, electricity consumption still dropped some 3% last year. Not surprisingly, industrial output through the first three quarters of 2008 was reported down 2.5%; preliminary data suggest a sharper decline for the year as a whole (UNDP 2009: 22).

Inadequate access to heat and electricity services has a chronic character in Tajikistan. However, the energy shortages that took hold in Tajikistan in the winter of 2008, have a more acute character, and are producing new forms of socio-economic deprivation. In Tajikistan, electricity users are suffering from planned and unplanned cut-offs in access to electricity. In rural areas of Tajikistan (except for Gorno Badakhshan), household access to electricity (provided by the Barqi Tojik utility) is currently limited to 3.30 – 7.30 and 17.30 – 20.00 daily. Access is further reduced for other users (businesses, schools, hospitals unless they have their own generators).

In addition, the blackouts are causing the electric water pumps to wear down and break. Villages around Bishkek are experiencing water shortages and are unable to finance repairs. Still, the official socio-economic data suggest that impact of the "electric shock" has thus far been largely confined to the industrial sector. GDP during the first three quarters was reported up 7.2% in Tajikistan. Household incomes were boosted by surging remittances: IMF data show 2008 remittance inflows up 50% (to \$2.7 billion) in Tajikistan (Eurasia Insight 2008). Remittances in both countries helped fuel growth in spending and consumption: data on the CIS statistical office web site show the volume of retail trade up 4% in Tajikistan during the first three quarters of 2008.

3.7 Impact on food Production

In Tajikistan, the negative effects of the drought and locust infestation on agricultural production seem not to have been very large in 2008. Preliminary data for Tajikistan suggest double-digit increases in agricultural output in 2008; output of eggs, vegetables, milk, potatoes, and grains were reported up by 35%, 8%, 3%, 3%, and 1%, respectively. Data for Tajikistan reported on the CIS Statistical Committee web site through October show production of fruit, vegetables, and potatoes up by 80%, 13%, and 11% over 2007 levels; cattle, sheep, and goat herds on 1 October were reported to have grown 17-18% over year-earlier levels. This growth in food production was accompanied by reductions in cotton output, which dropped 24% in Tajikistan during the first 11 months.

Of course, official data from these (and other) countries are not always above reproach, and are sometimes inconsistent with the figures from other sources. According to data from the FAO/WFP/UNICEF survey in Tajikistan, 30% of the farmers reported cattle losses as a result of the harsh winter of 2007-2008; 60% reported the loss sheep or goats; and 54% reported the loss of poultry (FAO et al , 2008). If correct, these losses would have important negative implications for food security in the upcoming winter. The assessment concluded that there is a worse-than-usual feed crisis in the country. Some 20-25% of the cattle could die this winter, unless appropriate action is taken. Dry climatic conditions, over-grazing, and escalating hay prices had left farmers increasingly unable to feed their herds (USAID et al, 2008). Such inconsistencies underscore the importance of continued efforts to improve the quality of official statistics.

Table No.3.2

Food and Consumer Price Inflation in Tajikistan Republic (2007-2008)		
	2007	2008
Consumer Price Inflation	13%	21%
Food Price Inflation	15%	26%
-Cooking Oil	51%	71%
-Bread	8%	62%
-Milk	60%	25%

Data Source: *UNDP-Tajikistan Early Warning Reports, 2009 (Average Annual Rates)*

Table no. 3.2 shows that the food and consumer prices inflation in Tajikistan Republics in 2007 and 2008. It is very clear the consumer price and food price hike

two times in 2008. The cooking oil price increased 51 percent to 71 percent in 2008. The bread price extremely high level increased which is 8 time price inflation. As a result, it is understandable that the food crises hit in Tajikistan and more population get effects.

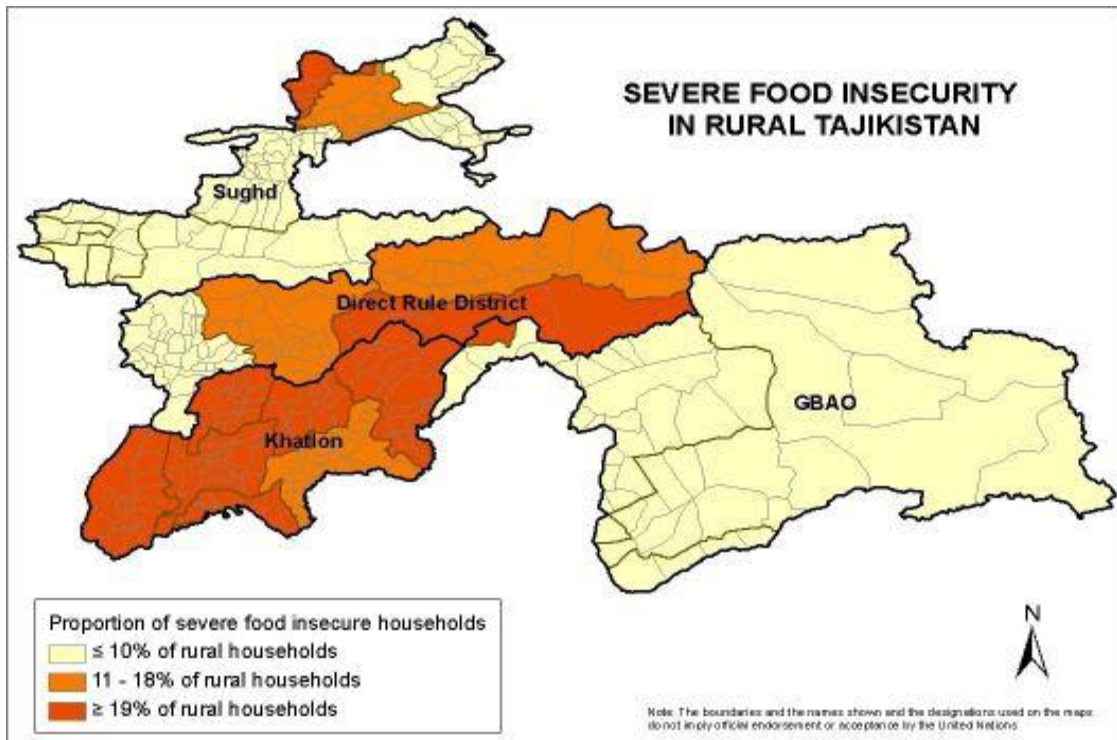
3.7.1 Food

Ironically, growth in agricultural production in 2008 did little to improve food security. Driven by higher global food and energy prices, consumer price inflation rates rose above 20% (on an average annual basis) in both Tajikistan As a result, despite continuing growth in food production and household incomes, according to UN estimates millions of people became increasingly unable to purchase basic foodstuffs in Tajikistan. Who are the foods insecure? Such questions are perhaps best understood in the context of absolute poverty and deprivation. This is particularly the case in Tajikistan and a few other regions of Cent Asia are among the low income countries in the Europe and CIS region (www.siteresources.worldbank.org).

According to internationally comparable World Bank data, the share of the population defined as living in poverty (relative to a threshold of \$2.15/day in consumption expenditures, using 2000 purchasing-power-parity exchange rates) in 2003 was 74% in Tajikistan. In rural areas these rates were even higher, at 77% and 76%, respectively (World Bank 2005). While these rates no doubt fell during 2003-2006, there can be little doubt that absolute poverty remains important in both countries particularly in rural areas.

It also seems likely that, despite the economic growth that these countries enjoyed during 2007-2008, its pro-poor characteristics have been weakened by rising prices for foodstuffs, which comprise some two thirds of the consumer price index in both countries and absorb larger shares of poor households' budgets (UNDP 2009: 22). In such circumstances, food insecurity necessarily has a chronic character, related to its cost (relative to poor household incomes) rather than to physical availability.

Map No. 3. 1- Severe Food Insecurity in Rural Tajikistan



Map Source: *UNDP Regional Bureau for Europe and CIS, New York, 2009*

Map no.3.1 shows that the severe food insecurity in rural Tajikistan in Khatlon and Districts of Republican Subordination province. The Sughd and GBAO provinces are not more than 10 percent proportion of severe food insecure households, 11-18 percent of households of Region. Map is clear showing that these provinces are getting effects by food insecurity in this region. The climatic condition and weak administration did not control the situation of food insecure region in Tajikistan. As a result, the most of part Khatlon and Districts of Republican Subordinate regions are severe food insecure and more than 19 percent households of Dushanbe, RRS, Khatlon regions are under severe food insecure area.

In Tajikistan, the WFP-led assessment conducted in the spring of 2008 found that urban households that must rely exclusively on markets for their food supply (without access to land to grow their own food) are most likely to experience food insecurity. The WFP-led study estimates that 15% of the urban population (200,000 people) are severely food insecure, while another 22% (300,000 people) are moderately food insecure (UNDP 2009: 24). Some 33% of the urban population (437,000 people) are assessed as being chronically food insecure. These are households without employed family members, with poor income-generating

prospects, no access to credit or other capital, and which are characterised by old age, and/or disease (UNDP 2009: 25). The cities of Khujand and Taboshar in Sughd province, and Kurgan Tyube and Sarband in Khatlon province, are considered to be “hotspots” of urban food insecurity.

The WFP-led assessment found that 34% of the rural population (1.68 million) were food insecure in May 2008; 11% of rural households (540,000 people) were classified as severely food insecure, while 23% of rural households (1.14 million people) were moderately food insecure.²⁹ Severely food insecure rural households were found to rely on income from self-employment or remittances (30% of severely insecure households), on agricultural wage labour (20%), on pensions/social benefits (15%), and on non-agricultural wage labour (10%) (WFP 2008: 45).

Most of these are not reliable income sources. Almost 40% of moderately food insecure households rely on remittances as their main income source; less than 20% rely on self-employed activities, 14% on wheat/potato sales, and 13% on agricultural wage labour (WFP 2008: 45). For this group, remittances are likely to be more regular and larger than for the severely food insecure.

In terms of the outlook for food prices in 2009 and beyond on the one hand, consumers in Central Asia as a whole and in Tajikistan in particular, are still suffering from the effects of the sharp increase in global food prices during 2007-2008. These pressures could be further exacerbated by the drought problems described above. The US Department of Agriculture reports that the wider Middle East and Central Asia region in 2007-2008 experienced a sharp drop in grain production, spurring governments to enact grain export bans and resulting in abnormally large region-wide grain imports (www.pecad.fas.usda.gov 2008). A 22% reduction in the 2009 winter wheat harvest is likewise forecast, with particularly large declines for Afghanistan, Iran, Iraq, Pakistan, and Syria. On the other hand, imported food costs have dropped sharply with falling global food prices since mid-2008. Whereas Tajikistan was paying \$314 for a ton of imported wheat in July 2008, this price had fallen to \$234 in December.

But continuing strong growth in remittances, combined with what seems to have been a surprisingly good harvest in 2008, have thus far moderated the impact of

the shock. Going forward, three types of risks seem most important. The impact of the global economic crisis on Tajikistan is likely to increase in 2009. This country external position in terms of remittances, export demand and bank financing could be quite exposed to the adverse developments that are now taking hold in the Russian Federation and Kazakhstan. Both of these countries which are major export markets and sources of remittance incomes and bank finance for Tajikistan is expected to experience low or zero economic growth rates in 2009 (www.eurasianet.org, 2008). National Bank of Tajikistan Governor Sharif Rahimzoda announced in early January 2009 that Tajikistan's gold and foreign currency reserves dropped from \$350 million to under \$200 million during 2008 a figure that would cover less than one month of Tajikistan's \$3 billion import bill (according to IMF projections).

The decline, which according to Rahimzoda reflects the need to support the exchange rate, occurred despite the inflow of some \$2.7 billion in remittance incomes over the course of the year. Most of these tensions would seem to have developed in the fourth quarter of 2008, when growth in remittance inflows dropped off sharply, and when electricity imports rose by 71% (in value terms). Some 2 percentage points of this decline are due to higher prices for gas imports from Uzbekistan a shock that Tajikistan will also experience. Both governments are therefore seeking expanded IMF support in 2009, a new Poverty Reduction and Growth Facility (Tajikistan) (IMF 2008: 67).

The severity of the winter of 2009, and of future winters, and their possible implications cannot be predicted. Through mid-January, the winter of 2009 had been relatively mild in Central Asia, particularly for Tajikistan. Still, a sustained cold snap combined with low water levels in Nurek could significantly reduce heat and electricity supplies and produce broader unfavourable socio-economic consequences. Moreover, if temperatures in Tajikistan have followed seasonal patterns, precipitation was well below normal levels during November-December 2008.

In terms of regional cooperation, the presidents of the five Central Asian countries pledged at the CIS Summit in Bishkek on 10 October to strengthen regional cooperation, in order to better manage the supra-national aspects of water and energy tensions affecting Tajikistan (UNDP 2009: 29). More effective regional cooperation mechanisms, to facilitate the trade/transit/transmission of electricity, gas, coal, and

other shortage products from the wealthier downstream to the poorest upstream countries in Central Asia, could be extremely useful. Longer term, prospects for reducing water/energy/food insecurities in Central Asia hinge on reforming the energy and agricultural sectors.

The Energy sector reforms in many transition economies have been successfully restructured and modernized. Energy intensities and greenhouse gas emissions have fallen; soft coal consumption has been replaced by gas; and more energy-efficient automobiles, appliances, and building codes have been introduced. Significant extensions of the geographic scope and quality of energy services, reductions in energy and financial losses, and improvements in transparency and cash flow within the sector have typically resulted.

This modernisation has been made possible by the rebalancing of energy tariffs, which both reduce (typically non-transparent) subsidies from commercial users to households and budget-funded organisations, and reduce burdens on generation and transmission capacity by encouraging energy consumption at off-peak hours (UNDP 2009: 29). The partial privatisation and marketisation of the energy sector particularly electricity generation, also trunk gas and oil pipelines, and oil, gas and coal extraction, in order to attract much needed private capital and expertise has also figured prominently.

The state's role in the energy sector has similarly been redefined, away from the direct management of energy production and supply, towards the regulation of the sector's natural monopoly elements, expanding network coverage, promoting energy security and the development of renewable energy sources, and the like. While households have typically ended up paying more for energy than was the case before 1990, the effects of higher tariffs are often offset by savings from reduced energy consumption during peak load periods, and improvements in service quality and reliability.

In Central Asia, the evolution of the energy sector has reflected a different logic, revolving around the "water-energy nexus" and tensions between upstream (Tajikistan and the Kyrgyz Republic) and downstream (chiefly Uzbekistan, but also Kazakhstan and Turkmenistan) countries. At bottom is the post-1990 breakdown of

the Soviet-era regime for energy cooperation among the Central Asian republics, under which the upstream hydropower facilities (chiefly Nurek) were used primarily as reservoirs to irrigate water-intensive agricultural sectors downstream in the summer. In exchange, the downstream countries provided Tajikistan with the fossil fuels (at subsidised prices) needed to generate electricity and heat in the winter (UNDP 2009: 30). The marketisation of post-Soviet oil and gas markets ended this arrangement, as the much higher market prices Uzbekistan and Kazakhstan charge the upstream countries for fossil fuels (as well as delivery uncertainties) increased the demand for hydropower and convinced Tajikistan to use Nurek primarily for hydropower generation.

The ensuing large winter water releases (to generate heat and electricity during peak demand season) produced winter flooding in the Syr-Darya basin that damaged the downstream countries' water infrastructures, while stoking fears of water shortages during the summer irrigation season. In the meanwhile, the controversies around the water-energy nexus diverted attention from the tangible benefits other transition economies derived from energy sector reforms.

Nearly two decades after independence, neither country has been able to attract significant foreign capital and expertise to the energy sector, or decisively expand the role of alternative energy technologies (e.g., micro-hydro, solar, wind) (UNDP 2009: 30). The continuation of Soviet-era policies keeping household tariffs well below cost recovery levels has retarded the capital investment needed to maintain the integrity of national energy (and water) supply systems.

The winter of 2008, when Tajikistan's decapitalised energy infrastructure collapsed and created a humanitarian crisis, demonstrated the consequences of inadequate energy sector reform. According to World Bank specialists, Tajikistan's household energy tariffs are among the worlds' lowest. Not surprisingly, electricity and water tariffs for households and other users have either risen sharply, or expected to do so in the next 12-24 months. In Tajikistan, household electricity tariffs rose 25% (to \$0.021 per kilowatt hour) in January 2009, following a 20% increase in January 2008 (UNDP 2009: 30).

While the state-owned Barqi Tojik electricity monopoly has been slow to embrace the small scale micro-hydro (and other alternative energy) projects that can be brought on line with small capital investments, and which donors are willing to co-finance, this may now be set to change: the Tajikistani government in January 2009 tasked the Ministry of Industry and Energy with ensuring the construction of 50 small hydro-power plants (UNDP 2009: 30) by the end of 2009. The compound crisis was in this sense a wake-up call for energy sector reform.

It may also have been a wake-up call for regional cooperation. CIS meeting on 10 October 2008, Head of states pledged renewed efforts to cooperate on “hydro-energy support, fuel resources supply, water accumulation in the Nurek reservoirs”. The rationale for this cooperation reflects the downstream countries’ fear that, with water levels at unprecedented lows, and in order to avoid a repeat of last winter’s energy shortages, the Tajikistani authorities will operate Nurek in full hydropower mode this winter, leaving little water left over for downstream irrigation in the spring and summer of 2009 (UNDP 2009: 31). The 10 October summit meeting was therefore followed by an 18 October agreement between government representatives, under which Kazakhstan agreed to provide Kyrgyzstan with 250 million kilowatt hours of electricity and guarantee the “timely” delivery of coal for the Bishkek Heat and Power Station in 2009 (Kazinform 2008).

In light of the many previous regional cooperation agreements that have not been implemented, prospects for the realisation of the Almaty accord may well depend on efforts by the governments of Tajikistan to take the pressure off their limited hydro generation capacity. These efforts have taken the form of increased procurement and imports of electricity and fossil fuels, as well as stockpiling mazut, generators and other mobile generation equipment. So far, this regional cooperation has born fruit for Tajikistan.

However, it is unclear whether this cooperation will continue robustly into 2009, particularly in light of tensions between the governments of Uzbekistan and Tajikistan regarding the latter’s expansion of the Rogun dam and hydropower station on the Vakhsh river cascade (AKI Press 2008). These governments’ has attempted in incapability to agree on the transmission of Turkmenistan electricity send to Tajikistan via Uzbekistan in the stopped this transmission in January 2009. This

exacerbated pressures on water levels at the Nurek hydropower station, and led the authorities in Tajikistan to tighten electricity rationing in late January 2009 (AKI Press 2008).

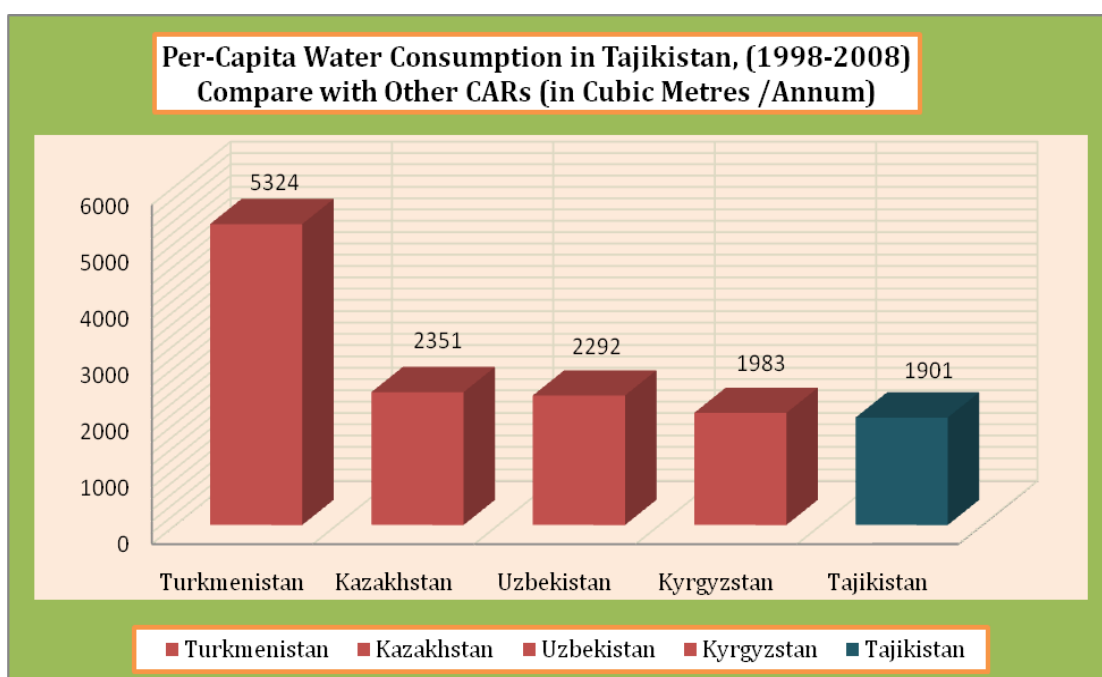
The critical immediate needs facing Tajikistan make the short-term urgency in increasing energy supplies understandable. Still, they run the risk of diverting attention away from three longer-term energy imperatives. First, it is not clear that those who were most vulnerable during last winter's compound crisis in Tajikistan have received the support they need in order to prevent a repeat in the winter of 2009 (UNDP 2009: 31). The "big picture" emphasis on expanding and repairing electric power generation, transmission and distribution capacity may have diverted attention from more prosaic but equally important measures to ensure that schools and hospitals are equipped with the stoves, generators and fuel needed to get through the winter. Second, the problems now afflicting Tajikistan's energy sectors are consequences of decades of under-investment, and of inadequate measures to reform and modernise energy sector regulation.

The production and distribution of electricity, gas, and other energy in the region remains dominated by state-owned monopolies whose tariffs (for households) are often set below long-run marginal costs, and which are not always interested in power generated via alternative energy sources, particularly by potential competitors. Measures to provide alternative energy producers with access to power grids, increase transparency within the sector, reduce the administrative burdens on these countries' limited regulatory capacities, and attract private investment to reduce losses and raise energy efficiency are particularly important. The inability of Tajikistan to reverse the decapitalisation within their energy sectors (particularly in terms of generation assets) is a concrete manifestation of these problems.

Third, the drought conditions now affecting the region raise the question of whether Central Asia is running out of water. Until now, the conventional wisdom has held that the distribution of the region's water resources was much more important than overall water levels. This was particularly the case for "upstream" Tajikistan, which until now have been perceived as having immense glacier water repositories. However, according to a report issued this fall by the United Nations Environment Programme and the World Glacier Monitoring Service, glacier area in the Tian Shan

mountains decreased by 25-35% during the 20th century. Rates of melt have increased significantly since the 1970s (UNDP 2009: 31).

Accelerating glacier melt may be boosting water flow in the Aral Sea basin today, but possibly at the cost of significant, and enduring, regional water shortages in the future. Such a scenario could spell the end Tajikistan's hydropower prospects, vision of which feature heavily in these countries' development strategies. It could also mean increased future reliance on fossil fuels, which could be difficult to reconcile with the importance of climate change mitigation. Better modelling of Central Asia's long-term hydrological, meteorological, demographic, and economic prospects is therefore of critical importance (UNDP 2009: 31).



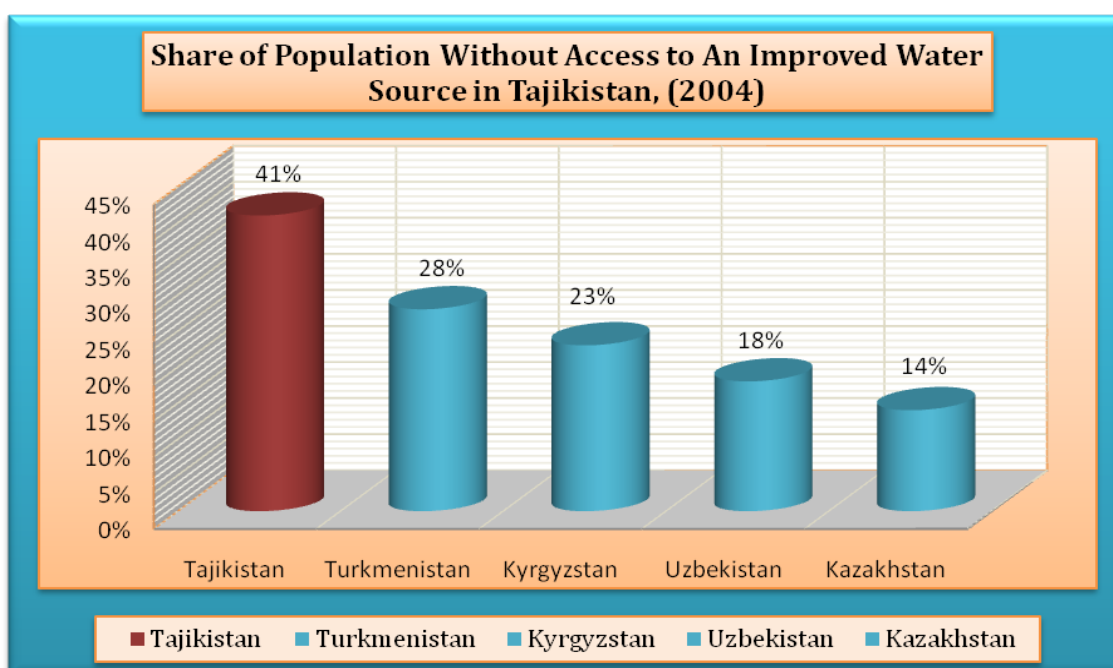
Data Source: www.fao.org.2009.

Figure No.3.1

Figure no. 3.1 shows that per-capita water consumption in Tajikistan, (1998-2008) compare with other republics of Central Asia. Tajikistan is having per-capita water consumption less than other republics (1901) in cubic meters per annum since 1998 to 2008. Since only 30-50% of Tajikistan's wheat crop is irrigated, the impact of the drought will likely be greater there than in Uzbekistan, where most of the crop is irrigated (Govt. of Tajikistan, 2009). However, the continuing predominance of outdated, ineffective water management mechanisms (including over irrigation), inefficient agronomic techniques, and the decapitalisation of irrigation and drainage infrastructures during the past decades result in exceptionally inefficient water use. As

the data in figure above show, even in “upstream” Tajikistan, per-capita water use is many times greater than in neighbouring countries, as well in other countries with similar aridity, topographical, and per-capita GDP levels.

As a substitute, it is due to extremely inefficient irrigated agricultural practices. World Bank research indicates that some 79% of Central Asia’s irrigated water is lost (mostly in unlined intra- and inter-farm canals), compared with loss levels of around 60% in developing countries overall (World Bank, 2004). Other researchers (Savoskul *et al.*, 2003) have estimated that the share of Central Asia’s arable land affected by salinisation and water logging has increased during the last decade from roughly 25% to 50% of irrigated land, results in crop yield decline by 20-30% (UNDP 2009: 33). While the most affected areas seem to be in downstream Uzbekistan (e.g., Kaskadarya) and Turkmenistan (the Achalon and Mary provinces), these problems are not unknown in Tajikistan.



Data Source: UNDP Central Asia Report 2005

Figure No. 3.2

Figure no. 3.2 shows that the share of population without access to an improved water sources in Tajikistan in year 2004 statistics. If it is compare with other Central Asian Republics share of population without access to an improved water sources. Tajikistan has huge water sources in the region. Central Asia’s wasteful water management practices need to be combated at a number of levels. Many of these such as the redesign and improved maintenance of key national and

sub-national irrigation systems can only be accomplished by central governments. But other parts of the problem can be solved by allowing market forces to play a stronger role in water allocation and use.

Movements away from centralised control over agricultural production and support for the cotton monoculture, permitting farmers greater latitude in deciding what to plant and where to sell their crops (and at what prices), removing barriers to community investments in water reclamation, micro-hydro plants, or alternative energy technologies this can go a long way toward reducing water used per dollar of farm output produced. Policies to support the commercial introduction of drip-irrigation, rain-water capture and other water-saving technologies could also go a long way. Longer-term solutions such as these to address Central Asia's chronic developmental challenges in the water area may also, in the final analysis, be the best response to the region's water security needs.

3.8 Relationship Between Food, Water and Energy

The relationship between food, water and energy are compound. Increasing the food needed to nourish people will require energy and water. Providing some forms of energy requires water, and making water safe for consumption requires energy to clean it and then to distribute it. Climate change caused by our unsustainable use of fossil fuels and deforestation affects food production and the availability of water. World Water Forum (2011) points to the need for a better management of the world's natural resources including the protection of freshwater systems, a reduction in waste in the production and distribution of food and a more informed use of water, land and other resources (WWF, 2012). There needs to be stronger political commitment and an enabling framework to carry out this transformation.

Freshwater resources around the world, particularly in the Tajikistan, have decreased in recent decades as a result of climate change and the lack of water resources is becoming increasingly acute. It is obvious that water challenges can only be addressed by taking into account the relationship between water resources, energy, food security and climate change. The key to a successful solution is factoring in these main aspects of regional and national water challenges, today and tomorrow. For over a decade, the Republic of Tajikistan has been living with crippling energy shortages in the winter months. In the coldest period of the year, the population has

access to electricity only two to three hours a day and in some districts there is no electricity for two to three months in a row (UN GS, 2011). This has an extremely negative impact on the socio-economic situation in the country.

However, in view of the need to ensure transparency and openness and to safeguard common regional interests, the Republic of Tajikistan, acting in good faith, requested the World Bank to conduct a ‘Techno-Economic Assessment Study and an Environmental and Social Impact Assessment’ of the project (UN GS, 2011). The Republic of Tajikistan, guided by the principles of good neighborliness, mutually beneficial cooperation and respect for the interests of neighboring countries, took an unprecedented step in agreeing to adopt these new approaches for the implementation of the project. The construction of the Rogun hydropower plant was envisaged in the aforementioned integrated water resource management plan for the Amu Darya River, which continues to serve as the main instrument for water allocation among countries of the basin. The Rogun complex is designed to improve water supply to over 3 million hectares of irrigated land in countries (UN GS, 2011) downstream of the Amu Darya during times of low rainfall or drought, thereby ensuring long-term water, energy and food security.

References

(*Indicate Primary Sources)

- AKI press, (2008), “Minenergo stavit zadachu s 1 yanvarya ogranichivat’ elektroenergiyu tol’ko po nocham” [Ministry of Energy gives itself the task of limit electricity only at night from 1 January], <http://kg.akipress.org/news/64840> (last accessed 9 December 2008).
- *Asian Development Bank, (2010), “Proposed Grant Republic of Tajikistan: Regional Power Transmission Project,” July 2010, Project Number: 43150.
- *FAO/WFP/UNICEF Survey, (2008), “73% of farmers attributed the loss of cattle to severe cold conditions (FAO/WFP/UNICEF Rural Tajikistan Emergency Food Security Assessment, May 2008).
- Feigenbaum, Evan A. (2007), “Central Asian Economic Integration: An American Perspective,” *Remarks to the Central Asia-Caucasus Institute Nitze School of Advanced International Studies*, Johns Hopkins University, Washington, DC.
- *Government of Tajikistan, (2009), “This is why the USDA has forecast a 25% reduction in the 2009 winter wheat harvest for Tajikistan, but only a 3% reduction for Uzbekistan”, *Report, Government of Tajikistan*, Tashkent.
- *IMF, (2008), “Republic of Tajikistan: First Assessment under the 2008 Staff- Monitored Programme”, December 2008; IMF, “Kyrgyz Republic: Request for an 18-Month Arrangement Under the Exogenous Shocks Facility”; and UNDP-Tajikistan, “Early Warning Indicators Report”, 20 January 2009. According to the IMF report, Tajikistan’s balance of payments was in surplus during the first three quarters of 2008.
- *International Monetary Fund, (2008), “Republic of Tajikistan: First Assessment under the 2008 Staff-Monitored Programme”, IMF Country Report 08/382, December 2008.
- Kazinform, (2008), “Podpisan protocol ob ispol’zovanii vodno-energeticheskikh resursov tsentral’noaziatskogo regiona” [Protocol signed about use of water and energy resources in Central Asia], 20 October, <http://www.inform.kz/index.php?lang=eng> (last accessed 18 November 2008).
- Martino, Luigi De, David Gullette and Munisa Vahobova, (2009), “UNDP’s Regional Bureau for Europe and CIS”, *Present Assessment, in Central Asia*, New York.
- Middle East and Central Asia: Continued Drought in 2009/10 Threatens Greater Food Grain Shortages”, Source: <http://www.pecad.fas.usda.gov/> (accessed on 12.10.2008)
- *Minister of Industry, (2008), “Power and Fuel Resources Saparbek Balkibekov told a Bishkek news conference on 10 November. Low water levels at Toktogul were given as the reason. Source: “Kyrgyzstan: Energy Minister Warns of Power Shortage This Winter”, *Eurasia Insight*, 11 November 2008.

- *Ministry of Foreign Affairs (MFA), (2009), *Parties reach consensus on all issues raised at the meeting, which covered hydro-energy support, fuel resources supply, water accumulation in the Toktogul and Nurek reservoir* — Kyrgyzstani Foreign Minister Karabaev.
- *UNDP, (2009), “Central Asia Regional Risk Assessment: Responding to Water, Energy, and Food Insecurity,” *Regional Bureau for Europe and the CIS*, New York, January.
- *UN Secretary-General, (2011), “Water Resources are the Basis for Sustainable Development and Future Progress”, Annex to the letter dated 6 June, from the Permanent Representative of Tajikistan.
- *USAID and IFDC, (2008), “A Rapid Assessment of the Livestock Feed Situation in Kyrgyzstan for the Coming Winter”, by the KAED Project, September, p 2-3.
- *WFP, (2008), “Emergency Food Security Assessment, Tajikistan”, (urban areas), *World Food Programme*, July.
- *WFP, (2008), “Tajikistan Emergency Food Security Assessment, Tajikistan (Rural Areas)”, *World Food Programme*, May.
- *World Bank, (2005), *Growth, Poverty and Inequality: Eastern Europe and the Former Soviet Union*, World Bank, Washington D.C.
- *World Bank, (2007), “Republic of Tajikistan Private Sector Development Strategy,” April 9, 2007, Report No. 38637, p.7.
- *World Bank, (2010), *Lights Out? The Outlook for Energy in Eastern Europe and Central Asia*, Washington DC, p. 101.
- *WWF, (2012), “Rio+20 Must Ensure A Future that is both Sustainable and Fair”, *UN Conference on Sustainable Development*, World Water Forum, Brazil, 11 June.
- National Bank of Tajikistan (<http://www.nbt.tj/en/?c=44&id=44&a=134>) unless specified otherwise, all socio-economic data used in this report are taken from national statistical office web sites.
- See <http://siteresources.worldbank.org/DATASTATISTICS/Resources/OGHIST.xls>
- See <http://enrin.grida.no/htmls/tadjik/soe2001/eng/htmls/energy/intro.htm>
- “Tajikistan: Drowning in Foreign Debt”, *Eurasianet*, 12 January 2009 (<http://www.eurasianet.org/departments/briefs/eav011209c.shtml>).
- *UNICEF, (2009), Tajikistan country office data, www.unicef.org.

Chapter~4
Policies and Programmes

4.1 Background

This chapter is based on food policies and programmes in Tajikistan. Here we also discussed the national and international policies on food security and the role of national and international agencies which are working on food security at the global level viz. Food and Agriculture Organization (FAO), International Food Policy Research Institute (IFPRI), World Food Programme (WFP) and World Food Council (WFC) etc. We also talk about the agricultural reforms and market economy in Tajikistan. Food security usually considered as an instrument to accelerate agricultural development and to increase food production and it is also to address the supply side of the food system.

Before independence, Tajikistan was economically interdependent on the Soviet Union. The production of food and agricultural commodities were mainly organized through a central planning process, which supported the input supply and the output disposal systems. In terms of food grains, certain countries were net exporters (i.e., Kazakhstan) and certain countries were net importers (i.e., Tajikistan). Following independence and the dissolution of their existing trading arrangements, the Central Asian countries faced a choice between self sufficiency in food production and food security through a combination of own production and regional trade. With interregional trade collapsing, each country chose to produce only the amount of grain needed by its population. For countries that were previously net importers, that has meant increased domestic grain production accompanied by increased market prices and farming of food grains in marginal lands. For countries that were previously net exporters, that has meant reductions in food grain production and net decreases in prices and national export revenues from food production activities (Babu et al ,2001).

The role of government to take local initiatives and make more effective and efficient policies in cases where are inadequate and insufficient availability of food. Here we are focusing on FAO's special programme on food production for food security in Low Income Food Deficit Countries (LIFDC) like Tajikistan. The director general of FAO proposed to governments a special programme for increasing food production in support of food security in LIFDC's. The proposal received in June 1994 with strong support by the FAO council.

In 1948 the United Nations General Assembly adopted and proclaimed the Universal Declaration of Human Rights and, according to Article 25(1), everyone has the right to a standard of living adequate for the health and well-being of himself and his family including food, clothing, and housing. Security is best assured when food is locally produced and made available on a continuous basis at an affordable price (maximizing stability in flow of supplies), regardless of climate and other variations. Food security includes freedom from both famine and chronic malnutrition. Nevertheless, it is very much linked with increased agricultural production, management of natural resources, environmental protection, and trade policies. Farmers should receive a fair income from sustainable agriculture and community buffer stocks of food should be maintained (Gahukar, 2004b).

4.2 Food Security on National Level

In Tajikistan 30 percent of the population are food insecure, mostly unskilled labourers, farmers and women headed households in rural areas. The level of malnutrition is very high with a 27 percent. Most of the population cannot afford the minimum consumption basket calculated at 20 Somoni (it's Tajik currency) /person/month and some 33 percent of the population live in extreme poverty and have only 10 Somoni/person/month available for the family needs. Poverty is predominantly a rural phenomenon with the urban population 20 percent less likely to be poor compared to the rural population. The regional breakdown of the very poorest shows that 45.7 percent reside in Khatlon region, 26.1 percent in Sughd region, 19.2 percent in Rayons of Republican Subordination, 6.9 percent in Gorno Badakhshan Autonomous Region (GBAO) and only 2.1 percent in Dushanbe (FSP, 2002).

Basic food production has suffered during the past years (2000 and 2001) severe problems due to a continuous drought and hence accentuated even more the structural food deficit. The grain harvest was decreasing due to weather condition. Other basic food production, particular potatoes has also decreased due to a lack of sufficient seed and some other factors.

The country imports 60 percent of its cereal requirements and is therefore vulnerable to price volatility. Nations are becoming increasingly dependent upon internationally traded food products, often at the expense of traditional agricultural

commodities. As the focus shifts to high value-added imports and exports, regulations targeting the food safety attributes of these products are increasingly cited as a source of potential non-tariff barriers to trade. To counter such concerns, various bilateral and multilateral efforts to demonstrate the integrity of the regulatory systems under which these foods are produced are taking centre stage (Tashmatov, 2000).

The present conditions of demographic growth and the complicated transition toward market economies in Tajikistan, the problems of food security and designing policies to achieve it without compromising economic growth are at the forefront of policy agendas in this country. The problem of food security is particularly real and complex in all the countries of the Commonwealth of Independent States (CIS) attempting to liberalize their markets through various reforms.

Food security in any state depends on the fundamental potential of that country's agricultural production; the level of its investment in the agricultural and food sectors, including the agro industrial system; and the provision of appropriate services to food producers to create the socioeconomic conditions needed for their normal activity. Achieving full harmony between the sustainable use of natural resources and the corresponding food security policy is possible with the sustainable development of agriculture.

4.2.1 Right to Food

All people have the right to decide what they eat and to ensure that food in their community is healthy and accessible for everyone. This is the basic principle of food sovereignty and also right to food. According to United Nations Report in June 2008 2.2 million peoples are most affected by food insecurity. About 30% of the population are threatened by a chronic lack of food, and tens of thousands go entire days without eating and approx 53% of the population lives below the poverty line (UN Report in June 2008). The most affected rural social groups include large families with high dependency ratio, small-scale farmers and women-headed household. The mostly affected urban groups included female-headed households, households depending on remittances and pensions, casual labourers and low income civil servants.

4.2.2 Agriculture Production Policy

The agricultural sector in Tajikistan represented the largest share in production of national income (37.5 percent), and the second largest share in the production of gross domestic product (23.3 percent). More than 20 percent of fixed assets and 42 percent of labour resources have been concentrated in this sector. In spite of these statistics, at present, agriculture is suffering an acute crisis. Domestic production is meeting only 10 percent of the annual demand for grain, 33.5 percent for meat, 43 percent for milk, 54 percent for eggs, and 87.3 percent for potatoes (Babu, et al. 2001). Insufficient development of the grain, livestock, and potato production sectors has necessitated importing these products from other states (Babu, et al. 2000).

Further, fruit and vegetable products are exported from Tajikistan even though domestic consumption of grapes and vegetables falls below recommended standards by 10 percent and 8 percent, respectively. Although the Government of Tajikistan has undertaken certain measures to assist the rural population, the crisis is ongoing, and agricultural enterprises continue to work under critical shortages of all types of agricultural inputs (Csaki et al. 2006). The situation for agro-processing industries is similar to that of agriculture, which has resulted in low levels of agro-industrial production.

Within the most recent 5 year period, the production of cotton fibre decreased by 40.8 percent, vegetable oil by 68.5 percent, wheat flour by 50.0 percent, whole milk products by 74.5 percent, wine and liquor products by 60.5 percent, meat products by 86.6 percent, and fruit and vegetable products by 75.1 percent (Babu, et al. 2000). Unless this trend is reversed through appropriate policies and programs, a large share of Tajikistan's population will continue to face serious food insecurity problems. In order to meet the food production shortfalls, these countries have resorted to increasing the production of food grains at the expense of other high value crops. The next section reviews the impact of policy reforms on food security.

4.2.3 Land Reform Policy

Land reform and its success in allocating land to individual farm households will determine the success of agrarian reform in Tajikistan. Since 1990, a legislative base regulating agrarian reform has been enacted. All the laws, decrees, and resolutions regarding agrarian reform are aimed at resolving two issues: (1) the transfer of land

and property of agricultural enterprises from the state to collective farming units, and (2) the restructuring of agricultural enterprises.

The Resolution of the Government in 1993 on the measures for drawing less favoured lands into agricultural production was an attempt to increase agricultural production. A special land foundation has been established to help create individual farming units and transfer land to lease crops and planting of fruit tree (Oweis, et al. 1999).

A number of new farming forms have been established in the republic in recent years. As of January 1999, 10 207 individual farming units had been established, with 716 000 ha of land allocated to them. Leasing enterprises have been established on the basis of 35 farming units. Inter-farm leasing is widespread: 50 000 collective and individual land leaseholders and 33 agricultural cooperatives control 93 000 ha of land. In addition, 78 000 individual farmers are producing agricultural crops, mainly grains, on 90 000 ha of marginal lands and wastelands.

According to the Decree of the President of Tajikistan in 1995, 50 000 ha of land suitable for cultivation have been allocated to the population. Twenty farms have been privatized and transformed into open-type joint stock companies to carry into effect the law on 'Privatization of state property of the Tajikistan Republic. Previous forms of farming may continue to be used if they continue to be profitable. If a farm is unprofitable or suffering losses it should be restructured into a different, more advanced form (Tashmatov, 2000).

4.2.4 Improve Irrigation System

Irrigation is directly related to food security. If there is good irrigation system in the country they get better output from agriculture but there is no better irrigation system and lack of water for farming they might be suffering from food deficit area. It is the largest water user worldwide, but also the first sector to lose out as scarcity increases (Rosegrant, et al. 2002). The challenges of water scarcity are heightened by the increasing costs of developing new water sources, soil degradation in irrigated areas, groundwater depletion, water pollution, and ecosystem degradation. Wasteful use of already developed water supplies may be encouraged by subsidies and distorted incentives that influence water use.

Hence, investment is needed to develop new water management policies and infrastructure. Although the economic and environmental costs of irrigation make many investments unprofitable, much could be achieved by water conservation and increased efficiency in existing systems and by increased crop productivity per unit of water used. Regardless, more research and policy efforts need to be focused on rain fed agriculture. Exploiting the full potential of rain fed agriculture will require investment in water harvesting technologies, crop breeding, and extension services, as well as good access to markets, credit, and supplies (Barghouti, 2001).

4.2.5 Impact of Taxation Policy

High import taxes and value-added taxes (VATs) hurt the food security of the Tajik people. High import taxes raise the cost of needed agricultural inputs. Higher priced agricultural inputs reduce the consumption of these goods. Therefore, the results of these taxes have been lower yields of agricultural commodities. In addition to the high import taxes, the increase in the VAT on agricultural products from 10 percent to 16 percent in Kazakhstan may increase government revenues, if people are able to purchase the same quantity of agricultural products; however, low incomes and higher taxes may cause less food products to be purchased (Chursov, 2001). Lower purchasing levels will increase the level of food insecurity in the region.

4.3 Motivation and Contribution of the Government

The involvements of Tajik government for improving food security are following:

4.3.1 Poverty Reduction Strategy Programmes

Under the three year (1999-2001) Poverty Reduction and Growth Facility (PRGF) programme of the IMF, the country has embarked in the definition of a poverty reduction strategy. The poverty reduction strategy focuses on labour intensive growth, provision of basic social services, restructuring of the agriculture sector, creation of a competitive banking system, strengthening of public expenditure management and governance, targeting of income support to the poorest groups of the population and improvement of pension system. The Government also adopt a monitoring system to measure the degree of implementation of the strategy programmes as well as its impacts on poverty reduction. For that purpose, social development performance indicators were developed. The PRSP is the main document for donor support and is therefore a very global strategy.

4.3.2 Programmes of Help for Food Security

Although the Government of Tajikistan expressed in the PRSP its strong commitment to continue the reform process in order to increase agricultural output and enhance upstream and downstream sector development, including employment, on local and regional level reforms. The main food aid programmes are following:

4.3.3 The National Strategy

The Poverty Reduction Strategy Programmes (PRSP) is the reference document of the Government for implementing development programmes. It includes all major components of the Food Security Strategy and poverty improvement availability, accessibility and the use of food in a broad concept. This programme is seriously constrained by an extremely tight fiscal environment and lack of resources taking into account the magnitude of the national poverty gap. The limited fiscal flexibility will considerably reduce the possibilities of the government to carry out these poverty alleviation programmes.

4.3.4 Co-operation of European Union (EU)

Currently three projects financed by the EC Food Security Programme are under implementation in Tajikistan. These are Aga Khan Foundation, Action against Hunger and Agency for Technical Cooperation and Development (ACTED). These all are support to food security in Khatlon and GBAO region by improving access to agricultural inputs, potable water and diversification of crops. These all are also increasing the sources of food and improvement of food security at households' level.

4.3.5 International Trade and Food Security

International trade can make substantial contributions and has crucial implications for the food security of countries and households. Food supplies can be stabilised and increased by food imports, the import of productive resources can help increase domestic food production and supplies, export production generates employment and income for large segments of the population, and the foreign exchange proceeds from exports provide for the capacity of a country to buy on the world market what it needs. The importance of trade policies for food security was recognized by the World Food Summit and reflected that struggle to ensure the food, agricultural trade and overall trade policies are contributing to development food security for all through a fair and market oriented world trade system

4.4 Role of International Organisations

There are many international agencies are taking active role in food insecurity in the global and country level. Some of them we discuss here.

4.4.1 World Food Programme (WFP)

The World Food Programme has been providing food assistance to Tajikistan since 1993. Between 1993 and 1999, a total of 116 623 metric tonnes has been provided to victims of the civil war including pensioners, widowed households, invalids and people in institutions. In 1996, WFP initiated a number of foods for work activities which included a land lease programme. The land lease programme has helped the most food insecure households to have access to land for self food production. Since 1996, WFP has helped rehabilitate close to 10 000 hectares of land through its food for work activities.

WFP Tajikistan is currently implementing a one year Protracted Relief Recovery Operation (PRRO) that aims to reach 370 000 beneficiaries and distribute about 50,082 tonnes of food. However, only about 20 000 tonnes is likely to be distributed and half of the beneficiaries reached this year as the PRRO has not received sufficient funding. WFP currently uses a transport corridor, which operates via the Baltic Sea ports (Riga), from where the food consignments are forwarded by rail to trans-shipment sites at Termez (Uzbekistan), Osh (Kyrgyzstan), or directly into Tajikistan.

Transportation from WFP warehouses to areas affected by drought, of which some are located in mountainous districts, which are not easily accessible, will be difficult in view of the nature of the terrain and the harsh climatic conditions during the winter months. Food, therefore, needs to be pre-positioned before the winter. In September 2009, WFP began working with the Government on poverty reduction indicators based on the safety net activities Food for Work (particularly water source-based) and Food for Education.

4.4.2 International Fund for Agricultural Development (IFAD)

International Fund for Agricultural Development (IFAD), a specialized agency of the United Nations, was established as an international financial institution in 1977 as one of the major outcomes of the 1974 World Food Conference. The Conference was organized in response to the food crises of the early 1970s. The conference resolved

that “an International Fund for Agricultural Development should be established immediately to finance agricultural development projects primarily for food production in the developing countries” (IFAD,1995).

One of the most important insights emerging from the conference was that the causes of food insecurity and famine were not so much failures in food production, but structural problems relating to poverty and to the fact that the majority of the developing world's poor populations were concentrated in rural areas. IFAD is dedicated to eradicating rural poverty in developing countries. Seventy to five percent of the world's poorest people from whom 1.4 billion women, children and men live in rural areas and depend on agriculture and related activities for their livelihoods. IFAD focuses on country-specific solutions, which can involve increasing poor rural peoples' access to financial services, markets, technology, land and other natural resources.

4.4.2.1 Goal and Objectives of IFAD

IFAD's goal is to empower poor rural women and men in developing countries to achieve higher incomes and improved food security. The objectives of IFAD are to ensure that poor rural people have better access to, and the skills and organization they need to take advantage of:

- Natural resources, especially secure access to land and water, and improved natural resource management and conservation practices;
- Improved agricultural technologies and effective production services;
- A broad range of financial services;
- Transparent and competitive markets for agricultural inputs and produce;
- Opportunities for rural off-farm employment and enterprise development;
- Local and national policy and programming processes.

IFAD is committed to achieving the Millennium Development Goals, in particular the target to halve the proportion of hungry and extremely poor people by 2015.

4.4.3 Role of World Health Organization (WHO)

It started implementing a Food Security Monitoring System (FSMS), while operating on food safety and life-saving nutrition activities throughout 2008. WHO has worked closely with WFP and other members of the food security cluster to incorporate nutrition indicators:

A- UNICEF, Provided \$1,377,000 in 2008 to complement its country programme of co-operation with the Government. The UNICEF is working together with WFP and FAO. They all are give an assessment of the situation regarding to food security, livelihoods, agriculture and nutrition in rural areas, scaling up micronutrient supplementation of women and children, enhancing high-impact health interventions, and addressing water shortages in selected locations.

B- IMF, Tajikistan has entered into a three-year arrangement under a Poverty Reduction and Growth Facility. The program aims to facilitate external adjustment, increase social spending, lay the foundation for the medium-term growth, contain public and external debt, strengthen key public sector institutions, and reform the agriculture sector.

4.5 World Food Summit

In November, 1996 the Food and Agriculture Organization (FAO, 1996) of the United Nations organized in Rome a meeting of world leaders, the World Food Summit, with the aim of providing a remarkable opportunity for governments, international organizations and all sectors of the civil society to join forces in an intensive campaign to ensure food security for the entire world's people. The Rome Declaration and the World Food Summit Plan of Action establish the ground for the achievement of a common objective that is food security. More than 800 million people throughout the world, and particularly in developing countries, do not meet their basic nutritional needs. The Heads of State and Government that gathered at the World Food Summit, pledged to reduce the number of undernourished people to half their present level, by the year 2015. There are seven strategic steps were developed to tackle the problem of food security.

The first is to ensure an enabling political, social, and economic environment designed to create the best conditions for the eradication of poverty and for durable

peace, based on full and equal participation of women and men, which is most conducive to achieving sustainable food security for all. This step is recognized as a necessary pre-condition for the achievement of food security and the eradication of poverty the establishment of a peaceful and stable political, social and economic environment. It can be achieved through joint efforts by the State and the international community.

For this on the one hand to stable economic conditions and on the other the implementation of development strategies through land reform, protection of property, water and user rights, and protection of vulnerable and disadvantaged groups, including women and indigenous groups. For this particular purpose, states should introduce a legislation fighting discrimination, protecting indigenous groups' identity and traditions, and supporting the pursuit of economic and social development that allows equal access to resources for all, including credit, land and water, and education (Maxwell et al. 1989).

The second step to achieve food security is implement policies aimed at eradicating poverty and inequality and improving physical and economic access by all, at all times, to sufficient, nutritionally adequate and safe food and its effective utilization. Here, the need is emphasized to implement policies to eradicate poverty through the promotion of economic, agriculture, fishery, forestry and land reform policies which will secure economic access to food.

Economic access to food is referred to the urban as well as the rural areas. In urban areas the idea is to provide sufficient income sources, such as employment opportunities and access to credit so as to improve the income of the poor. In rural areas access to productive resources such as land and water should be provided (FAO, 1996). Overall, this objective will allow food insecure households, and members of vulnerable and disadvantaged groups in urban and rural areas to meet their food, nutritional and health needs and to endeavour in supporting those who are not capable of doing so.

The third step is to pursue participatory and sustainable food, agriculture, fisheries, forestry and rural development policies and practices in high and low potential areas, which are essential to adequate and reliable food supplies at the

household, national, regional and global levels, and combat pests, drought and desertification, considering the multifunctional character of agriculture. Food production can be improved by fighting environmental threats to food security, such as desertification, drought and erosion, monitoring and conserving natural resources in food producing areas, in forest lands, and non-arable lands, developing appropriate policies and plans for water management techniques, improving irrigation and implement policies and programmes, in partnership with all actors of the civil society, which will systems increasing cropping intensities and reducing the deforestation rate (Byerlee, et al. 2000). Governments are invited to formulate strengthen the agricultural, fishery and forestry sectors through training and extension systems, always ensuring equal gender opportunities. This will require cooperation between the public and the private sectors to promote a stronger research system leading to the use of appropriate technologies in all sectors (Alston, et al. 2000).

The fourth step is to ensure that food, agricultural trade and overall trade policies are conducive to fostering food security for all through a fair and market oriented world trade system. This step approaches the issue of food security in terms of trade, a key element for the effective utilization of resources and for the stimulation of the economic growth. Governments need to establish reliable internal marketing and transportation systems to ease connections within and among domestic, regional and world markets (Akramov, et al. 2010).

The fifth step is to prevent and be prepared for natural disasters and man-made emergencies and to meet transitory and emergency food requirements in ways that encourage recovery, rehabilitation, development and a capacity to satisfy future trends. The idea is to establish prevention strategies for countries vulnerable to emergencies. This can be achieved first through the development of vulnerability information and mapping, with an analysis of their major causes and consequences, and then through the improvement and development of efficient emergency response mechanisms at international, regional, national and local levels (Goletti, 1999). However, it is fundamental that governments, with the support of civil societies, and of international organizations, ensure that emergency procedures be capable of sustaining the transition from relief to recovery and, finally, to development.

The sixth step is to Promoting most favourable share and use of public and private investments to foster human resources, sustainable food, agriculture, fisheries and forestry systems, and rural development, in high and low potential areas. The idea is to reverse the neglect that agriculture and rural development have experienced lately, through the development of a policy framework that will encourage public and private investments.

The seventh step is to implement, monitor, and follow-up this Plan of Action at all levels in cooperation with the international community (IFPRI, 1992). The objective of this step is to ensure the actual implementation of the World Food Summit Plan of Action. According to the latter, sub-regional, regional, and international cooperation efforts, will be improved. With the assistance of the international agencies of the United Nations, as well as of the international finance and trade institutions, poverty eradication strategies will be formulated and enforced, and individual national plans of action including targets, goals and timetables for achieving food security will be developed.

Clearly, the main objective of the seven strategic steps of the World Food Summit is to set the targets and the conditions necessary to achieve food security, by investing in agricultural infrastructure, research and training, supporting sustainable agricultural and rural development and improving access to food, especially among the disadvantaged groups.

The Food and Agriculture Organization of the United Nations (FAO), has been advocating food security as the main component to achieve development and it is upon this principle that the agenda of the World Food Summit was based. Food security depends on the implementation and performance of actions that are far beyond the agricultural sector. Due to its political, social and economic implications, ensuring food security engages heads of state and government and entails commitments and activities on the part of the whole spectrum of government ministries, international institutions and civil societies (FAO, 1996).

4.6 Role of Government and Future Challenges

There is no unified formula for the achievement of sustainable agricultural development and the resolution of their food security problems because of its

economic, geographic, demographic, cultural, and other differences in Tajikistan. Considering the particular importance of providing grains for the population, a program of urgent practical measures was developed in Tajikistan to increase domestic grain production, including rice. This program was approved by a Resolution of the Government, and by the year 2000 stipulates an increase in grain production of 853,700 tons. To develop the grain production sector and to raise the production of grains to 1 million tons per year the level sufficient to meet domestic demand the area under grain is to be expanded to 400 000 ha , the yield is to be increased to 2.5 ton/ha (Babu et al, 1999).

The following broad measures and steps must be undertaken for the support of agricultural development in Tajikistan-

- Establishing and developing the enterprises of the agro-chemical industry and developing a network of enterprises producing spare parts and machinery for agriculture will be key for jump-starting the agricultural economy.
- Arranging capacity building centres for people employed in agriculture and holding regular fairs for the promotion of agricultural inputs and outputs will re-educate the owners of the household plots (WB, 2003).
- Establishing and developing structures for the insurance of agricultural commodity producers and creating commodities exchanges for trading cotton, grain, and other agricultural commodities will help in managing the risk faced by agricultural producers. (Malthus, 2003).

Finally, setting up broad networks to provide information, auditing, consulting, and marketing services will help deepen the process of economic reforms of the agricultural sector. In light of the ongoing crisis in Tajik agriculture, little hope for rapid or easy agrarian reform is emerging. Extraordinary measures aimed at halting the recession of production will be needed to overcome the agrarian crisis. (Prasidh, et al. 1999). A regulated and socially oriented market economy, based on reasonable and expedient agrarian policy, must be formed. The specific policy measures that must be implemented should include the following.

- Providing civil peace and strong legislative, executive, and judicial power. There is no hope for any new initiatives or any possibility of resolving a single

issue without the elimination of political, interethnic, and social conflicts and of corruption in all social groups.

- Providing sufficient foodstuffs for the country's population both at the national and at the household level.
- Providing social security for the population so that the poor and vulnerable are protected.
- Developing rural crafts and local industry. This will generate additional jobs, help reduce hidden unemployment, and provide needed products, including the supply of competitive products to the external market.
- Pursuing flexible pricing, taxation, credit, and finance policy.
- Working systematically to improve the structure of the entire agro industrial complex with diverse forms of property and farming. This is intended to achieve efficiency in production and will target inefficiencies in harvesting and postharvest handling, storage, final processing, and retail sale of products.

Global food security will remain a worldwide concern for the next 50 years and beyond. Recently, crop yield has fallen in many areas because of declining investments in research and infrastructure, as well as increasing water scarcity. Climate change and HIV/AIDS are also crucial factors affecting food security in many regions. Although agro ecological approaches offer some promise for improving yields, food security in developing countries could be substantially improved by increased investment and policy reforms (Rosegrant, et al. 2002).

Achieving food security needs policy and investment reforms on multiple fronts, including human resources, agricultural research, rural infrastructure, water resources, and farm- and community-based agricultural and natural resources management. Progressive policy action must not only increase agricultural production, but also boost incomes and reduce poverty in rural areas where most of the poor live (Rosegrant, et al. 2003).

Tajikistan faces food insecurity to varying degrees despite the progress made in reforming their economies toward market-oriented ones. There is an urgent need to further expand and deepen the reform process by enabling functioning land, labour, and financial markets. Investments in rural infrastructure include revamping irrigation systems, agricultural research, and extensions.

There is also a need to review the trading arrangement among the Central Asian Republics to identify options for food trade that will improve allocation of land resources to most appropriate and economically efficient activities. In the meanwhile, designing and implementing food security and nutrition intervention to protect the poor and the vulnerable groups of the population is necessary (Babu, et al. 1999).

Subsequently, the national and international policies on food security and the role of national and international agencies viz. Food and Agriculture Organization (FAO), International Food Policy Research Institute (IFPRI), World Food Programme (WFP) and World Food Council (WFC) etc are working on food security at the global level. The agricultural reforms and market economy in Tajikistan have been also discussed in this chapter. Usually, Food security is considered as an instrument to accelerate agricultural development and to increase food production and it is also to address the supply side of the food system.

References

(*Indicate Primary Sources)

- Akramov, Kamiljon T., (2010), "Global Food Prices, Agricultural Transformation and Food Security in Central Asia," *International Conference On Eurasian Economies*, International Food Policy Research Institute, Washington, DC, USA.
- Alston, J. M. et al., (2000), "A meta-analysis of rates of return to agricultural R&D: Ex pede Herculem", IFPRI Research Report 113, IFPRI, Washington, D.C.
- *Asian Development Bank (ADB), (2000a), *Republic of Uzbekistan*. [Online: web] Accessed 21 Sep 2011, URL: <http://www.adb.org/Documents/Profiles/AOTA/35375012>.
- *Asian Development Bank (ADB), (2000c), *Tajikistan*. [Online: web] Accessed 13 July 2012, URL: <http://www.adb.org/Documents/Profiles/AOTA/33183012.ASP>.
- *Asian Development Bank (ADB), (2001a), *Kyrgyzstan*. [Online: web] Accessed 13 Aug 2011, URL: <http://www.adb.org/Countries/Highlights/KGZ.asp>.
- *Asian Development Bank (ADB), (2001b), *Central Asian Economies Seek To Re-Establish Regional Links*. [Online: web] Accessed 23 Sep 2011, URL: <http://www.adb.org/Documents/News/2001/nr2001087.asp>.
- *Asian Development Bank (ADB), (2001c), *Uzbekistan*. [Online: web] Accessed 7 March 2012, URL: <http://www.adb.org/Countries/Highlights/UZB.asp>.
- *Asian Development Bank (ADB), (2001d), *Kazakhstan*. [Online: web] Accessed 23 Jan 2012, URL: <http://www.adb.org/Countries/Highlights/KAZ.asp>.
- *Asian Development Bank (ADB), (2001f), *Turkmenistan*. [Online: web] Accessed 26 June 2012, URL: <http://www.adb.org/Countries/Highlights/TKM.asp>.
- *Asian Development Bank (ADB), (2008), *Food Prices and Inflation in Developing Asia: Is Poverty Reduction Coming to an End?* Manila, Phillipines.
- *Asian Development Bank (ADB), (2000e), *Kyrgyz Republic*. [Online: web] Accessed 14 Jan 2012, URL: <http://www.adb.org/Documents/Profiles/AOTA/30320012.ASP>.
- *Asian Development Bank (ADB), (2001e), *Tajikistan*. [Online: web] Accessed 25 July 2011, URL: <http://www.adb.org/Countries/Highlights/TAJ.asp>.
- *Asian Development Bank (ADB), (2000b), *Kyrgyz Republic*. [Online: web] Accessed 9 Jan 2012, URL: <http://www.adb.org/Documents/Profiles/AOTA/32144012.ASP>.
- Babu, S. C. And Reidhead W., (2000), "Poverty, Food Security, and Nutrition in Central Asia: A Case Study of the Kyrgyz Republic", *Food Policy*, 25 (6), pp. 647-660.

- Babu, S. C. and Reidhead, W., (2000), "Poverty, food security, and nutrition in Central Asia: a case study of the Kyrgyz Republic." *Food Policy*, 25 (6): 647-660.
- Babu, S.C., Tashmatov, A., (1999), "Emerging issues and challenges for attaining food security in Central Asia", Paper presented at the Workshop on Food, Agriculture and Natural Resource Policy Research-Setting the Priorities, 19–21 July 1999, Tashkent, Uzbekistan.
- Babu, Suresh and Rhoe, Valerie, (2001), "Food Security in Central Asia: Economic Opportunities, Policy Constraints, and Future Challenges", Keynote paper prepared for the UNCTAD Regional Workshop on "Food Security and Agricultural Diversification in Central Asia", Almaty, Kazakhstan.
- Babu, Suresh and Rhoe Valerie, (2000), "Food Security, Regional Trade, and Food Safety in Central Asia – Case Studies from Kyrgyz Republic and Kazakhstan".
- Babu, Suresh and Tashmatov, (1999), "*Emerging issues and challenges for attaining food security in Central Asia*", Paper presented at the Workshop on Food, Agriculture and Natural Resource Policy Research-Setting the Priorities, 19–21 July 1999, Tashkent, Uzbekistan.
- Babu, Suresh and Tashmatov, Alisher, (2000), "Food Policy Reforms in Central Asia: Setting the Research Priorities", International Food Policy Research Institute, Washington, D.C.
- Barghouti, (2001), "S.M *Sustainable Development International Perspectives*," 1, 127 (2001), www.sustdev.org/agriculture/articles/edition1/01.127.pdf and Food and Agriculture Organization of the United Nations, *Crops and Drops* (FAO, Rome, 2000).
- Byerlee D., K. Fischer, (2000), "Accessing modern science: Policy and institutional options for agricultural biotechnology in developing countries" (Agricultural Knowledge and Information Systems Discussion Paper, The World Bank, Washington, DC, 2000).
- Chursov, A., (2001), "Tax law changes prompt Almaty bakeries to consider increase in bread prices. Commercial News Update for July 2001. [Online: web] Accessed 13 Jan 2012, URL: <http://www.bisnis.doc.gov/bisnis/country/010802kaznewsjuly01.htm>.
- Csaki, C., Kray, H. and S. Zorya, (2006), "The Agrarian Economies of Central-Eastern Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2005", *World Bank ECSSD Working Paper 46*, Washington D.C.
- *FAO, (1994), "Committee on World Food Security," *Assessment of the Current World Food Situation and Recent Policy Developments*.

- *FAO, (1996), "Food Agriculture and Food Security, the Global Dimension," *World Food Summit*.
- *FAO, (2001), "The impact of HIV/AIDS on food security," *Committee on World Food Security*, Food and Agricultural Organization of the United Nations (FAO), 27th Session, Rome, 28 May to 1 June.
- *Food Security Programme (FSP), (2002), "Technical document for the Republic of Tajikistan".
- Gahukar, R. T., (2004b), "The Problem of Food Security," *Kisan World*, 21(3), 43–45.
- Goletti, F., (1999), Agricultural diversification and rural industrialization as a strategy for rural income growth and poverty reduction in Indochina and Myanmar, *MSSD Discussion Paper No. 30*, Washington DC: International Food Policy Research Institute.
- Hammer, W. C. K., (1999), "Food trade and implementation of the SPS and TBT Agreements: Current status of food trade, including food quality and safety problems". Paper presented at the Conference on International Food Trade Beyond 2000: Science-Based Decisions, Harmonization, Equivalence and Mutual Recognition, October 11-15, 1999, Melbourne, Australia. FAO: Rome.
- *IFAD, (1995), *The State of World Rural Poverty: A Profile of Asia*, International Fund for Agricultural Development, IFAD: Rome.
- *IFPRI, (1992), *Improving Food Security of the Poor*, sections 1-4.
- Kornegay, J. A. Beltran, J. Ashby, (1996), *Participatory Plant Breeding*, P. Eyzaguirre, M. Iwanaga (eds.) International Plant Genetics Research Institute, Rome.
- K. G. Cassman and L. T. Evans, (1998), *Feeding the Ten Billion: Plants and Population Growth*, Cambridge University Press: Cambridge.
- Kangas, R. (1999), *The importance of political and social stability for economic revival in Central Asia 2010: Prospects for Human Development*, New York: Associated Print Productions, Inc.
- Lerman, Z., (2008), "Agricultural Development in Central Asia: A Survey of Uzbekistan", *Eurasian Geography and Economics*, 49(4): 481.
- Lerman, Z. and D. Sedik, (2008), *The Economic Effects of Land Reform in Tajikistan*, Report prepared for European Commission under the EC/FAO Food Security Programme.
- Lerman, Z., Csaki, C. and G. Feder (2004), *Agriculture in Transition: Land Policies and Evolving Farm Structures in Post-Soviet Countries*, Lexington Books, Oxford, UK.

- M. W. Rosegrant, X. Cai and Cline, S. A., (2002), *World Water and Food to 2025: Dealing with Scarcity*, IFPRI, Washington, DC.
- Malthus T. R. (2003), *An Essay on the Principle of Population*, New York: Norton.
- Maxwell S. & Fernando A. (1989), "Cash Crops in Developing Countries: The Issues, the Facts, the Policies," *World Development*, Vol.17, No.11.
- Maxwell S. & Smith M. (1992), *Household Food Security: A Conceptual Review*, IDS, 1992.
- Michalopoulos, C., (1999), "The integration of transition economies into the world trading system," *Policy Research Working Paper No. 2182*, World Bank: Washington DC. [Online: web] Accessed 26 March 2012, URL: [Online: web] Accessed 13 April 2012, URL:<http://wbln0018.worldbank.org/research/workpapers.nsf>.
- Nichol, Jim, (2011), "Tajikistan: Recent Developments and U.S. Interests", Congressional Research Service.
- Oweis, T. and A. Hachum, J. Kijne, (1999), "Water harvesting and supplementary irrigation for improved water use efficiency in dry areas" (System-Wide Initiative on Water Management Paper 7, International Water Management Institute, Colombo, Sri Lanka.
- Pandya-Lorch, R. And M. Rosegrant, (2000), "Prospects for Global Food Security: A Central Asian Context", *Food Policy*, 25 (6), pp. 637-646.
- Prasidh, H. E. Cham, (1999), "Food trade and implementation of the SPS and TBT agreements: Challenges for developing countries in meeting the obligations of the SPS and TBT agreements and the Codex Alimentarius. Paper presented at the Conference on International Food Trade Beyond 2000: Science-Based Decisions, Harmonization, Equivalence and Mutual Recognition, October 11-15, 1999, Melbourne, Australia. Rome: FAO.
- Rosegrant, M. W., Meijer, S. and Cline, S. A., (2002), "International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT): Model description" IFPRI, Washington, DC. [Online: web] Accessed 13 Jan 2012, URL: <http://www.ifpri.org/themes/impact/impactmodel.pdf>.
- Rosegrant, Mark W. and Cline, Sarah A., (2003), "Global Food Security: Challenges and Policies", *Science* 302, 1917(2003).
- Rozelle, S. and J.F.M. Swinnen, (2004), "Success and Failure of Reform: Insights from the Transition of Agriculture", *Journal of Economic Literature*, XLII (2).
- S. Ceccarelli, S. Grandi, R. H. Booth, (1996), in *Participatory Plant Breeding*, P. Eyzaguirre, M. Iwanaga, (eds.), International Plant Genetics Research Institute, Rome, pp. 99-116.

- Shul'ga, V., Y. Chaplygin, O. Rybkin, and S. Kazanskiy,(2001), "Strategic Targers and Stages of Economic Reform in the CIS Countries," *Central Asia and the Caucasus Journal of Social and Political Studies*, No. 4 (10).
- State Committee On Statistics Republic Of Tajikistan, (2008), "Food Security And Poverty If The Republic Of Tajikistan", *Information Bulletin*, No. 4 / 2007, Dushanbe.
- Tashmatov, A., (2000), Food policy reforms for sustainable agricultural development in Uzbekistan, the Kyrgyz Republic, and Tajikistan, *Food Policy* 25: 719–73.
- *UN Report, (2008), "United States Department of Agriculture (USDA), 2008, Food Security Assessment 2007", *Agriculture and Trade Report GFA 19*. Washington, D.C.
- *World Bank, (1990), *Poverty: World Development Indicators*, Oxford Univ. Press, New York, 1990.
- *World Bank, (1996), *Poverty Reduction and the World Bank: Progress and Challenges in the 1990s*, The International Bank for Reconstruction and Development/ The World Bank, Washington, DC.
- *World Bank, (2009), *Farm Mechanization: A New Challenge for Agriculture in low and Middle Income ECA Countries*, Washington, DC: World Bank.
- *World Bank, (2010), *Crisis Response: Europe and Central Asia Region Food Projects*.
- *World Bank (1999), *World development Report 1999*, New York: Oxford University Press.
- *World Bank Group, (2003), "Millennium Development Goals: About the Goals". [Online: web] Accessed 14April 2012, URL: http://www.developmentgoals.org/About_the_goals.htm.
- *World Bank, (2001a), *Selecting an LSMS Data Set*. [Online: web] Accessed 13 Jan 2012, URL: <http://www.worldbank.org/lsms/guide/select.html>.
- *World Bank, (2001b), "Environment Management Capacity Project," [Online: web] Accessed 1 June 2012, URL: <http://www4.worldbank.org/sprojects/Project.asp?pid=P073108>.

Chapter~5
Conclusion

The year 2008 marked two of the biggest crises in recent history: the food crisis at the beginning of the year and the financial crisis at the end. The crises have hit different segments of society. The main victims of the former were the poor, even the poorest of the poor, living in low-income countries, whereas the initial casualties of the latter were relatively affluent income groups in the developed world. Nevertheless, in the era of increasing economic globalisation, the secondary and long-term impacts of both crises affect millions of people around the world. This research deals with the food insecurity in Tajikistan, while the financial meltdown is still unfolding.

At the time it was drafted, just after the World Trade Forum in September 2008, food and oil prices had started to fall, and they were still on a sharp downslide by the end of the year. Yet it remains to be seen whether the financial crisis will mutate into a real cyclone for the developing world, right down to the level of subsistence farming. The analysis of the possible implications of such a development goes beyond the scope of this research. The ultimate difficulty here is the policy dilemma between quick fixes and long-term solutions. Given the multidimensionality of the problem, addressing food insecurity requires a comprehensive and coherent policy agenda at all levels, from the local to the international.

Central Asia's poorest countries find themselves particularly vulnerable to food, water, and energy insecurities. Tajikistan experienced a "compound crisis" during the winter of 2007-2008, as the exceptionally cold weather across Central Asia caused breakdowns in the country's energy infrastructure and damaged winter crops and reduced livestock herds. Slower economic growth and significantly higher food prices resulted which were subsequently exacerbated by global trends and by the onset of drought conditions in the spring and summer. According to government officials, the water level at Tajikistan's Nurek hydro power station in early July was some 7 metres below year earlier levels, and was not much above the "dead level", below which hydro power cannot be generated. In order to ensure that hydroelectric resources will be sufficient to get the country through the winter of 2008-2009, the authorities have announced a series of emergency measures, including limits (with selective cut-offs) on household and industrial electricity deliveries effective 1 September.

Tajikistan is a mountainous country, with vast water reserves, which depend on the seasonal melting of snowfields and glaciers. Numerous evaluations of experts and scientists confirm that climate warming in the highlands of Tajikistan considerably impacts on the state of glaciers, snowfields and glacial lakes. General estimates of changes in water resources in Tajikistan show that in the short term perspective the river flow may increase because of the intensive melting of glaciers and snowfields on the background of warming temperatures. However, in the long term the picture is opposite and deficit of water flow in the main rivers of Tajikistan is anticipated. The climate change impacts will likely lead to water shortages for irrigation, which has already occurred in the agrarian sector. It is serious threat to food security in Tajikistan.

While water, energy, and food insecurity is sharpest in Tajikistan, these concerns are increasingly making themselves felt in Kyrgyzstan as well. The specter of drought conditions and low water levels in Central Asia's "upstream" countries (Tajikistan) could further exacerbate the perennial water concerns experienced by "downstream" countries like Uzbekistan and Turkmenistan, in whose agricultural sectors the water-intensive cultivation of cotton and rice plays critical roles. More broadly, higher global food and agricultural prices are exacerbating the effects of last winter's frosts, raising fresh concerns across the region about inflation, food security, poverty, and malnutrition.

This research endeavors to provide insight into the living situations and managing strategies that many families use to get by in everyday life in Tajikistan. It aims to show that many average people in Tajikistan are knowledgeable and aware of their situation related to poverty and food shortage and have developed individual, household, and communities strategies for dealing with it. Many of these strategies are built into the culture and are naturalized and regularized through every day observance. Others are more unique to individuals or more recent adaptations based on difficult situations. People have found that they need to be self-sufficient and, to a large extent, cannot rely on official government systems or aid from international organizations in order to survive.

This research plans on to provide possible ways for international organizations and governments to think about food aid and development work. It suggests that

organizations seriously consider and analyze the local knowledge and practices of communities before going into them, a part of the development and aid picture that seems to be grossly missing. It also argues that these processes should be bolstered through aid and development work whenever possible. The people involved in poor and hungry communities know more about their daily situations than external aid workers, but aid workers are the ones with the ability to apply for program funding, consider local processes and opportunities from an outside perspective, and initiative efforts to improve livelihoods. By analyzing and thoroughly considering ethnographic information about how people live, think about food and deal with shortages, international organizations can better address local situations and have more informed aid workers.

Within a specific context, this research suggests numerous points that support and development organizations would benefit from considering in the Tajikistan context and perhaps throughout Central Asia as a whole. First, it shows the significant food security challenges and poverty faced even by the middle class, highly educated, and often urban populations in Tajikistan and highlights the importance of focusing support and development dollars on households and communities, with less focus on individuals. It also shows only a handful of the complex strategies and systems that exist related to food and support within the country and reveals that such systems are essential to many people's survival. It also shows the importance of food and food traditions within communities and the social relevance of hospitality and sharing food. Further consideration of these processes and a focus on a broader ethnic selection, including Tajiks, as well as other ethnic groups within the country, would likely provide even more complex and important information worth considering when initiating support and development programs.

It is known that the agricultural sector of the country is one of the most vulnerable to the risks and consequences of climate change. Since agriculture is largely dependent on the climate and weather conditions, any adverse effects of climate change and variability in the form of natural disasters that are determined either by the abundance or the lack of precipitation will directly affect the agricultural sector and food production. The main crops that are most vulnerable to climate change risks in Tajikistan are rice, wheat, vegetables, fruits, cotton and other moister-

loving culture. The risk of yield reduction of these crops under climate warming is caused by a lack of natural moisture and water resources for irrigation.

Since Tajikistan is rich in water resources, hydropower engineering is an important sector. Its development depends on the stability of the flow of main rivers. Currently, the share of hydroelectricity production in Tajikistan is 98 percent. It is known that climate change has three main risks for sustainability of the energy sector of Tajikistan.

- Firstly, it is primarily the risks associated with the supply of water resources for electricity production. Even now, there has been some reduction in runoff, which causes problems in the hydropower sector.
- Secondly, climate change impacts in the form of climate-caused natural disasters may adversely affect the sustainability of hydropower facilities and infrastructure. It is known that change of water availability of the Vakhsh River over the past 50-70 years has insignificantly affected the existing hydropower facilities.
- Thirdly, climate change will possibly change the structure of the energy consumption in the medium and long term. Currently, the major energy consumers in Tajikistan are industry, agriculture, and housing and communal services.

The rise of temperature, the unevenness in rainfall and the intensive melting of glaciers are the key indicators of climate change in Tajikistan. As a consequence, there is an increase of climate-caused natural disasters as floods and mudslides in some areas of the country and droughts in other ones. Water resources, natural ecosystems, agriculture, water management, energy sector, transport infrastructure, food security and public health in Tajikistan are the most vulnerable to climate change. In this case, the vulnerability of water resources is a cross-issue, as it is closely intertwined with other key sectors: land resources, agriculture, energy, food production etc.

Because of its endemic poverty and the weakness of its state services, the population of Tajikistan is extremely vulnerable to the occurrence of external shocks. The 2008 winter compound crisis and the repetition of hazards (floods, mudflows, and extreme weather patterns) has stressed traditional coping mechanisms and adversely

affected the resilience of the poorest households. In this context, the economic crisis which has further developed in the first semester of 2009 has directly hit the poorest households and has put an important number of them in a situation of moderate/borderline food insecurity.

The overall economic situation deteriorated in the first semester of 2009 causing a drop in industrial production (-13 percent), export revenues (-48 percent) and an overall slowing down of the growth rate of the GDP (-50 percent). This has largely been the consequence of low prices and weak demand on global markets for cotton and aluminium which remain the two main export commodities for Tajikistan. The global financial crisis has also affected the amount of foreign remittances sent by Tajik emigrate workers, mainly from Russia which dropped by an estimated 34 percent. It is estimated that those remittances contribute to 30-50 percent of the national GDP. As a result, unemployment has increased as one third of industrial plants and factories are at standstill and a consequent number of migrant workers are returning to Tajikistan. This situation also entails lower tax revenues for the State which in turn generates delays in the payment of wages and pensions (35 million TJS of arrear payments). Economic Access being largely identified as the main cause for food insecurity in the Country, this economic crisis has thus generated large spread moderate/borderline food insecurity in the country.

A certain number of seasonal elements have however contributed to temporarily ease the situation. Summer is a season when households are typically better-off in terms of food security due to summer harvest which means better food access thanks to increased income as well as own production from house gardens. Agricultural season has been favourable this year thanks to timely and sufficient rainfall and possibly change in crop patterns (increased planting of wheat crop instead of cotton crop). As a result, summer crop production for 2009 is expected to be higher by +25-40 percent according to estimates as compared to last year figures. The good level of agricultural production has also supported the relative stability of prices for food items. The cost of the Food Basket was of 85.14 TJS in July 2009 which represents a decrease of 13 percent as compared to the prices for the same period last year. It should be however noted that prices remain at a significantly higher level than before the mid-2007 world hike in food prices.

Finally, it can be said that availability of food at regional and state level rarely creates any problem. The most important is the access to food availability rather than food production in Tajikistan. The concept of food security is complex and multidimensional. We can see it at international, national, regional, household and even at individual levels. Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutrition food to meet their dietary needs and food preferences for an active and healthy life.

The concept of food security is complex and multidimensional. It is the nutritional status of the individual household member that is the ultimate focus and the risk of that adequate status not being achieved or becoming undermined. Subsequently, it is found that food security is related to food safety such as hygiene and prevention of illnesses caused by food in bad condition or food borne sicknesses.

There are number of socio-economic indicators for measuring household food insecurity such as owning poor quality land or no land, holding distress sales of livestock productive and valued assets, taking loans, substitution of inferior quality staple food and vegetables, migration for search of work, working of pregnant and lactating mothers, etc. Food availability is an integral part of the food security chain and is a function of domestic production of food grains and imports/ exports.

Food security remains an important issue in the mountainous nation of Tajikistan, where of its 7 million population, two million are undernourished. Agricultural activity represents 24.5 percent of GDP in Tajikistan. However, poverty precedence in the country sits at 54 percent. FAO supported Tajikistan from 2004 to 2006 through a project entitled support to the preparation of investment projects within the National Programmes for Food Security (NPFS). FAO supported the Poverty Reduction Strategy, the monitoring and food security unit and the Ministry of Agriculture in designing, analyzing and evaluating food security and agricultural investment programmes. Tajikistan is a member of the Economic Cooperation Organisation (ECO) and the nation's Regional Programme for Food Security (RPFS) was formulated in 2005. In close consultation with ECO member countries, FAO played a leading role in promoting regional food security. ECO's nine regional

programmes are partitioned into sub-groups of trade and production and are to be implemented over a five-year period.

Recent economic and social shocks have adversely affected the agriculture sector, reducing land use and productivity. Inadequate smallholder land size, unresolved land reform issues, skewed agricultural policies and strategies, water management obstacles and non sustainable use of the country's natural resources are significant challenges. Compared with other Central Asian countries, Tajikistan has the highest number of female-headed households, which are disproportionately affected by poverty and discrimination. The U.S. Agency for International Development Family Farming Program (FFP) is a four-year effort to improve food security in Tajikistan by increasing the volume of agricultural production, boosting the income of food insecure households to make food more accessible, and raising the standard of household nutrition.

The overall objective is to support food security in all its dimensions preventing crises and contributing to achieving the Millennium Development Goal 1 (MDG-1) in Tajikistan. The purpose is to increase food security and rural incomes, particularly in rural areas, so that beneficiary communities' are better prepared, capable and resilient to cope with recurring "lean seasons" as well as with external shocks. The expected results of the programme are to food availability, food accessibility, stability of food supply and utilization.

The main focus of the interventions will be on the most food insecure areas, communities and groups in subsistence households, principally in the Northern and Southern of uplands. Activities that contribute to improved quantity and quality of food production, along with increased reliability of food production systems, for subsistence households in the most vulnerable communities, principally in upland areas of Tajikistan; and/or

- Activities that contribute to increased sustainable rural income generation and improved access to markets; and/or
- Activities that contribute to improved food use and nutrition, the establishment or strengthening of social safety nets, and reduction of other debilitating factors, especially for the most vulnerable,

- Activities that contribute to local capacity building both at local governmental level and, especially, at community level in order to help villagers to look for development opportunities by themselves.

Tajikistan has consistently supported the further development and strengthening of regional cooperation and partnership; it believes that the challenges facing Central Asia, particularly with respect to water, energy and the environment, should be addressed through dialogue and negotiations, in compliance with the purposes and principles of the Charter of the United Nations; and Tajikistan is making every effort to achieve sustainable development, well-being and prosperity in the region.

The Republic of Tajikistan believes that it is only through timely and coordinated efforts that the countries of the region will collectively be able to address contemporary challenges and find the right solutions to existing and emerging problems. Region-wide approaches to water and energy resource use in Central Asia will contribute towards more effective water resource management. This will help to ensure water, energy and food security, economic growth, greater overall prosperity and, more generally, the sustainable development of the entire region.

Selected Bibliography

(*Indicate Primary Sources)

- Acharya, Amitav, (2001), "Human Security East versus West", *International Journal*, Vol. 56 (3) 442-460.
- *ADB, (2006), "Trade Facilitation and Customs Cooperation," Financed by the Asian Development Bank, Prepared by: Adil Cubukgil, for the Asian Development Bank, January.
- AKI press, (2008), "Minenergo stavit zadachu s 1 yanvarya ogranichivat' elektroenergiyu tol'ko po nocham", Ministry of Energy gives itself the task of limit electricity only at night from 1 January. [Online: web] Accessed 14April 2012, URL: <http://kg.akipress.org/news/64840>
- Akramov, K. and N. Omuraliev, (2009), "Institutional Change, Rural Services, and Agricultural Performance in Kyrgyzstan", *Discussion Paper 175*, Washington, DC.
- Akramov, Kamiljon T., (2010), Global Food Prices, Agricultural Transformation and Food Security in Central Asia, International Conference on Eurasian Economies, International Food Policy Research Institute, USA: Washington, DC.
- Alamgir, Mohiuddin, (1991), *Providing food security for all*, London: Intermediate Technology.
- Alston, J. M. et al., (2000), "A meta-analysis of rates of return to agricultural R&D: Ex pede Herculem", IFPRI Research Report 113, IFPRI, Washington, D.C.
- *Asia Report, (2009), "Tajikistan: On the Road to Failure", Crisis Group Working to Prevent Conflict worldwide.
- *Asia Report, (2011), "Tajikistan: The Changing Insurgent Threats", *Asia: Is Poverty Reduction Coming to an End?* Manila, Phillipines.
- *Asian Development Bank, (2000), *Women and gender relations in Tajikistan*, Manila.
- *Asian Development Bank, (2008), *Food Prices and Inflation in Developing Asia: Is Poverty Reduction Coming to an End?* Manila, Phillipines.
- *Asian Development Bank, (ADB), (2000a), *Republic of Uzbekistan*. [Online: web] Accessed 21 Sep 2011, URL: <http://www.adb.org/Documents/Profiles/AOTA/35375012>.

- *Asian Development Bank (ADB), (2000b), *Kyrgyz Republic*. [Online: web] Accessed 9 Jan 2001, URL:<http://www.adb.org/Documents/Profiles/AOTA/32144012.ASP>.
- *Asian Development Bank (ADB), (2000c), *Tajikistan*. [Online: web] Accessed 13 July 2012, URL:<http://www.adb.org/Documents/Profiles/AOTA/33183012.ASP>.
- *Asian Development Bank (ADB), (2000e), *Kyrgyz Republic*. [Online: web] Accessed 14 Jan 2012, URL:<http://www.adb.org/Documents/Profiles/AOTA/30320012.ASP>.
- *Asian Development Bank (ADB), (2001b), *Central Asian Economies Seek To Re-Establish Regional Links*. [Online: web] Accessed 23 Sep 2011, URL:<http://www.adb.org/Documents/News/2001/nr2001087.asp>.
- *Asian Development Bank (ADB), (2001c), *Uzbekistan*. [Online: web] Accessed 7 March 2012, URL: <http://www.adb.org/Countries/Highlights/UZB.asp>.
- *Asian Development Bank (ADB) (2001d), *Kazakhstan*. [Online: web] Accessed 23 Jan 2012, URL: <http://www.adb.org/Countries/Highlights/KAZ.asp>.
- *Asian Development Bank (ADB), (2001e), *Tajikistan*. [Online: web] Accessed 25 July 2011, URL: <http://www.adb.org/Countries/Highlights/TAJ.asp>.
- *Asian Development Bank (ADB), (2001f), *Turkmenistan*. [Online: web] Accessed 26 June 2012, URL: <http://www.adb.org/Countries/Highlights/TKM.asp>.
- *Asian Development Bank (ADB), (2008), *Food Prices and Inflation in Developing*
Asimov, Mukhamed (1987), *Tajikistan*, Moscow: Novosti Press.
- *ASP Asian Development Bank (ADB), (2000b), *Kyrgyz Republic*. [Online: web] Accessed 9 Jan 2012, URL:<http://www.adb.org/Documents/Profiles/AOTA/32144012.ASP>.
- Babu, S. C. and Reidhead W., (2000), “Poverty, Food Security, and Nutrition in Central Asia: A Case Study of the Kyrgyz Republic”, *Food Policy*, 25 (6): 647-660.
- Babu, S.C. and Tashmatov, A., (1999), “Emerging issues and challenges for attaining food security in Central Asia”, Paper presented at the Workshop on Food, Agriculture and Natural Resource Policy Research-Setting the Priorities, 19–21 July 1999, Tashkent, Uzbekistan.

- Babu, Suresh and Rhoe, Valerie, (2001), “Food Security in Central Asia: Economic Opportunities, Policy Constraints, and Future Challenges”, Keynote paper prepared for the UNCTAD Regional Workshop on “Food Security and Agricultural Diversification in Central Asia”, Almaty, Kazakhstan.
- Babu, Suresh and Sanyal Prabuddha, (2009), *Food Security, Poverty and Nutrition Policy Analysis*, New York: Library of Congress.
- Babu, Suresh and Tashmatov, Alisher, (2000), “Food Policy Reforms in Central Asia: Setting the Research Priorities”, International Food Policy Research Institute, Washington, D.C.
- Barghouti, (2001), S.M *Sustainable Development International Perspectives*, 1, 127 (2001), [Online: web] Accessed 12 April 2012, URL: <http://www.sustdev.org/agriculture/articles/edition1/01.127>.
- Baris, Karapinar and Christian Haberli, (2010), *Food Crises and the WTO World Trade Forum*, Cambridge: Cambridge University Press.
- Barun, J.et al., (1992), *Improving food security of the poor, Concept policy and programme*, International food policy research institute, Washington.
- Bhattacharya, B., (2001), “Food security, NPA and Nato”, *Yojana*, Vol.45 (1).
- Bigman, David, (1985), “Food Policies and Food Security under Instability: Modeling and Analysis.
- Braun, Joachim Von, (1995), *Employment for poverty reduction and food security*, Washington: International Food Policy Research Institute.
- Broca, Sumiter S.,(1998), *Agricultural trade liberalisation, food security and poverty: a preliminary survey*, New Delhi: National Council of Applied Economic Research.
- Byerlee, D. and K. Fischer, (2000), “Accessing modern science: Policy and institutional options for agricultural biotechnology in developing countries”, Agricultural Knowledge and Information Systems Discussion Paper, The World Bank, Washington, DC.
- Cheneviere, Alian, (2007), *Central Asia the son’s timberline: Turkmenistan. Uzbekistan. Kazakhstan. Kyrgyzstan. Tajikistan. Xinjiang*, Turkmenistan: Vilo Publishing.
- Christiansen, Robert, (2002), *Republic of Tajikistan: Selected Issues and Statistical Appendix*, Washington.

- Chung, K. et al., (1997), *Identifying the food insecure: the application of mixed method approaches in India*, International food policy research institute, Washington.
- Chursov, A., (2001), “Tax law changes prompt Almaty bakeries to consider increase in bread prices. Commercial News Update for July 2001. [Online: web] Accessed 13 Jan 2012, URL: <http://www.bisnis.doc.gov/bisnis/country/010802kaznewsjuly01.htm>.
- *CIA, World Fact Book, (2008). [Online: web] Accessed on 21 Sep 2011, URL: <https://www.cia.gov/library/publications/the-world-factbook/geos/ti.html>.
- Csaki, C., Kray, H. and S. Zorya, (2006), “The Agrarian Economies of Central-Eastern Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2005”, *World Bank ECSSD Working Paper 46*, Washington D.C.
- D. Byerlee, K. Fischer, (2000), “Accessing modern science: Policy and institutional options for agricultural biotechnology in developing countries”, Agricultural Knowledge and Information Systems Discussion Paper, The World Bank, Washington, DC.
- Daly, J.C.K., (2007), “Unlocking the Hydroelectric Potential of Tajikistan”, *Terra Daily*.
- Djalili, Mohammad Raza et al., (1998), *Tajikistan: the trials of independence Area of Responsibility*, Surrey: Curzon Press.
- Dyurgerov, M. B. and M. F. Meier, (2000), “Twentieth Century Climate Change: Evidence from Small Glaciers”, *Proceedings of the National Academy of Sciences* 97(4): P.P. 1406–1411.
- *Eurasian Developments Bank, (2008), *Water and Energy Resources in Central Asia Utilization and Development Issue, Industry Report*, Republic of Kazakhstan, Almaty.
- Fajgenbaum, Jose, (2003), “Republic of Tajikistan: First Review” under the Three-Year Arrangement under the Poverty Reduction and Growth Facility, and Request for Modification and Waivers of Performance Criteria, Washington.
- Falkingham, J., (2000), “A Profile of Poverty in Tajikistan”, *Centre for Analysis of Social Exclusion*, London School of Economics.

- Falkingham, J. et al, (2002), *A Profile of Poverty in Tajikistan*, London School of Economics and World Food Program, *Pre-Crop Assessment Mission Report and Cereals Yield Forecast for 2002: Tajikistan*, Dushanbe, WFP
- Falkingham, Jane, (2000), *Women and gender relations in Tajikistan*, Manila: Asian Development Bank.
- *FAO, (1994), Committee on World Food Security, *Assessment of the Current World Food Situation and Recent Policy Developments*.
- *FAO, (1996), Food Agriculture and Food Security, *The Global Dimension*, World Food Summit.
- *FAO, (1997), Food and Agriculture Organization, United Nations, *Reforming FAO: the challenge of world food security*, Rome.
- *FAO, (2000), Food and Agriculture Organization of the United Nations, *Crops and Drops*, FAO, Rome.
- *FAO, (2001), Food and Agricultural Organization of the United Nations (FAO), "The impact of HIV/AIDS on food security," Committee on World Food Security, 27th Session, Rome, 28 May to 1 June, 2001.
- *FAO, (2005), "Aquastat FAO's Information System on Water and Agriculture". [Online: web] Accessed, 25 July 2012, URL: <http://www.fao.org/nr/water/aquastat/countries/tajikistan/index.stm>.
- *FAO, (2005), "Measuring hunger at sub national levels from household", *Food and Agriculture Organisation*, Statistics Division Working Paper Series, Number ESS/ESSA/005e www.fao.org/es/ess/faostat/foodsecurity.
- *FAO, (2008), "High Level Conference on World Food Security: the Challenges of Climate Change and Biodiversity", Food and Agriculture Organization, United Nations, Rome, 3-5 June.
- *FAO, (2008), "*Tajikistan Reducing the Impact of Price Surge and Agriculture Rehabilitation Programme*", (8-9).
- *Food and Agricultural Organization of the United Nations (FAO), (2001), "The impact of HIV/AIDS on food security," Committee on World Food Security, 27th Session, Rome, 28 May to 1 June.
- *Food Security Programme (FSP), (2002), Technical document for the Republic of Tajikistan.

- Fortucci, P., (2002), “The Contribution of Cotton to Economy and Food Security in Developing Countries”, *The Food and Agriculture organization of the United Nations (FAO)*, International Cotton Advisory Committee.
- Frankenberger, T.R. and Carton, Mc., (1998), “The household livelihood security concept”, *Food, Nutrition and Agriculture*, F.A.O., Rome.
- Fumagalli, M., (2008), “EUCAM-EU Central Asia monitoring”, CEPS Centre for European Policy Studies, Europe.
- Fumagalli, Matteo, (2008), “The ‘Food-Energy-Water’ Nexus in Central Asia: Regional Implications of and the International Response to the Crises in Tajikistan”, *European Union -Central Asia Monitoring*, 2(3).
- Gahukar, R. T., (2004b), “The problem of food security,” *Kisan World*, 21(3), 43–45.
- George, P.S., (1999), “Some reflection on food security in India”, *Indian Journal of Agricultural Economics*, Vol.54 (2).
- Goletti, F., (1999), “Agricultural diversification and rural industrialization as a strategy for rural income growth and poverty reduction in Indochina and Myanmar”, *MSSD Discussion Paper No. 30*, Washington DC: International Food Policy Research Institute.
- Goodson, L. P., (2001), *Afghanistan’s Endless War*, Seattle, University of Washington Press.
- *Government of Tajikistan, (2008), Government of the Republic of Tajikistan, *The Concept of the Agrarian Policy of the Republic of Tajikistan*, Dushanbe.
- *Government of Tajikistan, (2008), “The Concept of The Agrarian Policy of The Republic of Tajikistan”, Approved by the Resolution of the *Government of the Republic of Tajikistan*, 31 December.
- *Government of Tajikistan, (2008), “Food Security and Poverty in the Republic of Tajikistan,” *State Committee on Statistics Republic of Tajikistan*, Information Bulletin, Dushanbe.
- Gurgen, Emine, (1999), *Economic Reforms in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan*, Washington.
- Hammer, W. C. K., (1999), “Food trade and implementation of the SPS and TBT Agreements: Current status of food trade, including food quality and safety problems”. Paper presented at the Conference on International Food Trade Beyond 2000: Science-Based Decisions, Harmonization, Equivalence and Mutual Recognition, October 11-15, 1999, Melbourne, Australia. FAO: Rome.

Headey, D and Fan, S., (2010), “Reflections on the Global Food Crisis. How Did It Happen? How Has It Hurt? And How Can We Prevent the Next One?”, *International Food Policy Research Institute*. Research Monograph 165. [Online: web] Accessed 21 Sep 2011, URL: <http://www.ifpri.org/sites/default/files/publications/rr165.pdf>. Cited in European Commission DG ENV News Alert Issue 225 January 2011.

High Level Task Force on the Global Food Security Crisis Tajikistan Country fiche, October 2009. [Online: web] Accessed 24 Feb 2012, URL: <http://www.un-foodsecurity.org>.

Hiro, Dilip, (2009), *Inside central Asia: a political and cultural history of Uzbekistan, turkmenistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, and Iran*, New York: Overlook Duckworth.

Idrisova, A., (2010), “Climate change impacts on biodiversity and its implications on Protected Areas Management in Tajikistan,” Central European University, Budapest.

*IFAD, (International Fund for Agricultural Development), (1995), *The State of World Rural Poverty: A Profile of Asia*, IFAD: Rome.

*IFPRI, (1992), *Improving Food Security of the Poor*, sections 1-4.

*IFPRI, (2000), *Food Policy Reforms in Central Asia: Setting the Research Priorities*, International Food Policy Research Institute, Washington, D.C.

*IFPRI (International Food Policy Research Institute), (2000), *Achieving urban food and nutrition security in the developing world*, Washington: International Food Policy Research Institute.

*IFPRI (International Food Policy Research Institute) (2011), *Water for food: Innovative water management technologies for food security and poverty alleviation*, New York: United Nations.

*IMF (2008), “IMF helping countries respond to food crisis”, paper presented at Food Security Conference, [Online: web] Accessed 22 Sep 2011, URL: <http://www.imf.org/external/pubs/ft/survey/so/2008/NEW060308Ahtm>.

*IMF (2008), “Republic of Tajikistan: First Assessment under the 2008 Staff-Monitored Programme”, December 2008; IMF, “Kyrgyz Republic: Request for an 18-Month Arrangement Under the Exogenous Shocks Facility”; and UNDP-Tajikistan, “Early Warning Indicators Report”, 20 January 2009. According to the IMF report, Tajikistan’s balance of payments was in surplus during the first three quarters of 2008.

- *IMF Economic review, (1994), *Tajikistan*, Washington DC: International Monetary Fund.
- *International Crisis Group, (2009), *Tajikistan: On the Road to Failure*, Asia Report, No. 162, 12 February.
- *International Fund for Agricultural Development (IFAD), (1995), *The State of World Rural Poverty: A Profile of Asia*, IFAD: Rome.
- *International Monetary Fund (2008), “Republic of Tajikistan: First Assessment under the 2008 Staff-Monitored Programme”, IMF Country Report 08/382, December 2008.
- *International Monetary Fund, (1999), *Economic reforms in Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan*, Washington DC.
- Ivanic, M. Martin, (2008), “Implications of Higher Global Food Prices for Poverty in Low-Income Countries”, *World Bank Policy Research*, Working Paper, No. 4594.
- J. Kornegay, J. A. Beltran, J. Ashby, (1996), *Participatory Plant Breeding*, P. Eyzaguire, M. Iwanaga (eds.) International Plant Genetics Research Institute, Rome.
- Jalolov, Aziz, (2011), *Tajikistan The impact of volatile and increasing food prices on small holders*, Bonn, Germany.
- John, T. Cook and A. Frank Deborah (2011), *Food Security, Poverty and Human Development in the United State*, Boston: Boston University Press.
- Johnson, G., (1976), “Increased stability of grain supplies in developing countries, optional carry, Overs and insurance”, *World Development*, Vol.4 (12).
- Joint United Nations Program on HIV/AIDS (UNAIDS), (2003), [Online: web] Accessed 4 June 2012, URL: [http:// www.unaids.org](http://www.unaids.org).
- K. G. Cassman, *Proc. Natl. Acad. Sci. U.S.A.* 96, 5952, (1999) and L. T. Evans (1998), *Feeding the Ten Billion: Plants and Population Growth*, Cambridge University Press: Cambridge.
- Kamiljon, T.Akramov and Shreedhar, Ganga, (2012), IFPRI Discussion Paper 01163 March 2012, Economic Development, External Shocks, and Food Security in Tajikistan, IFPRI.

- Kangas, R., (1999), *The importance of political and social stability for economic revival in Central Asia 2010: Prospects for Human Development*, New York: Associated Print Productions, Inc.
- Kassam, K. A., (2008), "Diversity as if Nature and Culture Matter: Bio-cultural Diversity and Indigenous Peoples," *International Journal of Diversity in Organizations, Communities and Nations* 8: 287–95.
- Kazinform, (2008), "Podpisan protokol ob ispol'zovanii vodno-energeticheskikh resursov tsentral'noaziatskogo regiona" (Protocol signed about use of water and energy resources in Central Asia). [Online: web] Accessed 14 April 2012, URL: <http://www.inform.kz/index.php?lang=eng>.
- Kelly, Charles, (2009), "Field note from Tajikistan Compound disaster - A New Humanitarian challenge", *Journal of Disaster Risk Studies*, 2(3).
- Kilavus, T.D., (2011), "Understanding Civil War: A comparison of Tajikistan and Uzbekistan" *Europe –Asian Studies*, Vol.63 (2): 263-290.
- Kreutzmann, H., (2005), "The Significance of Geopolitical Issues for Development of Mountainous Areas of Central Asia", *Strategies for Development and Food Security in Mountainous Areas of Central Asia*, International Workshop, Dushanbe, Tajikistan.
- Kumar, Sanjeev, (2006), "Drug Trafficking in Central Asia: A case Study of Kyrgyzstan," M.Phil Dissertation from *School of International Studies*, Jawaharlal Nehru University, New Delhi.
- Lal, Rattan, et al., (2011), *Climate Change and Food Security in South Asia*, New York: Library of US Congress.
- Lerman, Z., (2008), "Agricultural Development in Central Asia: A Survey of Uzbekistan", *Eurasian Geography and Economics*, 49(4): 481.
- Lerman, Z. and D. Sedik, (2008), *The Economic Effects of Land Reform in Tajikistan*, Report prepared for European Commission under the EC/FAO Food Security Programme.
- Lerman, Z.; Csaki, C. and G. Feder, (2004), *Agriculture in Transition: Land Policies and Evolving Farm Structures in Post-Soviet Countries*, Lexington Books, Oxford, UK.
- Lerman, Zvi and David Sedik, (2009), "Agricultural Recovery and Individual Land Tenure: Lessons from Central Asia," FAO Regional Office for Europe and Central Asia, *Policy Studies on Rural Transition No. -3, October*.

- Library of Congress, (2007), "A Country Study: Tajikistan", *Federal Research Division*, [Online: web] Accessed 23 Sep 2011 URL: <http://lcweb2.loc.gov/frd/cs/tjtoc.html>.
- Lieshout, Van et al., (2004), "Climate change and malaria: analysis of the SRES climate and socio-economic scenarios," *Global Environmental Change*, 14: 87–99.
- Lobell, David, (2010), "Climate Effects on Food Security", in Marshall Bruke and David Lobell (eds.) *Climate Change and Food Security Adapting Agriculture to a Warmer World*, New York: Springer.
- M. W. Rosegrant, Meijer, S. and Cline, S. A., (2002), "International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT): Model description" IFPRI, Washington, DC. [Online: web] Accessed 12 June 2012, URL: <http://www.ifpri.org/themes/impact/impactmodel.pdf>.
- M. W. Rosegrant, X. Cai and Cline, S. A., (2002), *World Water and Food to 2025: Dealing with Scarcity*, IFPRI, Washington, DC.
- Madramootoo, Chandra A. and Viktor A. Dukhovny, (2008), *Water and Food Security in Central Asia*, Springer, London, New York.
- Makhmud, F. Shavmarov, (2008), "Peasants' Perspectives towards Development Interventions: Case studies of Community Agriculture and Improvement of Household Food Security Project", in Zarafshan valley of Tajikistan reported.
- Malthus T. R., (2003), *An Essay on the Principle of Population*, New York: Norton.
- Martino, Luigi De, David Gullette and Munisa Vahobova, (2009), "UNDP's Regional Bureau for Europe and CIS", *Present Assessment, in Central Asia*, New York.
- Maxwell S. & Fernando A, (1989), "Cash Crops in Developing Countries: The Issues, the Facts, the Policies," *World Development*, Vol.17 (11).
- Maxwell S. & Smith M., (1992), *Household Food Security: A Conceptual Review*, IDS.
- McKinney, Philip and Matthew Parnaby, (2004), "National Nutrition Survey, Tajikistan", Survey Implemented by: Action against Hunger, *Republican Centre for Nutrition Issues, Ministry of Health*, October.

- Michalopoulos, C., (1999), “The integration of transition economies into the world trading system” *Policy Research Working Paper No. 2182*, World Bank: Washington DC. [Online: web] Accessed 24 Sep 2011, URL: [http://wbIn0018.worldbank.org/research/workpapers.nsf/bd04ac9da150d30385256815005076ce/c575dcf6f65d76928525682d00625787/\\$FILE/wps2182.pdf](http://wbIn0018.worldbank.org/research/workpapers.nsf/bd04ac9da150d30385256815005076ce/c575dcf6f65d76928525682d00625787/$FILE/wps2182.pdf).
- Middleton, R. and H. Thomas, (2008), *Tajikistan and the High Pamirs*, New York: Odyssey Books.
- *Minister of Industry, (2008), “Power and Fuel Resources Saparbek Balkibekov told a Bishkek news conference on 10 November. Low water levels at Toktogul were given as the reason. Source: “Kyrgyzstan: Energy Minister Warns of Power Shortage This Winter”, *Eurasia Insight*, 11 November 2008.
- Ministry of Foreign Affairs, (2009), *Parties reach consensus on all issues raised at the meeting, which covered hydro-energy support, fuel resources supply, water accumulation in the Toktogul and Nurek reservoir-Kyrgyzstani* Foreign Minister Karabaev.
- Mohamed, Behnassi et al., (2011), *Global Food Insecurity Rethinking Agricultural and Rural Development Paradigm and Poverty*, New York: Springer.
- Mustaeva, N., (2009), “Challenges and Opportunities for Sustainable Energy End-use in Urban Residential Sector of Tajikistan”, Central European University, Budapest.
- National Bank of Tajikistan [Online: web] Accessed 11 April 2012, URL: <http://www.nbt.tj/en/?c=44&id=44&a=134>.
- Nichol, Jim, (2011), “Tajikistan: Recent Developments and U.S. Interests”, Congressional Research Service.
- *NNS, (2004), “National Nutrition Survey, Tajikistan (12-14)”, Funded By the *United States Agency for International Development (USAID)*.
- Nygaard, D. et al., (2005), “Seizing Opportunities to Promote Development and Improve Food Security in the Mountainous Regions of Central Asia”, *International Workshop*, Dushanbe, Tajikistan June 6-10, 2005.
- Odling-Smee, John, (2002), “Republic of Tajikistan”, Staff Report for the 2002 Article IV Consultation and Request for a Three-Year Arrangement Under the Poverty Reduction and Growth Facility, Washington.

- Olimova, S., (2005), “Impact of External Migration on Development of Mountainous Regions: Tajikistan, Kyrgyzstan, Afghanistan, and Pakistan”, *International Workshop*, Dushanbe, Tajikistan, June 6–10, 2005.
- Oweis, T. and A. Hachum, J. Kijne, (1999), “Water harvesting and supplementary irrigation for improved water use efficiency in dry areas” (System-Wide Initiative on Water Management Paper 7, International Water Management Institute, Colombo, Sri Lanka.
- Pandya-Lorch, R. And M. Rosengrant, (2000), “Prospects for Global Food Security: A Central Asian Context”, *Food Policy*, 25 (6): 637-646.
- Parikh, Kirit S., (2005), *Food security, poverty and employment guarantee*, Mumbai.
- Pomfret, R., (2008), “Kazakhstan”, Anderson, K. and Swinnen, J. (eds.) *Distortions to Agricultural Incentives in Europe’s Transition Economies*, Washington DC: World Bank.
- Pomfret, Richard, (2003), “Central Asia since 1991: The Experience of the New Independent States”, *OECD Development Centre Working Paper no. 212*, Formerly Technical Paper no. 212.
- Prasidh, H. E. Cham, (1999), “Food trade and implementation of the SPS and TBT agreements: Challenges for developing countries in meeting the obligations of the SPS and TBT agreements and the Codex Alimentarius. Paper presented at the Conference on International Food Trade Beyond 2000: Science-Based Decisions, Harmonization, Equivalence and Mutual Recognition, October 11-15, 1999, Melbourne, Australia. Rome: FAO.
- Rao, C.H.H., Ray. S. K. and K. Subbarao, (1988), “Unstable Reforms and Poverty Alleviation in India,” *Indo-Dutch Studies on Development Alternatives*; 17, New Delhi, Sage Publications.
- Reutlinger, S., (1977), *Food insecurity: magnitudes and Remedies*, Washington, U.S.A.
- Ritohie, Mark et al., (1999), *WTO and the globalization of food in security: how globalization under mines food security, food safety and sustainability*, New Delhi: Research Foundation for Science, Technology and Ecology.
- Rosegrant, M. W., Meijer, S. and Cline, S. A., (2002), “International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT): Model description” IFPRI, Washington, DC. [Online: web] Accessed 13 Jan 2012, URL: [http:// www.ifpri.org/themes/impact/impactmodel.pdf](http://www.ifpri.org/themes/impact/impactmodel.pdf).

- Rosegrant, Mark W. and Cline, Sarah A., (2003), "Global Food Security: Challenges and Policies", *Science* 302, 1917.
- Rozelle, S. and J.F.M. Swinnen, (2004), "Success and Failure of Reform: Insights from the Transition of Agriculture", *Journal of Economic Literature*, XLII (2).
- Russell, B., (2008), "Food crisis needs aid on scale of tsunami to avert famine", *The Independent*, 23 April.
- Ceccarelli, S. et al., (1996), in *Participatory Plant Breeding*, P. Eyzaguirre, M. Iwanaga (eds.), International Plant Genetics Research Institute, Rome.
- S. M. Barghouti, (2000), *Sustain. Dev. Int.* 1, 127 (2001), [Online: web] Accessed 2 Jan 2012, URL: <http://www.sustdev.org/agriculture/articles/edition1/01.127.pdf> and Food and Agriculture Organization of the United Nations, *Crops and Drops*, FAO, Rome.
- Sanderson, Fred.H and Roy, Shyamal, (1980), *Food Trends and Prospects in India*, Allied Publishers, New Delhi.
- Sarris, A. and Taylor, L., (1976), "Central Stock, Food Aid and Food Security", *Food, Nutrition and Agriculture*, Vol.4, no.2.
- Schmidhuber, Josef and Tubiello, Francesco N.,(2007) , "Global Food Security under Climate Change," *Proceedings of the National Academy of Sciences of the United States of America*, Vol. (104): 19703-19708.
- SCS, (2007), "*Food Insecurity Assessment based on food consumption statistics derived from Tajikistan 2005 Household Budget Survey*" *State Committee of Statistics Tajikistan Preliminary Summary Report* Dushanbe, Tajikistan.
- Sen, A.K., (1981), *Poverty and Famines: An essay in entitlement and deprivation*, Clarendon press, Oxford.
- Shul'ga, V., Y. Chaplygin, O. Rybkin, and S. Kazanskiy, (2001), "Strategic Targers and Stages of Economic Reform in the CIS Countries. *Central Asia and the Caucasus Journal of Social and Political Studies*, No. 4 (10).
- Sibrian, R., (2006), Indicators for monitoring hunger at global and sub-national levels, In *First World Congress of Public Health Nutrition Congress Proceedings*, Barcelona, Spain.
- Sinha, Mukesh Kumar, (2005), *The Persian World: Understanding People, Polity and Life in Iran, Afghanistan and Tajikistan*, Gurgaon: Hope India.

- Slayton, T. and T. Peter, (2008), “Japan, China and Thailand can solve the rice crisis-but US leadership is needed”, CGD Notes, Center for Global Development.
- Sorokin, Anatoly, (2008), “Scenarios of Future Development in the Aral Sea Basin”, Madramootoo, Chandra A. and Viktor A. Dukhovny (eds.), *Water and Food Security in Central Asia*, Springer, London, New York.
- South Asia Initiative Conference, New Delhi, India, April 24-25, 2002 (Conference Papers), *Economic reforms and food security: The role of trade and technology*, New Delhi: ICRIER.
- *State Committee On Statistics Republic Of Tajikistan (2008), “Food Security And Poverty If The Republic Of Tajikistan”, *Information Bulletin, No. 4 / 2007*, Dushanbe.
- Sumanjeet Singh, (2009), "Global food crisis: magnitude, causes and policy measures", *International Journal of Social Economics*, Vol. 36 (1): 23-36.
- Swaminathan, M.S., (1996), *Sustainable agriculture: towards food security*, New Delhi: Konark.
- T. Oweis, A. Hachum, J. Kijne, (1999), “Water harvesting and supplementary irrigation for improved water use efficiency in dry areas”, System-Wide Initiative on Water Management Paper 7, International Water Management Institute, Colombo, Sri Lanka.
- T. R. Malthus, (2003), *An Essay on the Principle of Population*, New York: Norton.
- Tashmatov, A., (2000), Food policy reforms for sustainable agricultural development in Uzbekistan, the Kyrgyz Republic, and Tajikistan, *Food Policy* 25: 719–73.
- Tweeten, L., (1999), “The Economics of Global Security,” *Review of Agricultural Economics*, Vol.21 (2): 473-488.
- Umarao, (2012), “Socio-economic Development in Tajikistan”, Lecture delivered on March, 2012 in International Seminar at School of International Studies, Jawaharlal Nehru University: New Delhi.
- Umarao, (2012), “Development of Hydro-Energy in Tajikistan, problems and prospectus”, Lecture delivered on June, 2012 in *International Seminar* at School of International Studies, Jawaharlal Nehru University: New Delhi.

- Umaraoov, (2012), “Foreign Trade and Investment Trends in Tajikistan, 1991-2011”, Lecture delivered on May, 2012 in *International Seminar* at School of International Studies, Jawaharlal Nehru University: New Delhi.
- Umaraoov, (2012), “Russia’s Policy towards Tajikistan, 1991-2011”, Lecture delivered on June, 2012 in *International Seminar* at School of International Studies, Jawaharlal Nehru University: New Delhi.
- Umaraoov, (2012), “Socio-economic Development in Tajikistan”, Lecture delivered on March, 2012 in *International Seminar* at School of International Studies, Jawaharlal Nehru University: New Delhi.
- Umaraoov, (2012), “Tajikistan’s Regional Trade and Transport Potential”, Lecture delivered on June, 2012 in *International Seminar* at School of International Studies, Jawaharlal Nehru University: New Delhi.
- *UN News Centre, (2004), “UN Monitors Water Quality in Tajikistan after Floods Erode Supply,” *UN Office for the Coordination of Humanitarian Affairs*, August 4th, 2004.
- *UN Report, (2008), United States Department of Agriculture (USDA), 2008, Food Security Assessment, 2007. *Agriculture and Trade Report GFA 19*. Washington, D.C.
- *UNDP, (2009), “Central Asia Regional Risk Assessment: Responding to Water, Energy, and Food Insecurity,” *Regional Bureau for Europe and the CIS*, New York, January.
- *UNDP HDR, (2005), “Bringing down barriers: Regional Cooperation for Human Development and Human Security,” *Central Asia Human Development Report, United Nations Development Programme*, [Online: web] Accessed 12 Jan 2012, URL: <http://hdr.undp.org/en/reports>.
- *UNDP MDGs (2012), “The Millennium Development Goals Report 2012”, *United Nations Development Programme*, June.
- *UNICEF, (2009), Tajikistan country office data. [Online: web] Accessed 4 May 2012, URL: <http://www.unicef.org>.
- *United States Department of Agriculture (USDA), (2008), Food Security Assessment
- *USAID, (2008), “Global Food Insecurity and Price Increase”. [Online: web] Accessed 21 May 2012, URL: http://pdf.usaid.gov/pdf_docs/PNADL352.pdf
- *USAID and IFDC, (2008), “A Rapid Assessment of the Livestock Feed Situation in Kyrgyzstan for the Coming Winter”, by the KAED Project, September.

- Warikoo, K. and Mahavir Singh, (ed.) (2004), *Central Asia since Independence*, Delhi: Shipra Publications.
- Wegerich, K. Olsson and Froebrich, J., (2007), “Reliving the past in a changed environment: Hydropower ambitions, opportunities and constraints in Tajikistan”, *Energy Policy*, 35(7): 3815-3825.
- Weinberger, K. M. et al, (2008), “Food Crisis in The Asia-Pacific Region”, *Asia Panj Clin Nutr* 200918(4): 507-515.
- *WFP, (2008), “Emergency Food Security Assessment, Tajikistan”, (urban areas), *World Food Programme*, July.
- *WFP, (2008), “Tajikistan Emergency Food Security Assessment, Tajikistan (Rural Areas)”, *World Food Programme*, May.
- World Bank Group, (2003), “Millennium Development Goals: About the Goals,” [Online: web] Accessed 11 Nov 2011, URL: <http://www.developmentgoals>.
- *WFP, (2008), “Integrated Food Security and Humanitarian Phase Classification Pilot in Tajikistan”, *World Food Programme*.
- *World Bank, (1986), *Poverty and hunger: Issues and options for food security in developing countries*, Washington DC.
- *World Bank (1990), *Poverty: World Development Indicators*, Oxford Univ. Press, New York, 1990.
- *World Bank, (1996), *Food security for the World*, Washington: World Bank.
- *World Bank, (1996), *Poverty Reduction and the World Bank: Progress and Challenges in the 1990s*, The International Bank for Reconstruction and Development/ The World Bank, Washington, DC.
- *World Bank, (1999), *World development report 1999*, New York: Oxford University Press.
- *World Bank, (2005), “Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2005”, *World Bank ECSSD Working Paper 46*, Washington D.C.
- *World Bank, (2001a), *Selecting an LSMS Data Set*. [Online: web] Accessed 13 Jan 2012, URL: <http://www.worldbank.org/lsms/guide/select.html>.

- *World Bank, (2001b), Environment Management Capacity Project. [Online: web] Accessed 1 June 2012, URL: <http://www4.worldbank.org/sprojects/Project.asp?pid=P073108>.
- *World Bank, (2005), *Growth, Poverty and Inequality: Eastern Europe and the Former Soviet Union*, World Bank, Washington D.C.
- *World Bank, (2008), “Addressing the food crisis: the need for rapid and coordinated action”, paper presented at Group of Eight, Meeting of Finance Ministers, Osaka, 13-14 June.
- *World Bank, (2009), *Farm Mechanization: A New Challenge for Agriculture in low and Middle Income ECA Countries*, Washington, DC: World Bank.
- *World Bank, (2010), “Index insurance and climate risk: Prospects for development and disaster management”, International Research Institute for Climate and Society, World Development Report.
- *World Bank (2010), Crisis Response: Europe and Central Asia Region Food Projects.
- *World Bank Country Study, (1994), *Tajikistan*, Washington: World Bank. *Turkmenistan*, Victoria: Lonely Planet.
- *World Bank Group, (2003), “Millennium Development Goals: About the Goals”. [Online: web] Accessed 14April 2012, URL: http://www.developmentgoals.org/About_the_goals.htm.
- *World Bank, (2005), “Tajikistan Poverty Assessment”, *Update*, The World Bank, Washington D.C.
- *World Food Programme, (2005), “Tajikistan: Market Profile for Emergency Food Security Assessments, Emergency Needs Assessment”, Branch (ODAN), *World Food Programme*.
- Yokubzod, Said, (2008), “Food Security and the Improvement of Water Use Efficiency,” Madramootoo, Chandra A. and Viktor A. Dukhovny (ed.), *Water and Food Security in Central Asia*, Springer, London, New York.

INTERNET SOURCES

www.pecad.fas.usda.gov/cropexplorer.
<http://siteresources.worldbank.org/>
<http://www.eurasianet.org/departments/briefs/eav011209c.shtml>.
<http://www.eurasianet.org/departments/briefs/eav>
<http://wbln0018.worldbank.org/research/workpapers>
<http://www.adb.org/Documents/Profiles/AOTA/30320012.ASP> (Accessed August 4, 2011)
<http://www.adb.org/Documents/Profiles/AOTA/32144012.ASP> (Accessed January 9, 2001)
<http://www.adb.org/Documents/Profiles/AOTA/33183012.ASP> (Accessed March 7, 2012).
<http://www.adb.org/Documents/Profiles/AOTA/35375012.ASP> (Accessed September 21, 2011)
www.adb.org/Countries/Highlights/KAZ.asp (Accessed May 22, 2012).
www.adb.org/Countries/Highlights/KGZ.asp (Accessed July 25, 2011).
www.adb.org/Countries/Highlights/TAJ.asp (Accessed July 26, 2011).
www.adb.org/Countries/Highlights/TKM.asp (Accessed September 23, 2011).
www.adb.org/Countries/Highlights/UZB.asp (Accessed September 27, 2011).
<http://wbln0018.worldbank.org/research/workpapers>.
<http://www.adb.org/Documents/Profiles/AOTA/30320012.ASP> (Accessed August 4, 2011)
<http://www.adb.org/Documents/Profiles/AOTA/32144012.ASP> (Accessed January 9, 2001)
<http://www.adb.org/Documents/Profiles/AOTA/33183012.ASP> (Accessed March 7, 2012).
<http://www.adb.org/Documents/Profiles/AOTA/35375012.ASP> (Accessed September 21, 2011)
www.adb.org/Countries/Highlights/KAZ.asp (Accessed May 22, 2012).
www.adb.org/Countries/Highlights/KGZ.asp (Accessed July 25, 2011).
www.adb.org/Countries/Highlights/TAJ.asp (Accessed July 26, 2011).
www.adb.org/Countries/Highlights/TKM.asp (Accessed September 23, 2011).
www.adb.org/Countries/Highlights/UZB.asp (Accessed September 27, 2011).