Economic Development, External Shocks, and Food Security in Tajikistan

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ABSTRACT

The combination of the recent global food and financial crises has had severe negative consequences on food security in Tajikistan. High dependence on food imports has made Tajikistan extremely vulnerable to the increasing global food prices and the volatility and transmission of global food prices was an important dimension of the food price crisis in the country. Excessive reliance on labor remittances exacerbated Tajikistan’s food insecurity and the vulnerability of its households. This study examines the impact of recent food and economic crises on macro- and household-level food security in the country using macro-, sectoral-, and household-level data from national and international sources. The study also discusses overall trends in economic growth and poverty reduction, constraints and bottlenecks on agricultural growth and productivity, and other policies that may mitigate the negative effects of future external shocks.

Keywords: global food crisis, financial crisis, food security, agriculture, land reform, remittances, Tajikistan
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1. INTRODUCTION

Enhancing food and nutritional security has reemerged as a critical international and national policy goal in the wake of the recent global food and economic crises. As international food prices surged in 2007–2008, some large grain exporters imposed restrictive trade policies to protect themselves from negative impacts of increasingly integrated world markets. However, these trade restrictions further increased international food prices and amplified price volatility in international food markets. In the meantime, small import-dependent countries were severely affected by the economic and food crises. High and volatile food prices clearly worsened the national- and household-level food security in these countries (Heady and Fan 2010; FAO 2011a). Although food prices plummeted in 2009, they started to rise again in the second half of 2010. International food prices measured by the Food Price Index of the Food and Agriculture Organization of the United Nations (FAO) peaked in February 2011, but the index has declined slightly in recent months (by about 5 percent), though it is still higher than its September 2010 value (FAO 2011b). According to the recent edition of *The State of Food Insecurity in the World*, published by FAO, “high and volatile food prices are likely to continue” (FAO 2011a, p. 11) due to growing demand from consumers in emerging economies and supply-side challenges caused by increasing natural resource pressures and the global slowdown in projected yield improvements of important crops. Long-term climatic changes; the increasing frequency of unpredictable weather shocks; and growing linkages between agricultural commodity, energy, and financial markets may also amplify international food price volatility. Therefore, combination of investment in improved agricultural productivity and increased food production, greater policy predictability and general openness to trade will be needed to meet the rising demands for food and achieve sustainable long-term food security (FAO 2011a; OECD/FAO 2011).

Low-income countries such as Tajikistan have been especially vulnerable to global food and economic crises. High reliance on food imports has made Tajikistan vulnerable to the external shocks. More than 50 percent of cereals, 30 percent of bovine beef, 80 percent of poultry products, three-quarters of vegetable oils, and most of sugar consumption in Tajikistan rely on imports. Such high reliance of food consumptions on imports is mainly due to the collapse of agricultural production in the 1990s and increasing natural resource (especially agricultural land) constraints in the country. Between 1990 and 1996 Tajikistan’s agricultural production plummeted by more than two times, measured by agricultural value added. Recent agricultural growth in 2000–2008 was impressive, averaging more than 8 percent per year. This allowed the sector to recover to its pre-transition levels in gross terms. However, the country’s population has increased by more than 40 percent since the early 1990s, and thus, at the per capita level, the current level of agricultural value added is still about three-quarters of its pretransition level. Given that agriculture is a major source of employment (more than 40 percent) in the country, low productivity and meager earnings from agriculture are major causes of poverty and nutritional problems in rural areas.

Further, despite considerable growth in the recent years, per capita gross domestic product (GDP) level in 2010 was still significantly below pretransition levels (in real terms, per capita GDP in 2010 was about two-thirds of the 1990 level). Nearly half of the population still lives under the absolute poverty line. Moreover, the recent food and financial crises have negatively affected Tajikistan’s economy and food security in many aspects. First, the country’s terms of trade have considerably deteriorated in recent years while relative prices of its major imports (fuel and foods) with respect to its main exports (aluminum and cotton) have significantly increased. Second, rising global food and fuel prices led to significant inflationary pressure in Tajikistan, and double-digit inflation was observed in the second half of 2007 and throughout 2008 and early 2009. Rising inflation became evident again in 2011: the annualized inflation rate rose from about 5 percent in mid-2010 to nearly 15 percent in mid-2011 (EBRD 2011b). Rising food prices have contributed to the overall inflation since 2007, and food prices have increased significantly more than nonfood prices. Although part of the negative terms of trade effect was

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1 Throughout the paper pre-transition refers to the time period prior to the collapse of the Soviet Union (1990-1991).
compensated by increased remittance inflows in 2007 and 2008, the global financial crisis in 2008–2009 led to a significant decline in remittance incomes. Compared with the preceding year, the inflow of remittances fell by more than 30 percent in 2009, negatively affecting both national and household incomes (World Bank 2011b). As a result, food security both at macro and household levels significantly deteriorated.

Global crises also negatively affected Tajikistan’s growth rates: economic growth slowed down to 3.4 percent in 2009 from an average of around 9 percent between 2000 and 2008. It recovered to 6.5 percent in 2010, but it is still significantly less than the pretransition growth rates. Moreover, reduction in poverty and improvement in household welfare significantly slowed down during the crisis. In the precrisis period, the poverty headcount ratio declined from 72 percent to 54 percent in the four years between 2003 and 2007 (World Bank 2010a), but only 7 percent between 2007 and 2009 (2009 Tajikistan Living Standards Survey). The extreme poverty rate stagnated during this 2007–2009 period, but it had fallen by nearly 2.5 times in 2003–2007. Further, within Tajikistan some provinces suffered more, including Khatlon and Gorno-Badakhshan Autonomous Oblast (GBAO), with both moderate and extreme poverty rates increasing significantly. Furthermore, our analysis of subjective measures of the impact of the crisis using data from the 2010 European Bank for Reconstruction and Development (EBRD)–World Bank Life in Transition II Survey shows that this impact on Tajik households was large and widespread. Overall, nearly fourth-fifths of the households report being affected: 14 percent of households stated that they were affected “a great deal,” 36 percent “a fair amount,” and 16 percent “just a little.” The most common coping strategy of affected households in Tajikistan was reducing consumption of staple food items such as bread and dairy products. Approximately 60 percent of affected households reported that they reduced their food consumption. By these subjective measures, the impact of the crisis on Tajik households was significantly greater than on households in other Central Asian countries (EBRD 2011a).

The current negative developments have raised considerable concern among policymakers and development partners on how to best ensure national food and nutritional security in the short, medium, and long term. Because Tajikistan is in the midst of political and economic transition, considerable attention has recently been devoted to modernizing the agricultural sector through ongoing agricultural reforms process and policy initiatives, such as the Freedom to Farm Resolution and the Food Security Bill (2010). The recently held “Consultations on Agricultural Policy and Programming in Republic of Tajikistan” organized by the President’s Office and Ministry of Agriculture in April 2011 highlighted renewed political will toward achieving food and nutritional security in the country. In addition, the government of Tajikistan recently established the Food Security Council of the Republic of Tajikistan (FSCT) to coordinate strategic decisionmaking concerning food security in the country. The government has realized the importance of agricultural reform to achieve long-term food security and in the overall economic development of the country and has now adopted a far-reaching comprehensive agricultural reform program (World Bank 2010b and 2011a; Development Coordination Council 2011), which was jointly developed with development partners, including the United States Agency for International Development (USAID). Further, the government is currently formulating (a) a comprehensive strategy for agriculture and water sectors for the 2011–2020 period and (b) an investment plan for the next 5–10 years based on sector strategies and the approved reform program.

Formulating and implementing an effective agricultural development strategy and investment plan are complex tasks that require long-term commitment from stakeholders. Moreover, reform and development strategy must remain flexible and dynamic to accommodate refinements in design and objectives over time, as external, socioeconomic, and political conditions change and new challenges arise. Building the country’s long-term capacity in generating and using the knowledge needed to design, implement, and refine its agricultural development strategy is crucial to ensuring sustainable success. It is thus vital to take stock of the various dimensions of the agriculture development and food security situation to better inform and strengthen policymaking.

Food security is commonly defined as a state wherein “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” (FAO 2010, p.8). This definition considers multiple dimensions
including food availability (via domestic production and trade) and food access and absorption (influenced by household incomes, safety net programs, assets, health infrastructure, and nutrition). But often traditional food security analysis focuses primarily on the household and the individuals within and undertakes primarily a calorie-based approach to estimate undernourished populations.\(^2\) We examine food security in Tajikistan using the analytical framework (depicted in Figure 1.1) suggested by Ecker et al. (2010), which broadly follows the aforementioned definition of food security. Reflecting on the potential impacts of the recent global food crisis at macro- and microeconomic levels, this framework extends the previously existing perspective of food security as primarily a household-level issue by including macroeconomic and sectoral factors, policy interventions, and external shocks. It considers the many factors that may influence food security and explicitly accounts for sectors that are most relevant for food and nutritional status of individuals, including agriculture, trade and infrastructure, and health and education. Thus, this framework emphasizes the need for an integrated approach for improving food and nutrition security effectively. It is particularly appropriate for examining national development strategies and specific intervention options in the form of policies, investments, and programs to improve food security. Overall, the framework outlines pathways in the food and nutrition security system through which policies and external shocks translate into nutrition outcomes and the key factors determining the outcomes. For analytical purposes, the framework differentiates food security at the national (macro) and household (micro) levels. The factors at both levels are horizontally and vertically interconnected through various linkages (Ecker et al. 2010).

**Figure 1.1—Conceptual framework to study food security in Tajikistan**

Source: Ecker et al. 2010.

\(^2\) As used in USDA food security assessments (USDA 2008).
In this stock-taking exercise, we do not fully address all parts of food security, which involves various sectors and contains many feedback loops described in Figure 1.1, due to budget and time constraints. The study focuses on examining macro and sectoral (agriculture) aspects of food and nutritional security in Tajikistan. It also investigates the impact of recent food and economic crises on macro- and household-level food security using macro, sectoral, and household survey data from national and international sources. The rest of the study is organized as follows. Section 2 discusses overall trends in economic growth and poverty reduction in the country. It examines the trends in the complete and extreme (food) poverty using data from 2007 and 2009 Tajikistan Living Standards Survey. Section 3 examines patterns and structure of food availability in Tajikistan by exploring its agricultural sector, domestic food production, and constraints faced therein. Section 4 analyzes the impact of the global food and economic crises on macro-level food security, domestic prices, and well-being of households in Tajikistan. *Macro-level food security* here refers to the balance of food supply and demand for a particular country in which its residents’ food needs can be met through a combination of domestic production and imports. The gap between domestic production and consumption needs to be fulfilled by food imports. Thus, a country’s ability to finance its food imports is considered as an important indicator of macro-level food security. The analysis of the transmission of global food price inflation to domestic markets in Tajikistan is conducted from the wheat price perspective. The examination of the crisis impact on the household consumption is done using the data from the 2010 EBRD–World Bank Life in Transition Survey II. Section 5 discusses domestic food security challenges and potential policy responses. Section 6 concludes the paper by summarizing the main findings of the study and outlining directions for future research.
2. TRENDS IN ECONOMIC DEVELOPMENT AND POVERTY REDUCTION

Tajikistan is a landlocked country located in Central Asia that occupies 142,000 square kilometers. A country with rich and varied topography, it is home to about 7 million people, most of whom reside in river valleys and plains, given that around 93 percent of the country’s land area is covered by mountains. Of its population, nearly 74 percent reside in rural areas, and about 55 percent of its labor force is employed in the agricultural sector, a much higher statistic compared with other transition countries (World Bank 2011a).

Tajikistan’s total gross domestic product (GDP) was 24.705 billion somoni (US$5.64 billion3,4) in 2010, equivalent to 3,591.5 somoni ($8205) per capita (Statistical Agency 2011c). Adjusting to purchasing power parity this corresponds to 2,147 current international dollars (World Bank 2011a). The industrial sector generates about one-sixth of total GDP and only 5 percent of employment. Nevertheless, industrial goods generate about three-fourths of the country’s export earnings due to a large contribution from the aluminum industry. The agricultural sector generates more than one-fifth of total GDP and about 55 percent of employment. Agriculture (mainly, cotton fiber) also generates about one-fifth of Tajikistan’s export earnings. The importance of the agricultural sector extends beyond its contribution to GDP, employment, and export earnings. Most of Tajikistan’s rural population depends on farm income to a greater extent. Poverty is also considerably higher in rural areas. According to the 2009 Tajikistan Living Standards Survey (TLSS), about 47 percent of Tajikistan’s population lives below the absolute poverty line, and nearly 80 percent of the poor population resides in rural areas. The importance of the agricultural sector to Tajikistan’s long-term food security, as well as overall economic development and poverty reduction, thus cannot be underestimated.

During 1992–1997 the country experienced a civil war that took a heavy toll, leaving nearly 50,000 people dead and more than one million people internally displaced (United Nations 2004). The war also negatively affected Tajikistan’s economic and agricultural growth during the 1990s (Figure 2.1). As shown in Figure 2.1, all aggregate GDP, per capita GDP, and agricultural GDP (aggregate value added in agricultural sector) collapsed during this period in Tajikistan. In 1996, Tajikistan’s aggregate GDP was equal to one-third of its pretransition level. Agricultural GDP did comparatively better. The evidence suggests that such production collapses were common in all transition countries due to liberalization of prices, inconsistent market reforms, and delays in building market and collective action institutions (Rozelle and Swinnen 2004). However, the magnitude of the collapse in Tajikistan’s GDP (more than 60 percent) was significantly higher than that in its Central Asian neighbors, mainly due to political conflict during 1992–1997.

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3 All dollar amounts are expressed in U.S. dollars.
4 Converted using average annual exchange rate of 4.3790 somoni per US$.1.
5 Ibid.
Nevertheless, the post conflict period saw remarkable growth, where the country reported 8.6 percent annual average GDP growth during 2000–2008 (Figure 2.2). Despite these impressive growth rates, Tajikistan’s aggregate and per capita GDP has not reached their pretransition levels. While aggregate GDP in 2010 was only 85 percent of its 1990 level, per capita GDP was even lower at 64 percent. During 2000–2008, Tajikistan reported the highest rate of agricultural growth in the region at 8.3 percent per year. As a result, in 2008, Tajikistan’s agricultural GDP reached its 1990 level. The recovery of economic growth was possible mainly because a peace agreement was achieved in 1997 and political stability continued since then. Generally, good overall macroeconomic management, supported by development assistance from multilateral and bilateral development partners, helped Tajikistan to maintain high economic growth over the prolonged period of time.
Another important factor of Tajikistan’s recent economic performance has been the increasing flow of labor remittances since the late 1990s. While out-migration during the conflict years may have been prompted mainly by security concerns and political instability, the following years have witnessed a large outflow of migrant labor from both rural and urban areas, especially to Russia, due to poor employment opportunities in Tajikistan and better economic and work prospects in Russia. Significant wage differential between Russian and Tajik labor markets is also an important determinant of labor migration. Some estimate that up to one million Tajik labor migrants are in Russia alone (Brown, Olimova, and Boboev 2008). In 2008, the inflow of worker’s remittances peaked at almost $2.5 billion or about 45 percent of its GDP. Due to the global financial crisis, the inflow of remittances declined significantly in 2009 and was estimated at $1.7 billion or 35 percent of GDP (Figure 2.3). Apart from helping Tajikistan finance its balance of payments, remittances play an important role in poverty reduction and improving food and nutrition security at the household level (Brown, Olimova, and Boboev 2008; World Bank 2010a and 2011a; Justino and Shemyakina 2010; Azzarri and Zezza 2011). While this is an important factor, it is relevant to note that out-migration may be mainly driven by limited work opportunities in the domestic economy, which need to be enhanced to achieve long-term food security and sustainable economic prosperity.

The significant inflows of remittance transfers and high economic growth, particularly agricultural growth, were the key drivers of poverty reduction in many developing and transition countries across the world (World Bank 2007b). These two factors definitely played significant roles in poverty reduction in Tajikistan. However, the relationship between the contributions of faster economic growth during the past decade, including agricultural growth and inflow of remittances, and the steep decline in Tajikistan’s poverty rate need to be further investigated. Overall, the poverty headcount rate in Tajikistan fell from more than 90 percent in the late 1990s to 47.2 percent in 2009 (Figure 2.4). Similarly, the extreme poverty rate declined from 42 percent in 2003 to 17.5 percent in 2009. Further, the poverty headcount rate is higher in rural areas, where in 2009, 49.2 percent of the population was identified as poor, compared with 41.8 percent in urban areas. However, there was no difference between the urban and rural extreme poverty rates (Table 2.1).
Despite significant decline in last decade, the poverty rate in Tajikistan is still the highest among transition countries. Moreover, recent global food and financial crises negatively affected the reduction in poverty and improvement in household welfare. In the precrisis period, the poverty headcount ratio declined from 72 percent to 53 percent (nearly 20 percent) in four years (2003–2007) (World Bank, 2010a), but since then it declined less than only 6 percent between 2007 and 2009 (Table 2.1). More importantly, the extreme poverty rate stagnated during this period, but it had fallen by almost 2.5 times in 2003–2007. Furthermore, within Tajikistan some provinces suffered more, including Khatlon and Gorno-Badakhshan Autonomous Oblast (GBAO), with both the complete and extreme poverty rates increasing significantly. For example, in Khatlon province, complete and extreme poverty rates increased by 6.9 percent and 12.9 percent, respectively. Similarly, in GBAO province, these indicators increased by 19 percent and 16 percent, respectively. On the contrary, the poverty headcount rate declined significantly in Dushanbe, Region of Republican Subordination (RRP), and Sughd province. The latter also had experienced a significant decline in the extreme poverty rate.

Table 2.1—Change in poverty headcount and extreme poverty rates, 2007–2009

<table>
<thead>
<tr>
<th></th>
<th>Overall poverty</th>
<th>Extreme poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2009</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>53.1</td>
<td>47.2</td>
</tr>
<tr>
<td>Urban</td>
<td>49.3</td>
<td>41.8</td>
</tr>
<tr>
<td>Rural</td>
<td>54.4</td>
<td>49.2</td>
</tr>
<tr>
<td>Provinces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dushanbe</td>
<td>42.7</td>
<td>33.9</td>
</tr>
<tr>
<td>GBAO</td>
<td>42.9</td>
<td>61.9</td>
</tr>
<tr>
<td>Khatlon</td>
<td>47.0</td>
<td>53.9</td>
</tr>
<tr>
<td>RRP</td>
<td>47.4</td>
<td>38.9</td>
</tr>
<tr>
<td>Sughd</td>
<td>69.0</td>
<td>48.3</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations from 2007 and 2009 Tajikistan Living Standards Survey (TLSS).
Note: The sample size in 2007 TLSS was 4,860; 1,503 households interviewed in the 2007 TLSS were interviewed again in 2009.
Further, the analysis of the panel consisting of about 1,500 households, who were interviewed in 2007 and 2009, suggests that well-educated households without children benefited the most from the decline in poverty while less-educated large households with many children experienced an increase in both overall and extreme poverty. The analysis also reveals that there is a high degree of vulnerability among Tajik households: many nonpoor in 2007 became moderately poor in 2009, and some nonpoor moved into even the extremely poor group and vice versa (Table 2.2). The transition matrix provided in Table 2.2 shows the changes in poverty status of households between the two rounds (2007 and 2009) of the survey. In this analysis, a given household is considered extremely poor if its per capita expenditure is below the extreme (food) poverty line. Likewise a household is classified as moderately poor if its per capita expenditure is between the complete and extreme poverty lines. It is evident in Table 2.2 that about 38 percent of households were nonpoor in both years. Similarly, 9.4 percent and 3.8 percent of surveyed households were moderately poor and extremely poor in both years, respectively.

Table 2.2—Transition matrix in and out of poverty including moderate and extreme poverty

<table>
<thead>
<tr>
<th>2009 TLSS</th>
<th>Nonpoor</th>
<th>Moderately poor</th>
<th>Extremely poor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonpoor</td>
<td>561</td>
<td>184</td>
<td>68</td>
<td>813</td>
</tr>
<tr>
<td></td>
<td>(37.7%)</td>
<td>(12.4%)</td>
<td>(4.6%)</td>
<td>(54.7%)</td>
</tr>
<tr>
<td>Moderately poor</td>
<td>249</td>
<td>140</td>
<td>75</td>
<td>464</td>
</tr>
<tr>
<td></td>
<td>(16.7%)</td>
<td>(9.4%)</td>
<td>(5.1%)</td>
<td>(31.2%)</td>
</tr>
<tr>
<td>2007 TLSS</td>
<td>Extremely poor</td>
<td>85</td>
<td>68</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>(5.7%)</td>
<td>(4.6%)</td>
<td>(3.8%)</td>
<td>(14.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>895</td>
<td>392</td>
<td>200</td>
<td>1,487</td>
</tr>
<tr>
<td></td>
<td>(60.2%)</td>
<td>(26.4%)</td>
<td>(13.4%)</td>
<td>(100%)</td>
</tr>
</tbody>
</table>


Thus, more than half (51 percent) of the households did not change their poverty status between 2007 and 2009. The rest of the households (about 49 percent) moved across the three poverty categories between the two rounds of the TLSS. Nearly 27 percent of households experienced an improvement in their poverty status as indicated by the sum of the cells below the main diagonal of the transition matrix. In contrast, more than 22 percent of the households experienced a decline in their poverty status. Further, compared with approximately 22 percent of the households moving from the moderately poor and extremely poor categories to the nonpoor category, about 17 percent of the households fell into poverty. Some households moved between the moderately poor and extremely poor categories also.

The high poverty rates directly impact households’ economic access to safe, healthy, and nutritious food and thus are a barrier to achieving long-term food and nutritional security in the country. Thus it is not surprising that the prevalence of undernourishment in Tajikistan is also the highest in Central Asia (30 percent of the population), highlighting the depth and severity of the food and nutritional security challenges in the country. Therefore, improving household welfare and reducing poverty are very important for achieving long-term food and nutritional security in Tajikistan. In this regard, developing the agricultural sector and increasing agricultural productivity and yields will be imperative. Agricultural growth can contribute to increasing domestic food availability as well as to improving welfare of more than 50 percent of the country’s labor force employed in this sector.

6 The food (extreme) poverty line is identified as the cost of buying a diet of 2,250 calories per capita per day, given the food consumption patterns of households in a reference population in Tajikistan. The complete poverty line includes food component (64 percent) and nonfood component (36 percent), that is, the cost of the minimum nonfood goods and services consumption consistent with the consumption patterns of the reference population (World Bank 2008).

7 Dietary energy consumption is continuously below a minimum dietary energy requirement for maintaining a healthy life and carrying out light physical activity with an acceptable minimum body weight for attained height (FAO 2011a).
3. AGRICULTURAL DEVELOPMENT CHALLENGES IN TAJIKISTAN

Ensuring stable availability of food is a basic prerequisite to achieving food security. The evidence on per capita food availability presents a snapshot of the food and nutrition security challenges in Tajikistan. In terms of per capita cereal availability, Tajikistan fares relatively well among Central Asian countries during the past decade (Figure 3.1). However, it ranks the lowest in per capita meat availability in comparison to other Central Asian countries (Figure 3.2).

Figure 3.1—Annual per capita cereals supply, Central Asia

![Annual per capita cereals supply, Central Asia](image1)

Source: FAO 2011a.

Figure 3.2—Annual per capita total meat supply, Central Asia

![Annual per capita total meat supply, Central Asia](image2)

Source: FAO 2011a.
Overall food availability in a given country depends mainly on domestic agricultural (food) production and on food trade, imports, or both. Food aid may also play an important role in some low-income countries, especially in emergency situations. This section discusses the trends, structure, and challenges of domestic agricultural (food) production in Tajikistan. It would be useful to trace the production dynamics across sectors, crops, and farm types to understand its implications for raising food availability from domestic resources. Apart from presenting a descriptive account of these trends, it is also useful to examine key constraints and challenges faced by the sector and to outline policy changes that are needed to achieve greater food productivity and output growth in a sustainable manner.

**Trends in Agricultural Production**

Before exploring the recent developments in the agricultural sector, we will provide a brief description of the various agroclimatic zones and administrative provinces around which production is organized. Because Tajikistan has a highly mountainous terrain, most of its agricultural production is restricted to irrigated river valleys, which are broadly grouped into four valley systems as follows (Lerman and Sedik 2009):

- Fergana Valley in the north along the Syr Darya (southwest of Uzbekistan into Tajikistan)
- Broad Khatlon lowlands in the southwest, from Kulyab in the east to Uzbekistan in the west
- Gissar valley between Dushanbe and Tursunzade, just north of Khatlon
- Narrow Zeravshan valley extending east to west between Fergana and Gissar valleys

These valley systems fall into four oblasts or provinces, namely, Sughd (Northern and Zeravshan zones), Khatlon (Vaksh and Kulyab zones), Region of Republican Subordination (RRP; Gissar and Rasht zones), and Gorno-Badakhshan Autonomous Oblast (GBAO; Pamir highlands). Of these, Sughd and Khatlon are more populated, housing 32.9 percent and 39.3 percent of the population with 17.8 percent and 17.3 percent of the land area (24 percent and 33 percent of agricultural land), respectively. RRP, with around 26 percent of the agricultural land area, houses 24 percent of the population; and GBAO, with nearly 45 percent of the total land area (only 1 percent of sown agricultural land), is home to only around 3.5 percent of the population, as it falls in the Pamir mountain region (Lerman and Sedik 2009).

Approximately 37 percent of gross agricultural output is produced in Khatlon, 34 percent in Sughd, 26 percent in RRP, and only about 3 percent GBAO (Statistical Agency 2011a).

**Changes in Land Use and Allocation**

The net effect of limited land reform was a significant shift in the distribution of agricultural land use among different farm types. The total amount of agricultural land allocated to state and collective farms declined significantly. As shown in Table 3.1, the land controlled by state and collective farms dropped dramatically, from more than 95 percent of the total arable land in the pretransition period to only 27.5 percent in 2009. Most of this land was shifted to private dekhan farms and household plots in the process of limited land reform. Currently, more than 18,000 private dekhan farms, with an average farmland size of 18 hectares, control about 40 percent of the total (sown) arable land in the country. Nearly one-quarter of arable land is controlled by more than 740,000 traditional household plots that have an average size of 0.3 hectares per holding. Another important feature of the changes in arable land use during the transition period was the allocation of so-called presidential plots, which now accounts for about 9 percent of total arable land. There are about 375,000 such plots in the country with average size of 0.2 hectares per holding.
Table 3.1—Farm types and structure in Tajikistan

<table>
<thead>
<tr>
<th>Farm type</th>
<th>Number</th>
<th>Average size (ha/farm)</th>
<th>% Arable area</th>
</tr>
</thead>
<tbody>
<tr>
<td>State farms</td>
<td>193</td>
<td>322</td>
<td>7.5</td>
</tr>
<tr>
<td>Collective dekhan farms</td>
<td>9,000</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Private dekhan farms</td>
<td>18,040</td>
<td>18</td>
<td>39.2</td>
</tr>
<tr>
<td>Household plots</td>
<td>740,400</td>
<td>0.3</td>
<td>24.2</td>
</tr>
<tr>
<td>Presidential plots</td>
<td>375,000</td>
<td>0.2</td>
<td>9.1</td>
</tr>
</tbody>
</table>

Source: FAO 2009.

In recent years, the crop patterns changed in favor of food and high-value crops. Probably, the bottlenecks in regional economic relations and changes in global commodity markets encouraged the government to focus on food security, leading to the increased cultivation of wheat and other food crops. As a result, the area sown with wheat, potatoes, and vegetables increased at the expense of the areas sown with cotton and feed crops. Analysis of the composition of the sown area suggests that grains became the dominant crop in Tajikistan, accounting for about 51 percent of arable land in the country, with wheat being cultivated on 41 percent of the land sown (Figure 3.3). The next largest crop sector by sown area is cotton, with almost 20 percent of total sown area, primarily in irrigated areas, which declined dramatically compared with the early 1990s. Potatoes, melons, fruits, and vegetables together account for more than 10 percent of total sown area. Area under these crops increased considerably during last several years. For example, land area under fruit and vegetable production increased by 16 percent and 30 percent, respectively, compared with 2005 (Development Coordination Council 2011). During this period, the share of arable land allocated to feed crops also declined significantly, resulting in only 14 percent of arable land currently being allocated to feed production.

Figure 3.3—Distribution of agricultural land by crops, 2009

![Diagram of agricultural land by crops, 2009](image)


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8 The anecdotal evidences suggest that the area sown with cotton has increased in 2011 due to favorable conditions in international cotton markets.
Changes in Agricultural Production

The above-mentioned changes in land allocation resulted in significant modifications in agricultural output. The analysis of the sectoral composition of agricultural output in Tajikistan shows that in the pretransition period, about two-thirds of gross agricultural output was produced in the crop sector and about one-third was produced in the livestock sector. In contrast, during the transition period, the crop sector’s share in gross agricultural output increased from 67 percent in 1990 to more than 90 percent in 2009. This is a result of faster growth in the crop sector and stagnation in the livestock sector. The above-mentioned alterations in land allocation combined with significant decreases in feed crop yields led to a shortage of fodder for the livestock sector. This has important implications for food and nutritional security in the country. As noted by Sedik (2010), Tajikistan along with other socialist countries saw the decline of the Soviet system of livestock production during the 1990s and after, as centralized feed and livestock production systems (via large enclosures or farms, subsidiary plots, and pasture grazing) disintegrated. In place of these is decentralized livestock husbandry with dependence on limited feed crops and common pasture lands, eroding livestock productivity.9 For example, milk yields are estimated to have declined from an already low five liters to four liters per cow during 2005–2009 due to poor feed quality, lack of appropriate rearing practices, and marketing channels (Development Coordination Council 2011).

Changes in land allocation led to significant increases in grain, potato, and vegetable outputs, while production of cotton and feed crops has declined significantly (Figure 3.4). The gross agricultural output in the grain sector, mainly wheat, has grown more than fourfold during the transition period, with an average annual growth rate of 7.7 percent. The annual growth rates of grain output have accelerated during the last decade (at more than 10 percent annual average growth rate). Likewise, the potato output has tripled during this period, while growing with average annual growth rate of 11.2 percent. The observed growth in grain and potato outputs is not due solely to changes in sown area. The grain and potato yields also increased considerably (Figure 3.5) during the last decade, probably due to increased allocation of irrigated land under wheat production. Nevertheless, average wheat yields of around 2.0–2.5 tons/ha in Tajikistan are much lower than average yields observed in other countries of the region (Figure 3.6).

Figure 3.4—Changes in gross crop output, 1990–2009

![Figure 3.4—Changes in gross crop output, 1990–2009](image.png)


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9 Fish farming has increased during recent years, but currently only eight major farms are in Tajikistan, two of which are large, state-owned farms, and hence form a very marginal agricultural produce (less than 200 tons or 0.03 kg/per capita; Development Coordination Council 2011).
A brief overview of the agricultural production trends in Tajikistan over the recent decade highlights that the recent run of high agricultural growth has probably been driven by rapid growth in the grain, potato, fruit, and vegetable sectors. While the grain sector occupies the lion’s share of cultivated area, it is reasonable to expect that the rapid growth in high-value crops has lent itself to the rise in value of production given its production performance. The cotton sector, despite being a major cash crop, seems to be still recovering from the debt crisis; and to reap benefits from cotton production, both at the macro and farm levels, production and yield growth need to stabilize.

**Figure 3.5—Crop yields in Tajikistan, 1990–2009**

![Figure 3.5—Crop yields in Tajikistan, 1990–2009](image)


**Figure 3.6—Wheat yields in selected countries, 1990–2009**

![Figure 3.6—Wheat yields in selected countries, 1990–2009](image)

Source: FAO 2011a.

Further research is required to really uncover the drivers of production growth at the national and regional levels and the role various sectors can play in ensuring long-term food security, but in the medium and short term, the importance of developing value chains for the high-value food and cash crop sectors should be underscored. Against the backdrop of institutional and economic transition, a key
challenge is to ensure that various input supply mechanisms and infrastructural support required for progressive agricultural reforms is put in place to fill in the gap created by the disintegration of the command-style agricultural system. It is especially relevant to develop value chains for perishable high-value crops to ensure waste is minimized, marketability of produce is increased, and nutritious products reach the vulnerable Tajik population. It is timely that the Government of Tajikistan passed series of legal and policy documents to initiate agricultural reforms in various sectors ranging from land tenure reforms to local governance (Development Coordination Council 2011).

Challenges and Constraints to Agricultural Production

The key challenges and constraints for developing agriculture and increasing domestic food production can be categorized into those relating to natural resources and institutional and policy constraints.

Natural Resource Constraints

Tajikistan has limited land resources suitable for agricultural production, and only around 5.3 percent of its total land area is arable, compared with 8.4 percent in Kazakhstan and 10 percent in Uzbekistan (Table 3.2). It also has the one of the lowest amounts of arable land per person (0.1 ha), which has been declining over years due to high population growth and land degradation. But Tajikistan’s true natural resource challenge is its mountainous terrain (93 percent) with high prevalence of steep lands (54 percent), shallowness (48 percent), and erosion risk (26 percent). As seen earlier, the GBAO province, which commands a little less than half the total land area, falls completely in the Pamir mountain ranges and has barely any arable land and potential to farm crops. This poses a challenge to policymakers and planners to augment the cultivated area and also to ensure that populations in remote mountainous regions are well connected to food markets.

Evidence suggests that countries with a high share of mountainous terrain and populations staying within the mountains are more susceptible to food insecurity and shocks (FAO 2002; von Dach et al. 2006). Globally, it is estimated that about 40 percent of the mountain population in developing and transition countries (nearly 300 million people) are vulnerable to food insecurity, and of these, nearly 90 percent live in rural areas, almost half of whom are likely to be chronically hungry (FAO 2002; Huddleston et al. 2003). Past studies also show a significant gap in daily per capita calorie intake as well as per capita food availability in grain equivalent between mountainous and nonmountainous countries (Akramov, Yu, and Fan 2010). It is important to note that from a policy perspective, these results indicate that measures that enhance income-generating capacity and infrastructure access in mountainous regions may help to improve the overall food security.

Table 3.2—Key land and terrain statistics, Central Asia

<table>
<thead>
<tr>
<th>Country</th>
<th>Total area ('000 km²)</th>
<th>% of arable land to total (2009)</th>
<th>Arable land per person (2007, ha/person)</th>
<th>Share of total steep lands, %</th>
<th>Shallowness, %</th>
<th>Erosion risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazakhstan</td>
<td>2,711</td>
<td>8.4</td>
<td>1.5</td>
<td>23</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>199</td>
<td>6.7</td>
<td>0.2</td>
<td>59</td>
<td>54</td>
<td>28</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>142</td>
<td>5.3</td>
<td>0.1</td>
<td>54</td>
<td>48</td>
<td>26</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>471</td>
<td>3.9</td>
<td>0.4</td>
<td>19</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>445</td>
<td>10.1</td>
<td>0.2</td>
<td>25</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>


Tajikistan’s mountainous terrain poses a policy challenge to effectively use limited land resources, but it also presents a potential advantage in the wealth of its rich water resources. As an
upstream country, Tajikistan’s annual water production is 13,000 cubic meters of water per person per year and is among the highest in the world (UNDP 2003). Mountains in Tajikistan generate approximately 55 percent of all the water in the Aral Sea basin, and its glaciers hold 845 cubic kilometers of water, which equals seven times the total annual flow in the Aral Sea basin. In fact, Tajikistan has more land area under glaciers—8 percent of the country area—than it has arable land (MIWMRT, UNDP, and IFSAS 2006). Additionally, the country is home to around 25,000 rivers and more than 1,300 lakes. Tajikistan has one of the highest total natural renewable water resources and the lowest dependency ratio in the region (UNDP 2003; FAO 2011c). While these rich water resources indicate much future potential, sustainable and efficient water management and use for agriculture still remains a key policy challenge. Moreover, the high number of rivers and lakes and erratic flooding render Tajikistan’s limited soil resources at risk to erosion (26 percent; Table 3.2), highlighting the need for sustainable and coordinated management of its natural resources.

Policy and Institutional Constraints

The agricultural sector of Tajikistan, and likewise in other transition countries, has undergone a series of policy, institutional, and structural changes during the last two decades. Three basic elements of the agricultural transition in transition countries include price liberalization and removal of direct government intervention in agriculture, land reform and farm reorganization, and the development of market and collective action institutions (Rozelle and Swinnen 2004). These processes have been underway in Tajikistan as well; however, most policy and institutional changes have been ad hoc, with little coordination between concerned stakeholders (Development Coordination Council 2011).

The government has thus initiated a comprehensive reform process over the past two years, in an effort to embark on a more systematic approach toward agrarian reform, by working closely with various governmental departments and ministries and with development partners. This agrarian reform package includes six reform areas such as land reform and farm restructuring, irrigation and water resources management, agricultural inputs, rural finance, local governance, and social policy. This section attempts to outline the key challenges and constraints in these sectors for food and nutritional security in Tajikistan.

Land Reform and Farm Restructuring

Agricultural land in Tajikistan is owned solely by the state, and private property rights are limited to use rights. The initial steps of land reform were in the early and mid-1990s, when additional land was allocated to households and an attempt was made to reorganize larger state farms into corporate farms (Lerman and Sedik 2009). Since the end of civil war in the mid-1990s, the state land reforms became an important policy goal because these large farms were characterized by low productivity and increasing inefficiency. In collaboration with development partners, the government made several attempts to develop appropriate farm restructuring and land reform strategies. The initial reforms attempted to restructure the unprofitable and marginally profitable collective and state farms into associations of leaseholders and dekhan farms and to transform state farms into collective farms. At the same time, Presidential Decrees

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10 Dependency ratio is the percent of total renewable water resources originating outside the country. This indicator may theoretically vary between 0 percent and 100 percent. A country with a dependency ratio equal to 0 percent does not receive any water from neighboring countries. A country with a dependency ratio equal to 100 percent receives all its renewable water from upstream countries, without producing any of its own (FAO 2011c).

11 To streamline the reforms process and increase transparency and participation, various working groups were constituted to evaluate challenges in each sector. These working groups then examined existing constrained and developed respective reform measures (Development Coordination Council 2011).
342 and 874 (1995 and 1997, respectively) allocated 75,000 hectares of irrigated land to households for private farming. From 1999 to 2005, more than 500 large collective farms were restructured into smaller collective _dekhan_ farms. In 2006, about 200 additional large collective farms were restructured into smaller farms. Overall, during this period, a total of nearly 700 large collective farms were restructured into more than 5,000 individual _dekhan_ farms. In general, official statistics suggest that an estimated 45 percent of total arable land was affected by farm restructuring and land reform by 2007 (Development Coordination Council 2011).

During the past decade, several government resolutions and legislations were passed to slowly reduce government intervention in land use and planning, as well as to ensure greater power to farmers in making production decisions. For instance, while the cotton debt crisis was resolved, a number of initiatives were passed under the _freedom to farm_ bill through Resolution No. 111 in 2007, which intended to reduce government intervention in farm activities. In addition, Tajikistan’s Land Code and other land use and agriculture-related laws have been amended numerous times. Nevertheless, while it is beyond the scope of this study to go into the land reforms in depth, it can be noted that the pace of reform has been slow, land reform and farm restructuring are incomplete, and various characteristics of collective farming still remain (Development Coordination Council 2011).

The evidence also suggests that the lack of information on property rights and delays in issuing land certificates, in combination with the absence of land cadasters and poor access to farm inputs and services, is deincentivizing farmers to take up individual production decisions (Lerman and Sedik 2009). Thus, land reform is a high priority in the current reforms process, and the government has set goals to guarantee farmers the freedom to make production decisions and to accelerate farm restructuring by issuing land use certificates (Development Coordination Council 2011). As noted by the government of Tajikistan, it would be useful to better understand and assess the current status of farming systems, their efficiency, and potential institutional and policy reforms—while considering lessons from other transition countries such as Armenia, Georgia, Kyrgyzstan, Moldova and China—to take further concrete steps in the near future.

**Irrigation and Water Management**

Irrigation water management and use are linked to food and nutritional security in multiple ways. Water through irrigation ensures stable food cultivation, apart from being used in agroprocessing and food industries. The availability of safe, potable drinking water and sanitation infrastructure can moreover have a bearing on food and nutritional security at the household level. Around 85 percent of Tajikistan’s total arable cropland is irrigated and generates 80 percent of the nation’s total agricultural product (UNDP 2003). Currently, more than 80 percent of the irrigated land in Tajikistan lies in Khatlon and Sughd provinces, followed by the RRP (Figure 3.7). Of the irrigated land, more than 40 percent is estimated to be irrigated by machine systems and pumps.

Although the share of irrigated land seems to be large relative to some developing countries, most of the irrigation systems were constructed for large farm plots primarily for cotton. Thus, areas near cotton-growing regions have relatively better access to water for agricultural and household purposes. The current irrigation water management system seems to be inefficient, and the majority of irrigation infrastructure is in deteriorating condition. The existing evidence highlights this fact: The efficiency of irrigation systems is estimated to be around only 55 percent, and nearly 70 percent of the boreholes for vertical drainage are estimated to be out of order. More than 50 percent of the gravity irrigation systems and about 65 percent of pumping stations are estimated to have deteriorated. Despite a wealth of water resources, around 20 percent of the irrigated lands such as those in Kulab, Istravshan, and Gissar regions face water shortage due to poor regulation of river flows (MIWMRT, UNDP, and IFSAS 2006). Other key constraints include inadequate funding for maintenance and operation of existing irrigation networks at the national level, as well as low collection of water user fees due to poverty (UNDP 2003; MIWMRT, UNDP, and IFSAS 2006; Development Coordination Council 2011).
Further, recent assessments indicate that droughts and floods have significant impact on household food security as well as output production in certain vulnerable regions (WFP 2010). According to some estimates, the adverse impact of natural disasters is equivalent to almost 5 percent of gross domestic product (GDP) per year (Barbone, Reva, and Zaidi 2010). While it would be useful to trace national and regional production trends with rainfall patterns, rainfall data are difficult to obtain and have thus not been attempted in this study. Nevertheless it is important to note that investments in irrigation infrastructure to reduce the effects of weather on agricultural production can be an important means to ensure food security and achieve stable agricultural performance (Fan, Gulati, and Thorat 2008). Better weather and rainfall monitoring systems can also be useful in this regard for planning and emergency operations.

Overall, the current reforms process envisions water sector reforms in an integrated manner and may divide water management into three branches: policy, regulation, and management. From a policy perspective, a transition from water management on the basis of administrative region to river basic management (hydrological boundaries) is a key measure. This assumes the creation of an integrated water resources ministry and a national water council at the national level, river basis administrations and self-financed state enterprises at the intermediate level, and finally water user associations (WUAs) at the farmer level. Decentralized water management institutions through WUAs aim to give user groups the right to operate and maintain on-farm irrigation networks locally and in a competitive manner through user fees and other mechanisms. While the transformation process is still underway, it remains to be seen how the water sector will eventually be restructured.

Agricultural Support Policy and Rural Finance

As seen above, agriculture sector performance has increased from the last decade, especially in the food and high-value crops sectors. However, the dissolution of the previous public (state) institutions for agriculture support systems has left the sector with a poor input supply and agricultural extension support system, limited access to credit, and the absence of well-functioning private markets. The current reforms process aims at encouraging trends toward crop diversification (especially an outward-oriented strategy for fruits and vegetables), testing new crops such as oilseeds (soya, sunflower, and rapeseed), revitalizing the cotton sector, and increasing yields of grain crops (Development Coordination Council 2011). To stimulate the crop sector production and yields, the availability and utilization of modern inputs such as
improved seeds, farm machinery, fertilizer, and agricultural support services such as extension and credit are necessary. In the pretransition period, former state and collective farms provided improved seeds and other inputs for farming and provided farm managers, agronomists, and technical staff to ensure modern farming practices. In the absence of this system, in the process of land reform and privatization of markets, input and support service delivery has been limited and inefficient (Lerman and Sedik 2009; World Bank 2010b; Development Coordination Council 2011).

As the agricultural sector was liberalized, seeds are now mostly sold at market prices, although in some cases cotton seed prices are sometimes controlled by ginneries (ICARDA 2008). In 2008, the seed demand exceeded the supply, and only about 50 percent of cotton and wheat seeds demanded were supplied (Table 3.3). As a result, farm-saved seeds constitute the main source of seeds, and unchecked and uncertified seed sale and use have been reported (FAO 2009). Poor seed storage facilities are also a constraint. The utilization of quality seeds has been instrumental in improving agricultural development and food security of developing countries, as seen from the experiences with hybrid rice in China and the Green Revolution in Asia (Li, Xin, and Yuan 2009; Hazell 2009). Apart from raising investment in domestic seed research capacity, collaboration with international institutes and the private sector may help to improve and increase quality seed available for farmers.

Further, Lerman and Sedik (2009) observe that machinery inventories have declined dramatically from the Soviet period. The number of tractors declined from 37,000 in 1991 to 19,000 in 2006, grain harvesters from 1,500–1,600 in the early 1990s to 900 in 2006, and cotton harvesters from 3,000 in 1991 to fewer than 600 in 2006. Field reports also reveal that the quality of tractors has deteriorated considerably because of significant costs associated with replacing parts. Smaller farms rely heavily on hiring tractors at increasing variable costs. While newer tractors are increasingly available through the market, given the considerable cost associated with purchase, usage still seems to be declining.

Table 3.3—Seed demand, availability, and supply in Tajikistan, 2008

<table>
<thead>
<tr>
<th>Crop</th>
<th>Seed demand</th>
<th>Seed availability</th>
<th>% Seed supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>64,138</td>
<td>33,991</td>
<td>53</td>
</tr>
<tr>
<td>Rice</td>
<td>1,925</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Maize</td>
<td>608</td>
<td>145</td>
<td>24</td>
</tr>
<tr>
<td>Cereals</td>
<td>9,134</td>
<td>1,712</td>
<td>18.7</td>
</tr>
<tr>
<td>Legumes</td>
<td>588</td>
<td>150</td>
<td>25.5</td>
</tr>
<tr>
<td>Potato</td>
<td>88,500</td>
<td>7,451</td>
<td>8.4</td>
</tr>
<tr>
<td>Cotton</td>
<td>28,050</td>
<td>15,679</td>
<td>56</td>
</tr>
</tbody>
</table>

Source: ICARDA 2008.

In addition, fertilizer use has also declined considerably and is estimated to average somewhere between 26 and 30 kg/ha (Figure 3.8). Past studies observed that a considerable monopoly exists in fertilizer supply, as large cotton companies supply up to 75 percent of the fertilizer available in the market (World Bank 2007a). In emergency situations such as the drought of 2007–2008, fertilizer was distributed by the Food and Agriculture Organization of the United Nations (FAO). Pesticides supplied to farmers from the government sources seem to be limited to those for locust control, which has been identified as a serious threat to production in recent years. Pesticides are also sometimes bought from the market, especially for cotton and some newly cultivated crops.

While various legislations have been passed on a piecemeal basis in recent years, a concerted input policy and strategy still needs to be devised for the agricultural sector. In the seeds sector for instance, laws on crop-breeding achievements, plant quarantine, and the seed industry were passed in 1995, 2001, and 2008, respectively, to deal with various aspects of seed breeding, regulation of variety testing, registration, seed quality control, certification, and other issues. In the current reforms agenda, the supply of inputs, including seeds, fertilizers, and pesticides, are seen to be channeled via the market; and farmers’ service cooperatives are envisioned to play an important role in improving farmer access.
Along with input supply, these service cooperatives are expected to strengthen appropriate farming practices, agronomic best practices, and methods of input use, with help from the private sector, research, and donor agencies. These services are currently dispensed through technical staffs at the local government level that are accountable to both relevant ministries and local government officials. International experience suggests that smaller farmers can make use of small-scale economies and pool resources together to increase access to inputs and services (Lerman, Csaki, and Feder 2004). In this regard, development partners (such as the German Agency for International Cooperation, or GIZ, and International Finance Cooperation) are collaborating with the government to develop agricultural machinery leasing services and trade and service cooperatives in Tajikistan. However, the lack of awareness and institutional support for building capacity among these cooperatives and the ability to link them to potential partners are major constraints in delivery of efficient services.

A practical model piloted by GIZ, the European Union (EU), and other development partners under the Tajik Agricultural Finance Framework (TAFF) project is a value-chains approach. This approach attempts to streamline agricultural support systems from input supply and extension service delivery to output marketing, transportation, storage, processing, packaging, and branding by developing the private-sector participation. This can be a useful approach to develop and modernize the agricultural sector in the country. One of the components is fee-based technical assistance for farmers through field advisors who patrol the cotton fields, check production status, and report back to a main agronomist, who then dispenses the advice. Currently there are 13 technical assistance groups with 60 field advisors that cover 14,000 ha of land, mainly in Khatlon and Sughd provinces. Their focus is primarily on cotton, with scope to scale up such services to other crops. Farmers currently pay 50 percent of the cost (total cost is 50 somoni (or about $11.42) per hectare), which is what the farmers are currently willing to pay as cotton prices are on the rise. The tentative reception to this scheme seems positive, and advised farmers seem to perform better than those not advised. If successful, as determined by visibly increasing yields, such pilot programs can be tested and scaled up as agriculture develops into a feasible private-business venture (Development Coordination Council 2011; EBRD 2010).

Another major constraint to enhancing productivity and profitability of agriculture is the taxation of farmland, inputs, and outputs, combined with limited access to credit. For instance, farmers pay import taxes on inputs including 5 percent import tax for input supplies, 20 percent value added tax, plus customs fees that directly impact farmer incomes and therefore ability to invest back in the farm. Agricultural export taxes for cotton are around 10 percent, and a 25 percent social tax is also charged on farms. Apart from taxation, farmers also face high costs from irrigation systems, infrastructure, and land rental. These costs may exceed the income from cotton sales, leading to low profitability and reduced investment in the sector.

Figure 3.8—Agricultural machinery and fertilizer use, Central Asia, 2007

![Agricultural machinery and fertilizer use, Central Asia, 2007](image)


Note: No fertilizer consumption data were available for Turkmenistan and Uzbekistan.
from streamlining agricultural taxation, new financing measures for agriculture activities are also required, especially in the wake of the cotton debt crisis of 2007 (IMF 2009). The European Bank for Reconstruction and Development (EBRD)-TAFF project has been active since 2010 in devising and testing alternative financing practices through community-based and local microfinance initiatives, credit-savings schemes, savings groups, and microlending organizations (Development Coordination Council 2011). Other financial alternatives to safeguard production such as crop insurance through public–private partnerships are also underway, although much remains at a discussion stage.

Local Governance and Social Protection Policy

In the view of strong evidence of persistent local government intervention in the agricultural sector, the government of Tajikistan has included local governance reforms under its agrarian reform strategy. In keeping with the land reform and agricultural transformation agenda outlined earlier, the ultimate objective of the local governance reforms in relation to food security would be to encourage the local government to be a facilitator rather than a decisionmaker and to ensure its transparency and accountability (Development Coordination Council 2011; World Bank 2010). The experiences of developed and developing countries suggest that the government can also play a significant role in ensuring the execution of food safety regulations and norms.

Apart from provincial government representatives, local governments in Tajikistan are broadly organized at the rayon (district) and jamoat (subdistrict) levels and undertake various activities from tax collection, inspecting production, and marketing activities. Previously, state representatives were actively involved in ensuring that farms met production targets. It is necessary to move away from this system, as reports indicate that although the government has stopped issuing targets, production and revenue forecasts are often interpreted as obligations that need to be met by farmers. Other issues on the reform agenda include clearly delineating responsibilities and terms of reference between various levels of government, as well as equipping them to better monitor and record production activities rather than regulate them. In this regard, computerization of government records (such as relating to land, production, and supplies) can be a valuable tool to ensure efficiency, accuracy, and transparency. At the top of the agenda are enhancing farmer awareness and educating local governments on laws, farmers’ rights, and responsibilities (Development Coordination Council 2011).

Further, social policy has also been identified as a critical aspect of agrarian reform and food security, primarily through developing and designing programs of social development in rural areas to safeguard the interest of vulnerable groups. Issues under the scope of this sector include establishing monitoring systems to identify vulnerable populations that may be affected by the reform process; studying informal employment; and identifying technical, vocational, and professional training (Development Coordination Council 2011).

It is beyond the scope of this study to delve into these issues in more detail, but a few emerging trends that pose important challenges to Tajikistan’s food and nutritional security can be highlighted in these arenas. First, there is a need to develop and expand social safety-net programs that protect the poor and vulnerable groups regarding food price inflation, weather shocks, international market volatility, and so forth. In this regard, apart from release of essential food items (such as grains, sugar, and vegetable oil) from state stocks in selected urban areas, the need for social transfer programs (food or cash) in urban and rural areas has to be investigated and the scope for development of food safety nets explored. Currently, emergency response via food and cash transfers and food-for-employment and school-feeding programs seems to be primarily delivered by international organizations and nongovernmental organizations such as the World Food Programme (WFP), United Nations Children’s Fund (UNICEF), and Save the Children. Second, with the disintegration of Soviet-style farm industries, the poor state of nonfarm employment opportunities and their role in ensuring food security and alleviating poverty needs to be explored. This would entail investment in rural nonfarm sectors and provide alternative sources of employment to rural labor to move out of agriculture. Third, the role of labor migration and remittances for poverty alleviation and food and nutritional security should be explored. With outmigration of male labor, feminization of
agricultural households and poverty is an emerging phenomenon. This needs to be converted into an opportunity by schooling, training, and equipping women farmers to participate in agricultural market systems, own land-use rights legally, and participate in governing bodies at the local and national levels (Shahriari et al. 2009; World Bank 2009; Somach and Rubin 2010). Fourth, needs of vulnerable groups such as pensioners, women-headed households, and households in mountainous remote regions should be factored in the planning to make the reform process inclusive (World Bank 2010b).

Climate Change and Food Security

One of the most important long-term constraints to ensuring food availability and security from domestic resources is the probable impact of climate change. IFPRI’s research shows that climate change can have a serious negative impact on agricultural productivity and cereal yields, and thus on food and nutritional security in the future in developing countries (Nelson et al. 2010). Tajikistan, like its Central Asian neighbors, is also vulnerable to potential adverse effects of climate change due to its location, terrain, and resource distribution (Heltberg and Bonch-Osmolovskiy 2011). Countries in the region have all seen an increase in temperatures over the past few decades: Uzbekistan (1950–2005) by 0.29 degrees Celsius, Kazakhstan (1936–2005) by 0.26 degrees Celsius, Turkmenistan (1961–1995) by 0.18 degrees Celsius, and Tajikistan (1940–2005) by 0.10 degrees Celsius (Perel’t 2007). The evidence suggests that average temperatures rose by about 0.5–0.8 degrees Celsius across most parts of the country during this 65-year period, with the biggest increases observed in Dushanbe (1.0 degrees Celsius) and Dangara (1.2 degrees Celsius) districts (UNFCCC 2008). Average temperatures in Tajikistan are projected to rise by 1.8–2.9 degrees Celsius by 2050. If these forecasts do materialize, water resources, agriculture, transport infrastructure, and public health will be the four main sectors in Tajikistan affected by climate change (Barbone, Reva, and Zaidi 2010).

Further, given the mountainous terrain in Tajikistan, temperature increase has been uneven, with some places registering cooling, such as the valley of Lake Bulinkul, where the 1940–2005 average temperature dropped by 1.1 degrees Celsius due to special climatic conditions in the eastern Pamir mountains (Eurasian Development Bank 2009). Changes in temperature have naturally resulted in changes in precipitation, which has serious consequences for agriculture and food security. Barbone, Reva, and Zaidi (2010) observe that temperatures increases of 2–4 degrees Celsius in February and March can lead to a 20 percent decrease in winter–spring pasture productivity. In contrast, in high mountain pastures, rising temperatures of 1.5–3.0 degrees Celsius can increase pasture productivity by 25–50 percent. As reported by Eurasian Development Bank (2009), in eastern Pamir region, on a plateau of between 4,000 and 6,000 meters above sea level, overall precipitation dropped by 5–10 percent, with the sharpest decrease of 44 percent registered in Murgab region. A similar downward trend was observed in the country’s southern lowlands such as Kurgan-Tyube (alternative spelling Qurghonteppa) and Shaartuz. On the other hand, annual precipitation has increased by 8 percent in all parts of Tajikistan located at heights less than 2,500 meters above sea level (Eurasian Development Bank 2009).

The government of Tajikistan has passed more than 30 bylaws related to environmental sustainability and climate change. In an effort to better coordinate and integrate climate change policy into on ongoing activities, the Pilot Program on Climate Resilience has recently been launched in Tajikistan to strengthen institutional capacities for climate resilience and to fund investment projects. Donor support for this program has provided the government of Tajikistan with $50 million as of 2009 for these purposes. While this program is still in a pilot stage, it is important to adopt a nuanced approach to tackling climate change issues because the country will be affected in different ways given its varied topography. Climate change initiatives require local government and central government to closely coordinate and learn from each other, as well as work with neighboring countries and international organizations to arrive at and adopt the best policy approaches to mitigate negative impacts from climate change (ICARDA 2010; Gupta et al. 2009).
4. GLOBAL FOOD AND ECONOMIC CRISES AND FOOD SECURITY IN TAJIKISTAN

Enhancing food and nutritional security has reemerged as a critical international and national policy goal in the wake of the recent global food and economic crises. As international food prices surged in 2007–2008 (and again in 2010–2011), some large grain exporters imposed restrictive trade policies. However, these trade restrictions further increased international food prices and amplified price volatility in international food markets. Further, the global economic crisis also created additional challenges for food security for many import-dependent and food-insecure countries around the world. High and volatile food prices clearly worsened the national- and household-level food security in these countries (Heady and Fan 2010; FAO 2011a). Tajikistan was among the hardest hit by the global food and economic crises. The crises hit the country in multiple ways: economic growth contracted, the import prices for wheat and other staple food items soared, and the inflow of remittances reduced.

This section describes the impact of the crises on macro-level food security using official data from both international and government sources. It then analyzes how global food price inflation, especially in wheat, a staple, was transmitted to domestic markets in Tajikistan and the government’s response to curb food price inflation. It concludes with an examination of the crises’ impact on the welfare and food security of households using data from the 2010 EBRD–World Bank Life in Transition Survey.

Food Trade and Macro-Level Food Security

As mentioned earlier, Tajikistan heavily depends on international trade to meet its domestic food demands. Net imports account for more than 50 percent of cereal consumption (Figure 4.1), and more than 60 percent of per capita calorie intake in the country comes from cereals (Figure 4.2). In addition, nearly three-quarters of total vegetable oil consumption and almost all of sugar consumption are based on imports. Overall, cereals, sugar, and vegetable oil account for about 80 percent of total calorie intake in the country. Moreover, nearly half of total meat consumption, including about 30 percent of bovine beef and 80 percent of poultry meat, also depends on imports. This high reliance on imported food can be attributed to mainly supply-side factors including low agricultural productivity and limited availability of arable land. Demand-side factors such as rising population also contribute to the food security situation in the country. Data from the National Statistical Agency of Tajikistan suggest that the average population growth rate during the last decade has been about 2 percent per year. According to UN population projections, Tajikistan’s population is expected to grow at an annual rate of 1.5 percent and may reach 9.5 million by 2030. Rising population combined with limited domestic agricultural potential and low agricultural productivity may further increase the country’s dependence on food imports.
The ratio of the total exports of goods and services to food imports, which reflects the relative cost of access to food available on the international markets, is often used to measure food security at the macro level (Diaz-Bonilla, E., M. Thomas., and S. Robinson 2002; Ecker et al. 2010). This indicator reflects the fact that macro-level food security is not equal to food self-sufficiency and captures both the country’s demand for food imports and its capacity to finance this demand using foreign exchange earnings generated by exports of goods and services. The higher the ratio of total exports to food imports, the more protected the country in terms of macro-level food security. Tajikistan faces enormous food security challenges based on this indicator (Table 4.1). The average value of this indicator for 178 countries around the world is about 11, indicating that on average, approximately 9 percent of foreign exchange earnings from exports of goods and services is used for food imports (Ecker et al. 2010). Based on this measure, Tajikistan’s macro-level food security with the ratio of 4.9 is comparable to countries like Armenia, Georgia, Yemen, and others. However, it is significantly lower than the world average and most of its Central Asian neighbors. From 2005 to 2008, on average, Tajikistan used more than 20 percent of its export revenue to finance food imports, a figure more than two times higher than the world average.
Table 4.1—Macro-level food security in selected countries

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Armenia</td>
<td>5,410</td>
<td>2,280</td>
<td>5.5</td>
<td>9.5</td>
<td>22</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>9,020</td>
<td>2,961</td>
<td>32.3</td>
<td>&lt;5</td>
<td>—</td>
</tr>
<tr>
<td>Georgia</td>
<td>4,700</td>
<td>2,859</td>
<td>4.7</td>
<td>&lt;5</td>
<td>—</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>10,320</td>
<td>3,490</td>
<td>32.5</td>
<td>&lt;5</td>
<td>—</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>2,200</td>
<td>2,644</td>
<td>6.3</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>1,950</td>
<td>2,118</td>
<td>4.9 (8.2)</td>
<td>17.0</td>
<td>30</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>6,980</td>
<td>2,731</td>
<td>70.6</td>
<td>6.2</td>
<td>6</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>2,910</td>
<td>2,581</td>
<td>17.3</td>
<td>6.3</td>
<td>11</td>
</tr>
<tr>
<td>World average</td>
<td>***</td>
<td>2,796</td>
<td>11.3</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>1,550</td>
<td>2,281</td>
<td>6.3</td>
<td>24.5</td>
<td>27</td>
</tr>
<tr>
<td>Cambodia</td>
<td>1,820</td>
<td>2,268</td>
<td>20.8</td>
<td>19.9</td>
<td>22</td>
</tr>
<tr>
<td>India</td>
<td>3,280</td>
<td>2,352</td>
<td>39.8</td>
<td>23.7</td>
<td>21</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>2,200</td>
<td>2,240</td>
<td>14.5</td>
<td>20.2</td>
<td>23</td>
</tr>
<tr>
<td>Nepal</td>
<td>1,180</td>
<td>2,360</td>
<td>3.8</td>
<td>19.9</td>
<td>16</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2n680</td>
<td>2,293</td>
<td>8.1</td>
<td>20.7</td>
<td>26</td>
</tr>
<tr>
<td>Yemen</td>
<td>2n330</td>
<td>2,068</td>
<td>5.0</td>
<td>25.4</td>
<td>31</td>
</tr>
</tbody>
</table>

| World average               | ***                         | 2,796                            | 11.3                                   | 13                            |                                       |

Note: GNI: Gross National Income. Lao PDR: Lao People’s Democratic Republic.

The heavy dependence on food imports means that Tajikistan is highly vulnerable to possible periods of food insecurity arising from external shocks such as international price volatility, food availability, and policy directives of its trade partners. In this regard, the ratio of Tajikistan’s total exports to its food imports dropped significantly in recent years, exposing Tajikistan’s vulnerability to rising global food prices (Figure 4.3). During the last three years, about 35–40 percent of Tajikistan’s export revenues were spent to finance its food purchases in international markets. Further, one may argue that revenue from exports of goods and services does not truly represent the country’s ability to finance its food imports. Other sources of foreign exchange such as labor remittances could also be important. This is especially true for countries like Tajikistan, where hundreds of thousands of labor migrants scattered around the world can mobilize large amounts of foreign exchange annually to help food security in their home country. According to the National Bank of Tajikistan (2011), foreign exchange influx from a remittance exceeds earning from exports of goods and services in recent years (Figure 4.4).

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12 Labor migrants from Tajikistan go mainly to Russia and Kazakhstan.
Thus, we modify the indicator of macro-level food security by adding remittances to the foreign exchange revenue from exports of goods and services. As a result, the above-mentioned ratio of total exports to food imports increases to 8.2, suggesting that on average, about 12.2 percent of Tajikistan’s total foreign exchange revenue from exports and remittances is used to finance its food imports. This number is still significantly higher than the world average. Further, this ratio declined even more in recent years as a result of global food and financial crises (Figure 4.3). On the one hand, rising global food prices increased the costs of Tajikistan’s food imports. On the other hand, financial crisis led to lower remittances because demand for migrant labor in Russia and Kazakhstan plummeted (Figure 4.4). Consequently, the value of food imports increased up to 20 percent of Tajikistan’s total foreign exchange earnings in 2010.
One of the reasons why Tajikistan’s food security position has become vulnerable over the past few years is probably that its export revenue is heavily dependent on exports of two main commodities—aluminum and cotton fiber—which account for nearly 80 percent of the country’s total exports. This exposes Tajikistan to food security risks related to commodity price fluctuations. It can be highlighted here that the performance of the agricultural sector not only determines the food availability and rural household incomes of the country, but also contributes significantly to its trade balance. This is one of the reasons the cotton sector and its performance are critical to food security in the country. In addition to food imports, Tajikistan is highly dependent on imports of energy products including oil and natural gas. This adds more pressure on Tajikistan’s balance of payments and exposes it to food security risks related to oil and natural gas price fluctuations. Therefore, it is useful to consider the ratio of total foreign exchange earnings (from exports of goods and services and remittances) to the sum of food and energy imports as an additional indicator of food security in the country. This ratio has been declining in recent years as a result of rising food and energy prices on the one hand and declining remittances on the other hand. It should be noted that as the economy diversifies and industrialization and urbanization intensify, the demand for energy imports will increase. This may create additional challenges for macro-level food security in Tajikistan because energy imports compete with food imports for foreign exchange.

Another important factor is that Tajikistan is in a precarious position with respect to its international (gold and foreign exchange) reserves, which also indicates the ability of a country to finance its imports, including food imports. The food import bill was almost twice that of the international reserves held by the country in 1997 and was still more than 100 percent of its reserves in 2006. This puts the country in a risky position in the event of a crisis in the domestic or international food market, as witnessed in 2007–2008 and 2010–2011, when global food and commodity prices surged significantly. This further highlights the role of international markets, especially regional markets in the Commonwealth of Independent States (CIS), in determining Tajikistan’s food security position. As seen during the recent global food crisis, CIS countries that supplied wheat to Tajikistan, such as Russia and Kazakhstan, along with other food exporters restricted wheat exports that may have fueled the price rise. As a net importer of wheat, Tajikistan faced severe domestic food price inflation, and the government responded by increasing supply, subsidizing prices in certain areas, and trying to raise domestic production.

Overall, improving Tajikistan’s long-term food security at the macro level requires diversification of the sources of its foreign exchange revenue as well as substantial growth in domestic food production. In this regard, improving agricultural productivity is an important factor. On the one hand, higher agricultural productivity may lead to higher domestic food supply; but on the other hand, it may help to increase the amount of foreign exchange revenue by increasing the exports of fruits and vegetables. While increasing agricultural productivity is crucial for improving long-term food security in the country, international donors may help to mitigate short term fluctuations in the country’s food security situation by providing timely food aid. From its independence, Tajikistan has received food aid periodically from international agencies such as the Food and Agriculture Organization of the United Nations (FAO), World Food Programme (WFP), and other donors. Food aid has been dispensed through multiple channels. In some cases direct food transfers have been channeled through emergency and disaster response programs. Various social safety net programs, such as WFP’s food and cash for work and school feeding programs in selected rural areas, Aga Khan Foundation’s school milk program in Gorno-Badakhshan Autonomous Oblast (GBAO), and FAO’s periodic food and agricultural input transfers, played important roles in addressing short-term food insecurity incidences in the country. The share of food aid in the domestic cereal supply has fluctuated over the years. FAO estimates that food aid accounted for around 14–15 percent of Tajikistan’s total cereal consumption in 1995–1997 and 2000–2002 but declined to about 7 percent in 2004–2006 (FAO 2011b). Nevertheless, these figures highlight the important role of food aid in enhancing cereal availability in the country.
Rising Global Food Prices and Domestic Food Price Inflation in Tajikistan

During 2007–2008, Central Asian countries, including Tajikistan, witnessed food price movements that closely echoed the price surge in the international markets. Adverse weather conditions in 2007 moreover resulted in a bad year for crop output in these countries (except in Kazakhstan), and in Tajikistan’s case, the food price situation was further aggravated by debt crisis in the agricultural sector. As seen in Figure 4.5, the spike in food prices in the international market was closely followed by accelerated price inflation in all Central Asian countries, followed by a decline when food prices crashed (Akramov 2011). This is most evident in the price spike of 2007–2008, especially in Tajikistan (where the food price index was more than 30 percent higher in the latter half of 2007).

Figure 4.5—Food price inflation (twelve month change in food price index) in Central Asia

In an effort to mitigate transmission of high and rising food prices from international markets and to protect its domestic food security, the Kazakhstan government imposed export tariffs on wheat in February 2008 and then temporarily suspended wheat exports in April 2008. Since Kazakhstan is the main supplier of wheat and wheat flour to Tajikistan, these trade restrictions likely had a negative impact on the availability of food in Tajikistan’s domestic market and further raised domestic prices. In the summer of 2008, prices of bread, wheat, and flour increased by 50 percent in Tajikistan (Akramov 2011, 2012).

The last several months of 2010 saw rising prices of wheat and other staples, which were triggered by the drought in Russia in the summer of 2010 and lower grain production in various parts of the world. The declining value of the US dollar and rising fuel prices are some structural and cyclical factors that have also contributed to the recent price increases (ADB 2011). Some countries have again responded through restrictive trade policies. For instance, Russia passed an embargo on wheat grain and flour exports in August 2010, which was extended through July 1, 2011 (USDA 2011). As seen in 2007–2008, rising international prices have been followed by rising food prices in Central Asia, including in Tajikistan, in key staples such as wheat and wheat flour (Akramov 2012). ADB (2011) estimates that while international prices rose by around 99 percent from June 2010, prices in developing Asian countries have risen by a lesser amount. Notably, wheat prices in Tajikistan increased by nearly 30–40 percent.

FAO (June 2011) estimates that in Tajikistan, prices of wheat flour in April 2011 remained at record levels, 50 percent higher than last year. Prices of potatoes, another key staple, are also estimated to have increased from mid-2010 onward, to stabilize at a higher level (Figure 4.6). Higher export prices
from Kazakhstan and increased oil prices are seen to be the major factors that have fueled the recent period of food inflation in the country. In April 2011, Russia, where Tajikistan imports more than 90 percent of its domestic oil supply, increased export duties on petroleum, causing domestic fuel prices to rise as well (Sodiqov 2011). As can be seen from Figure 4.6, domestic wheat and potato price movements in Tajikistan closely echoed the price movements in other Central Asian countries due to the closely interlinked regional market, not only for agricultural products but also for inputs such as fuel oil, as seen earlier, and even for labor, due to the relatively significant movement of labor between these countries.

**Figure 4.6—Food price inflation: Wheat (a) and potatoes (b)**

(a) Wheat

![Graph showing wheat price movements](image)

(b) Potatoes

![Graph showing potato price movements](image)

Source: FAO 2011b.

The simple analysis provided above indicates that the global food crisis had a significant impact on domestic food prices in Tajikistan. We now provide more formal empirical evidence on price transmission from international markets to domestic food prices in Tajikistan. For these purposes we use available monthly time-series data for international wheat prices and a number of domestic price indexes. The focus on international wheat prices is justified by the fact that more than 60 percent of daily calorie
intake in Tajikistan comes from wheat and wheat products. The selection of the domestic price indexes is based on the availability of relatively long time series and the assumption of potential price transmission channels.

Our first exercise to find evidence of price transmission was simply to analyze a graphical representation of the available food price series. We computed 12-month growth rates for each price index, as well as the exchange rate, for every month since January 2000. Our graphical analyses show that the growth rate of domestic food prices in Tajikistan started to accelerate in mid-2007 and exceeded the inflation and domestic exchange depreciation rates. This coincides with the period in which international food prices were growing significantly (Figure 4.7). We take this as a first crude indication of price transmission from international markets to domestic markets for the period of mid-2007 and onward. This evidence is far from conclusive, however, as some food prices also experienced periods of high growth earlier than 2007, with rates that were well above the domestic inflation rate, especially for wheat flour. This suggests that other factors can affect domestic food prices even when international prices are stable. Nevertheless, acceleration of domestic prices after 2007 seems to be quite general or at least more obvious than before 2007. Graphical representation also suggests that international wheat prices may affect not only domestic prices of wheat products but also overall food and consumer price inflation rates.

Figure 4.7—Twelve-month growth rates of wheat prices in global markets, Kazakhstan and Tajikistan


Further, we looked for evidence of co integration relationships between international wheat prices and corresponding domestic prices in Tajikistan. When we tested for the order of integration of our series, we could not reject that they were integrated of order one. We used augmented Dickey–Fuller and Phillips–Perron tests with and without a time trend and with no lags, one lag, two lags, three lags, and so forth up to seven lags. We concluded that all series are integrated order of one, which is as expected. We therefore did not run regressions at levels and instead tested for the presence of co integration vectors. For these purposes, we used the Johansen co integration test in which the underlying vector auto regression (VAR) model included a domestic price, international wheat prices, and the exchange rate. The results show strong evidence of co integration relationships between changes in international wheat prices and domestic food prices in Tajikistan.
Furthermore, we also used moving-average first-difference regression models to test whether the growth rate of international prices had explanatory power on the growth rate of domestic food prices. In these regressions, the growth rate of international wheat prices and the depreciation rate of domestic currency, somoni, are included as explanatory variables. We also included fixed effects to control for the period between mid-2007 and the end of 2008, when international wheat prices were very high. Our results are summarized in Table 4.2. These results show that the growth rate of international wheat prices positively affects the growth rate of the domestic prices of wheat and wheat products in Tajikistan. For example, during noncrisis periods, 1 percent increase in international wheat prices causes about 0.5 percent increase in domestic wheat prices (with one-month lag) in Tajikistan. However, during a global food crisis period, 1 percent increase in international wheat prices causes more than 1.1 percent increase in domestic wheat prices. In addition, the results suggest that fluctuations in international wheat prices not only have significant causal impact on domestic wheat and wheat product prices in Tajikistan, but the overall food and consumer price inflation rates in the country are also noticeably affected. For example, 1 percent increase in international wheat prices is associated with 0.08 percent increase in overall consumer price inflation. Overall, we conclude that there is strong empirical evidence of price transmission from international wheat markets to the domestic consumer markets in Tajikistan.

Table 4.2—Evidence on transmission of international wheat prices to domestic food prices in Tajikistan

<table>
<thead>
<tr>
<th></th>
<th>Wheat</th>
<th>Wheat flour</th>
<th>Bread</th>
<th>Food price</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global wheat prices (GWP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-month lag</td>
<td>0.456</td>
<td>0.058</td>
<td>0.029</td>
<td>0.003</td>
<td>−0.000</td>
</tr>
<tr>
<td></td>
<td>(0.158)**</td>
<td>(0.052)</td>
<td>(0.036)</td>
<td>(0.018)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Two-month lag</td>
<td>0.038</td>
<td>0.169</td>
<td>0.035</td>
<td>0.046</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td>(0.158)</td>
<td>(0.053)**</td>
<td>(0.035)</td>
<td>(0.018)**</td>
<td>(0.013)**</td>
</tr>
<tr>
<td>Global food crisis (GFC)</td>
<td>0.601</td>
<td>0.698</td>
<td>−0.123</td>
<td>0.309</td>
<td>0.147</td>
</tr>
<tr>
<td></td>
<td>(2.289)</td>
<td>(0.764)</td>
<td>(0.515)</td>
<td>(0.227)</td>
<td>(0.189)</td>
</tr>
<tr>
<td>Interaction of GWP and GFC</td>
<td>0.685</td>
<td>0.385</td>
<td>0.224</td>
<td>0.077</td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>(0.322)**</td>
<td>(0.105)**</td>
<td>(0.071)*</td>
<td>(0.037)**</td>
<td>(0.026)**</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>−0.240</td>
<td>−0.488</td>
<td>−0.307</td>
<td>0.045</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>(0.891)</td>
<td>(0.290)</td>
<td>(0.196)</td>
<td>(0.101)</td>
<td>(0.076)</td>
</tr>
<tr>
<td>R²=squared</td>
<td>0.17</td>
<td>0.37</td>
<td>0.25</td>
<td>0.28</td>
<td>0.25</td>
</tr>
<tr>
<td>N</td>
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<td>106</td>
<td>106</td>
<td>106</td>
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<tr>
<td>F-statistic</td>
<td>1.81</td>
<td>5.06</td>
<td>2.78</td>
<td>3.29</td>
<td>2.87</td>
</tr>
</tbody>
</table>

Source: Authors’ own estimations.

Notes: CPI: Consumer Price Index. * and ** significant at the 1% and 5% levels, respectively.

The Impact of Global Crisis on Households

This section investigates the impact of the global crisis on households in Tajikistan using data from the 2010 EBRD–World Bank Life in Transition Survey II (LiTS).13 We examine how the global crisis affected the economic well-being of households with special focus on the consumption of staple food, healthcare services, and basic utilities. The 2010 LiTS survey was conducted in the last quarter of

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13 The LiTS was carried out in 29 transition countries for the first time in 2006, and it collected a host of socioeconomic data about respondent households concerning the impact of transition on people’s well-being and measures of satisfaction and attitudes toward economic and political reforms as well as public service delivery. The survey also provided data on the extent to which crime and corruption affected peoples’ lives and the extent to which individuals’ trust in other people and in state institutions has changed during the transition period. For a detailed description and analyses of the 2006 LiTS survey, see World Bank, *Satisfaction with Life and Service Delivery in Eastern Europe and the Former Soviet Union: Some Insights from the 2006 Life in Transition Survey*, 2009.
2010 and collected a host of household-level socioeconomic data, including household characteristics, expenditures, labor market status, and access to finance. In addition, it also collected data about household experiences of the global crisis, including subjective perceptions about the impact of the global crisis on households, main transmission channels, and household coping strategies (EBRD 2011a). The LiTS survey in Tajikistan collected respective data from 1,007 households.

The following analysis briefly examines the impact of the global crisis on the well-being and food security of households in Tajikistan. According to subjective measures, the impact of crisis on Tajik households was enormous and pervasive. Overall, nearly 66 percent of Tajikistan’s households report being affected: about 14 percent of households stated that they were affected “a great deal,” more than 36 percent “a fair amount,” and almost 16 percent “just a little.” By this subjective indicator, the impact of the crisis was significantly greater on Tajik households than on households in other transition countries (EBRD 2011a). For example, more than 50 percent of Tajik households reported that they were affected either “a great deal” or “a fair amount,” compared with just 42 percent of households in all transition countries, about 28 percent in Kazakhstan, 25 percent in Kyrgyzstan, and just 16 percent in Uzbekistan. This subjective indicator of impact closely corresponds to objective indicators of shocks experienced by households. The survey results suggest that the majority of these households have been affected through the labor market and reduction in remittances. The most important transmission channel of the crisis impact has been distress in wage earnings: almost half of the affected households reported that they experienced reductions, delays, or suspensions in their wage earnings during the crisis. Nearly 42 percent of affected households stated that either a head of household or another household member lost his or her job during this period. A reduced flow of remittances was another important transmission channel in Tajikistan: about 38 percent (29 percent) of affected (all) Tajik households reported that they had experienced significant reductions in flow of remittances during the crisis period.

The results of multivariate logistic (simple and fixed effects) regression analysis (not reported), which allow for identification of the main characteristics of affected households, show that households that own a car are likely to report that their households were not affected by the crisis. Similarly, per capita household food expenditures are negatively correlated with crisis impact. This indicates that households that spend less on food consumption in per capita terms are likely to report that they were adversely affected by the crisis. On the other hand, respondents that depend on sales or bartering of farm products and pensions are likely to report that they were negatively affected by the crisis. For example, holding their other characteristics fixed, we can say that the odds of being adversely affected by the crisis for households that depend on sales or bartering of farm products are nearly 65 percent higher than the odds for other households. Likewise, we can say that households that depend on pensions are about 40 percent more likely to be negatively affected by the crisis. Further, correlation between the likely impact of the crisis and a household head’s education seems insignificant. Overall, these results are both qualitatively and quantitatively different from other Central Asian countries (EBRD 2011a and 2011b).

Figure 4.8 shows how Tajik households coped with adverse impacts and describes the likely welfare effects of the crisis. This diagram suggests that the crisis had, on average, more severe negative welfare effects on households in Tajikistan than on those in other transition and Central Asian countries. For example, more than 50 percent of households in Tajikistan reported reducing staple food consumption as a result of the global crisis, as compared with 38 percent in all transition countries and 35 percent in other Central Asian countries. In the Central Asian region, excluding Tajikistan, about 14 percent reported reducing health expenditures; in Tajikistan, more than 22 percent did so. Overall, the LiTS survey differentiated four broad categories of coping strategies employed by households during the crisis period (EBRD 2011a). The most common coping strategy for Tajik households was reducing consumption expenditures (Figure 4.9). More than 70 percent of Tajik households that were affected “a

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14 The survey covered the 29 transition countries and five comparator countries in Western Europe. For a detailed list of countries covered in the survey, see EBRD (2011a), Life in Transition: After the Crisis.
15 For an analysis of the impact of the global crisis on the well-being of households across the transition countries, see EBRD (2011a and 2011b).
16 This analysis greatly benefited from the approaches and methods used by EBRD (2011a and 2011b).
great deal” or “a fair amount” by the crisis reduced their food and health expenditures (Passive F & HE), and about two-thirds cut other expenditures (Passive OE). Active strategy options, including obtaining a second job or increasing working hours, selling assets, or moving to a new location, were used by more than one-third of affected Tajik households. Nearly the same number of affected households in Tajikistan used private safety nets such as borrowing money from relatives, friends, or a formal or semiformal financial institution. In Tajikistan, accessing public safety nets, including unemployment benefits, child support, and targeted social assistance, was among the lowest in transition countries, which can be explained by limited availability of such programs in the country.

**Figure 4.8—Household responses to the global crisis in Tajikistan**

![Graph showing household responses to the global crisis in Tajikistan](image)

*Note: Central Asia includes Kazakhstan, Kyrgyzstan, and Uzbekistan.*

**Figure 4.9—Coping strategies employed by households in Tajikistan**

![Graph showing coping strategies employed by households in Tajikistan](image)

*Note: Passive F & HE indicates reducing food and health expenditures. Passive OE indicates reducing other expenditures.*
This simple analysis suggests that households in Tajikistan significantly reduced their consumption expenditures during the crisis. From a policy perspective, it is important to understand how specific crisis events—the loss of jobs, reduced wages, and reduced flow of remittances—have affected household consumption. How do household characteristics such as wealth and sources of livelihood associate with household consumption response during the crisis? To what extent has access to private and public safety nets been able to soften the impact of the crisis? The fixed effects regression results reported in Table 4.3, which examines how household consumption was affected by crisis events, show household characteristics and household access to formal and informal credit (borrowing) or public safety net mechanisms. Following EBRD (2011b), we measure the household response in two ways:

- First, through the base response index\(^\text{17}\) that includes the impact on limited consumption categories including staple food, healthcare, and utilities but excluding luxury goods, car use, vacations, and training
- Second, through the overall response index\(^\text{18}\) that includes stress responses such as selling assets and relocating in addition to the impact on all consumption categories including luxury goods, car use, vacation, and others.

The results suggest that important crisis events including job loss, the closure of a family business, and reduced wages and flow of remittances had significant adverse impact on both base and overall consumption. However, their relative importance for adjustment of base and overall consumption varies. For example, the most severe shock for base consumption was a job loss; and similarly, the closure of a family business and job loss were the most significant crisis events for overall consumption. The reduced wages and flow of remittances also had significant impact on both base and overall consumption. We assume that the coefficients on reduced flow of remittances are lower bound of the related impact on consumption because other crisis events may also include the impact of crisis on migrant workers. For example, job loss may include a loss of job by a migrant worker.

We control for important household characteristics such as age, gender, and education level of a household head; household size; and location (rural versus urban). However, for the sake of presentational simplicity we do not report these regression coefficients. These results suggest that less-educated (measured with household head’s education level) households had to reduce their consumption more. The findings also indicate that female-headed household had to reduce the consumption of essential items more.

\(^{\text{17}}\) The index includes adjustment responses undertaken by the household with respect to consumption of staple food items, healthcare (doctor visits, health insurance, and medications), utilities (gas, water, electric), and phone service. For each household, the index is equal to the number of adjustment responses reported.

\(^{\text{18}}\) Similarly, this index is also equal to the number of adjustment responses reported; however, it covers all consumption categories and stress responses such as selling assets and relocating.
Table 4.3—Impact of the global financial crisis on household consumption in Tajikistan

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Base response</th>
<th>Overall response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Crisis impact index</td>
<td>0.287</td>
<td>0.491</td>
</tr>
<tr>
<td></td>
<td>(0.027)***</td>
<td>(0.071)***</td>
</tr>
<tr>
<td>Job loss</td>
<td>0.603</td>
<td>0.756</td>
</tr>
<tr>
<td></td>
<td>(0.045)***</td>
<td>(0.119)***</td>
</tr>
<tr>
<td>Close business</td>
<td>0.322</td>
<td>0.322</td>
</tr>
<tr>
<td></td>
<td>(0.072)***</td>
<td>(0.073)***</td>
</tr>
<tr>
<td>Less wages</td>
<td>0.756</td>
<td>0.889</td>
</tr>
<tr>
<td></td>
<td>(0.123)***</td>
<td>(0.123)***</td>
</tr>
<tr>
<td>Less remittances</td>
<td>0.240</td>
<td>0.322</td>
</tr>
<tr>
<td></td>
<td>(0.073)***</td>
<td>(0.121)***</td>
</tr>
<tr>
<td>Informal borrowing</td>
<td>0.307</td>
<td>0.307</td>
</tr>
<tr>
<td></td>
<td>(0.072)***</td>
<td>(0.073)***</td>
</tr>
<tr>
<td>Formal borrowing</td>
<td>0.041</td>
<td>0.323</td>
</tr>
<tr>
<td></td>
<td>(0.138)</td>
<td>(0.237)</td>
</tr>
<tr>
<td>Applied for public benefit</td>
<td>−0.381</td>
<td>−0.347</td>
</tr>
<tr>
<td></td>
<td>(0.193)**</td>
<td>(0.223)**</td>
</tr>
<tr>
<td>Received public benefit</td>
<td>0.545</td>
<td>0.467</td>
</tr>
<tr>
<td></td>
<td>(0.223)**</td>
<td>(0.373)</td>
</tr>
<tr>
<td>Owns a car</td>
<td>0.010</td>
<td>0.023</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.113)</td>
</tr>
<tr>
<td>Owns a second residence</td>
<td>−0.328</td>
<td>−0.333</td>
</tr>
<tr>
<td></td>
<td>(0.152)**</td>
<td>(0.151)**</td>
</tr>
<tr>
<td>Main source of livelihood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salary or wages</td>
<td>0.009</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.071)</td>
</tr>
<tr>
<td>Self-employment</td>
<td>−0.137</td>
<td>−0.137</td>
</tr>
<tr>
<td></td>
<td>(0.071)*</td>
<td>(0.071)*</td>
</tr>
<tr>
<td>Pensions</td>
<td>0.277</td>
<td>0.288</td>
</tr>
<tr>
<td></td>
<td>(0.078)***</td>
<td>(0.078)***</td>
</tr>
<tr>
<td>Sales of farm products</td>
<td>−0.198</td>
<td>−0.153</td>
</tr>
<tr>
<td></td>
<td>(0.073)***</td>
<td>(0.073)***</td>
</tr>
<tr>
<td>Help from relatives</td>
<td>0.124</td>
<td>0.148</td>
</tr>
<tr>
<td></td>
<td>(0.079)</td>
<td>(0.078)*</td>
</tr>
<tr>
<td>Region fixed-effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.20</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Source: Authors’ estimates using data from the 2010 EBRD–World Bank Life in Transition Survey II.

Note: The table reports fixed effects regression coefficients. Standard errors are in parentheses. The dependent variable is either an index of base consumption response including staple food and health expenditures or an index of overall consumption. All regressions contain socioeconomic control variables such as household size; wealth; rural versus urban residence; and age, gender, and education level of the household head. Crisis impact index summarizes the crisis impacts including job loss, business closure, wage reductions, reduced working hours, and flow of remittances. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Obviously, in Tajikistan, where formal channels of finance are underdeveloped and only few people have access to formal financial institutions, informal borrowing is very important. Thus, it is not surprising that there is statistically significant positive correlation between informal borrowing and consumption responses to the crisis. It is more likely that the affected people tried to mitigate the adverse consumption response by borrowing from relatives, friends, or a private money lender. There is no significant correlation between formal borrowing and consumption responses. Interestingly, the results reveal that households that applied for any form of public safety net reduced their base consumption less than those that did not. This is probably because households that found themselves in especially dire situations were not able to apply for public safety net because availability of such programs is very limited in the country. Finally, the lower section of Table 4.3 provides some insight into the relationship between households’ main source of livelihood and consumption response. These results suggest that...
pensioners had to significantly reduce both base and overall consumption. In the meantime, farm households and self-employed people had to reduce base consumption less. Also, wealthier households had to reduce their base consumption less.

The analysis in this section suggests that the recent global crises had significant negative impact on households in Tajikistan. Tajik households have been affected mostly through job loss, the closure of family business, and reductions in wage earnings and flow of remittances. Moreover, Tajik households had very limited labor market opportunities and safety net mechanisms to cope with the crisis. As a result, they had to cut consumption, particularly reducing expenditures on staple foods and healthcare.

Overall, our analysis in this chapter shows that recent food and economic crises had significant adverse impact on food security in Tajikistan. First, rising food prices, in combination with reduced inflow of remittances, deteriorated macro-level food security in the country. Second, domestic food and consumer price inflation rates in the country were significantly affected by fluctuations of international food prices. The households in Tajikistan suffered job losses and declines in remittances, and as a result, they had to cut their consumption of staple food, healthcare, and basic utilities.
5. POLICIES TO DEAL WITH FOOD SECURITY CHALLENGES

Surges in domestic food prices and a decline in inflow of remittances closely associated with global food and financial crises had a significant negative impact on food security in Tajikistan. The share of food expenditures in total consumer spending again exceeded 60 percent, although this has been decreasing over the past decade (FAO 2011a). Moreover, only an estimated 11 percent of rural households are net sellers of rural staples (Zezza et al. 2009). High food price inflation can thus have detrimental effects on food and nutritional security at the household level given the fact that consumers may cut down the quantity, quality, and diversity of food consumed due to lower disposable income. In fact, our earlier analysis suggests that more than 50 percent of households in Tajikistan cut their food consumption. Higher food prices also decrease the amount of income available to poor and marginal households to meet emergency health and medical expenditures. At the national level, the high and rising value of food imports will not only deplete scarce foreign exchange reserves but also entail increased cost in the form of emergency subsidies on food.

The government of Tajikistan took a series of policy measures to curb the price surge and limit its possible negative impacts on households. Initially, it lowered import taxes and tariffs on essential goods. It ordered the release of wheat flour, rice, and sugar from public stocks at subsidized prices. In 2011, the government allocated $58 million (260 million somoni) for food and fuel subsidies, and $13 million was allocated for flour and fuel reserves that would be provided to the population at discounted prices. The government has also set up special commissions to procure meat and other foodstuffs directly from farmers and sell them to the population without the involvement of intermediaries. It has also provided diesel to farmers at subsidized prices. In addition, price ceilings for flour and meat have been introduced. Apart from monitoring and regulating producer and consumer prices, the government has decided to increase public-sector wages and salaries, which could increase income available for households to more easily meet their food demands (IMF 2011a; Sodiqov 2011).

However, the short-term policy measures mentioned above cannot fully mitigate the negative effects of global food and financial crises on poor and vulnerable households. Thus, an important policy challenge for Tajikistan is how to best position itself to respond to these external shocks. As mentioned earlier, agriculture employs a significant portion of labor forces and provides livelihood opportunities for most of the rural households in the country. Thus, increasing agricultural productivity is essential to improving the well-being of these households. Moreover, increasing agricultural productivity helps to increase domestic food production and reduces import dependence. This requires the government of Tajikistan to accelerate agrarian reforms and remove existing institutional and policy constraints discussed earlier in Section 3.

Further, international experience suggests that the countries that effectively manage the adverse effects of the crisis had in place social safety net programs to help cushion the negative impacts of external shocks. The available evidence shows that Tajikistan’s social protection policies are very limited and that only a few households could benefit from such programs. Tajikistan, in collaboration with development partners, must continue efforts to develop effective social protection programs through the targeting of especially vulnerable groups with cash and food transfers, vouchers, and other such mechanisms. These programs can provide an essential safety net to needy households in reducing vulnerability to future food and economic crises that may arise. Apart from increasing agricultural productivity and strengthening the social safety net, various other factors can influence food and nutritional security, especially in Tajikistan, as it has many peculiarities in its terrain as mentioned earlier, in the outlay of its infrastructure, and in the state of development of its value chains. These factors are briefly discussed below as they affect and act as constraints to market integration within the country and contribute to price formation and inflation.
Domestic Food (Wheat) Markets

As mentioned above, Tajikistan imports more than 50 percent of domestic consumption of wheat and its products from international markets, especially Kazakhstan. A closer look at the sources of wheat imports into Tajikistan throws light on how the movement of domestic wheat prices in Tajikistan may be closely tied with international food prices, especially those of Kazakhstan. Overall, Kazakhstan is the largest exporter of wheat to Tajikistan and usually supplies more than 90 percent of Tajikistan’s wheat imports. Tajikistan also imports wheat in smaller quantities from Russia and Ukraine. Uzbekistan and Kyrgyzstan also supply some amount of wheat and other food items to Tajikistan, albeit in smaller quantities and often through informal routes.

Despite its significant dependence on wheat imports, Tajikistan remains poorly connected to its main partner, Kazakhstan, in the northeast, due to the mountainous geographical terrain of its border regions. An estimated 95 percent of Tajikistan’s total external trade volume is transported by rail through Uzbekistan to and from destinations such as Russia and Kazakhstan (WFP 2009 and 2010). Uzbekistan’s role in Tajikistan’s wheat trade is further highlighted during the long and harsh winter, as the mountain road pass that links northern and southern Tajikistan is closed. During such times, the only major transport route between the northern and southern parts of the country is through Uzbekistan via railroad transportation.

Within the country, the main market centers are situated in Dushanbe and Sughd, in keeping with their relatively better connectivity to international markets. Hissar is a major wholesale market 22 km from Dushanbe and receives output from farms located within districts under the Region of Republican Subordination (RRP) as well as a large quantity of imported wheat and wheat flour from Kazakhstan. Some major wholesale markets in the Sughd province include Panjshanbe and Istaravshan, which supply surrounding areas and are in turn largely supplied by local producers and imported wheat. In the south, in Khatlon province, the major market centers are in Kulyab and Kuran-Tybe, which are mostly supplied by local producers and to a lesser extent from Hissar and Sughd, especially during the summer period. Gorno-Badakhshan Autonomous Oblast (GBAO) remains remote, with small, dispersed local markets, the main center being in Korugh, the provincial administrative center, and is supplied in smaller quantities by the Khatlon markets as well as Hissar and Sughd. Border regions see cross-border exchanges in small quantities, sometimes informally with other countries like Afghanistan and China (WFP 2009, 2010; World Bank 2007a). Apart from these major market centers, villages usually have either daily or weekly markets that sell grain and other food items.

As a result of widely varying structural and supply conditions, wheat and wheat flour prices vary across different market centers. Figure 5.1 presents monthly price data for three regional (Dushanbe, Khatlon, and Sughd) markets from the FAO GIEWS monitoring system during 2009–2011. While a similar increase in prices has been observed across all regions over the 2010–2011 period for which data are available, it is critical to note that irrespective of the level of price and degree of volatility (which may be driven by seasonal considerations as well as supply and other shocks), price differentials exist across these regional markets. From Figure 5.1, Sughd has markedly lower prices of wheat flour, in keeping with its well-connected market position as a main center of imports. Prices in Dushanbe and Khatlon are very similar, with Khatlon prices marginally higher in recent months, possibly because of buying food from markets in Dushanbe or routing products through Dushanbe.
Our analysis of more recent price data for wheat flour and wheat from Tajikistan Agricultural Information Marketing System (Sugdagroserv Consulting 2011) suggests that for the period considered, wheat prices in all regional markets fluctuated around the average, and wheat prices in Kulyab remained somewhat lower than those in Istaravshan and Khujand in the latter part of 2010 and 2011. This may be because most of the grain supplied to Kulyab is supplied by local producers. In contrast, wheat flour prices in Istaravshan and Khujand, which are the primary points of entry for wheat flour from external sources, have remained lower for most of the period. These findings are in line with other surveys of prices (such as WFP 2011), which also observe that wheat flour prices in the northern markets in Sughd province are lower compared with those in the market centers in the south. These prices are especially lower in comparison to prices of market centers in the GBAO region.

Transport and Logistics

Past studies have observed that higher logistical and transport costs reduce trade competitiveness and market integration and increase the price of commodities sold in the market. In this regard, observed price differentials in food prices across different regional markets are mainly due to infrastructure bottlenecks. As noted by World Bank (World Bank 2005; Ojala, Kitain, and Touboul 2004), Tajikistan has one of the highest logistics costs, estimated to be around 27 percent of its gross domestic product (GDP), in the world. Transport costs form an important transaction cost associated with trade and price formation in food items, and various studies have observed that regions that are better connected to food supply routes have lower prices, as seen in wheat flour prices in Sughd province.

Another important feature of food transportation costs in Tajikistan, as mentioned earlier, is seasonality associated with weather conditions, as many roads and rail networks remain blocked through winter months. The evidence suggests that transport costs within markets centers in Tajikistan between Khujand and Dushanbe nearly triple during the winter season (Table 5.1). As noted earlier, the only route is via Uzbekistan, and this further exacerbates seasonal food price increases in the country. This is partly due to its mountainous terrain, as mentioned earlier, as well as the poor connectivity of market centers due to the state of rail and road networks. The railways network covers around 500 km and carries about 75–80 percent of the total freight goods in Tajikistan (Table 5.1). It is especially critical during winter to carry food from Uzbekistan to the southern parts of the country. The most prominent rail line is between Patahabad at the Uzbekistan border to Yangibazar (via Dushanbe), which represents around 48 percent of total import–export freight traffic; the northern line, from Bekabad to Kanibadam (via Khujand), which
covers 33 percent, is the most important line for ferrying food products; and the southern line, from Hashidy at the Uzbekistan border to Kulyab, handles 19 percent (WFP 2007). Most of the railways network was built during the Soviet period and still uses the broad-gauge system. While the railways network has performed reasonably well, its reach is limited in mountainous zones, which tend to be more food insecure and in need of connectivity.

Table 5.1—Transport costs from Khujand to Dushanbe

<table>
<thead>
<tr>
<th>Item</th>
<th>Summer (via Anzob Pass)</th>
<th>Winter (via Uzbekistan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>340 km</td>
<td>930 km</td>
</tr>
<tr>
<td>Total cost/ton (for a 10-ton truck)</td>
<td>$70</td>
<td>$260</td>
</tr>
<tr>
<td>Direct transport costs/ton</td>
<td>$13–$23</td>
<td>$26–$67</td>
</tr>
<tr>
<td>Residual costs/ton (bribes, transit costs)</td>
<td>$47–$57</td>
<td>$193–$234</td>
</tr>
</tbody>
</table>


Road networks were also mainly built during the Soviet period and are in urgent need of renovation and maintenance. Progress on this front is still underway through a number of donor-supported projects. Since liberalization, many private companies run trucking companies, which are the major carriers of food in domestic markets. While these private operators are seen to have lowered transport costs and to offer more competitive prices, past studies note that many trucks are in poor condition and replacement and renewal of the fleets remains a concern (World Bank 2005). Long-term investments in upgrading and increasing the logistics and transport infrastructure, as well the inclusion of private players in provision of competitive transport services, can be important measures in reducing transaction costs and thus price differentials across markets. As shown in Table 5.1, transportation costs are significantly higher when routed through Uzbekistan, and this provides a strong case for developing sound internal transport and logistics networks that connect the northern markets to the central, southern, and eastern regions. In this context, developing the potential of air freight can possibly improve transport of food between market centers and remote regions, especially in emergency situations.

Developing Efficient Value Chains in the Wheat Market

Relatively few studies have explored price formation from a value-chains perspective in Tajikistan, and this is a key knowledge gap. Although we were not able to access the marketable surplus ratio for wheat (that is, marketed quantity as a share of production), past studies indicate that this ratio for most commodities remain quite low, at less than 10 percent (other than vegetables, which was around 22 percent during 1999–2003; World Bank 2007a). Most wheat grain is either sent directly to village mills or sold to wheat wholesalers, who then sell to mills. In turn, wheat flour is sold either to households directly or through flour wholesalers and retailers. Imported wheat flour is generally sold through flour wholesalers and then retailers (Goodman 2008). A small survey of 161 wholesalers and 394 retailers conducted by WFP (2011) in 30 markets reveals that nearly 38 percent of the wholesalers reported trading in imported wheat and wheat flour but none in locally produced wheat flour. Only 2 percent of retailers reported dealing in locally milled and produced wheat flour. This supports the observation that imported flour available in Sughd regions may be cheaper. The survey also reports that high taxation was one of the key constraints in doing business locally.

Regarding the milling sector, a few existing studies have observed that quality, capacity, and functioning of large mills from the Soviet period have deteriorated due to outdated machinery and high maintenance costs. Medium mills generally process imported wheat and better-quality domestic wheat, whereas small mills at the village level process locally grown, poor-grade wheat. The number of small village mills that use imported equipment from China and Korea has increased recently, as they are more suited to cope with frequent power shortages observed in rural areas (WFP 2007). While Goodman (2008)
observes that value added at the village mill level is high and a profitable activity, one of the largest constraints faced by the milling sector is dealing with power shortages. This also acts as a constraint to the development of other food-processing industries that can further use wheat flour.

This section does not go deep into issues of the wheat value chain in detail, but it does highlight some important aspects with respect to market integration and price formation. First, efforts are required to stream the value-chain process from input supply in items such as seeds and fertilizer to retailing and marketing. This requires a thorough evaluation of the way existing markets function in the wheat sector; stages of price formation across various market regions; and the role of various players in the system, including farmers, wholesalers and millers, and retailers. The primary step to increasing the quality and competitiveness of domestic wheat production in markets is to improve yields and production. Initiatives like the Tajik Agricultural Finance Framework (TAFF) that encourage involvement of the private sector are a step in the right direction. It can be noted that the private sector needs to have a basic infrastructure in place to participate in agroprocessing, and for this the government needs to heavily invest in rural infrastructure such as electrification and roads, as well as create a more business-friendly environment by removing administrative barriers and taxes. It is useful to note that the World Bank (2007a) reports a 2005 survey of firms, of which 27 percent said that poor access to electricity was a problem in doing business, 13 percent said the same about transportation, and 8 percent said it about telecommunications infrastructure. Firms surveyed incurred losses on an average of 6 percent of their sales due to power shortages and 1 percent due to water shortages. It can be reiterated that higher costs incurred through logistics and poor infrastructural support lead to greater price differentials across regions, with developing regions witnessing higher market prices. Information dissemination on market prices can be critical for farmers to make price decisions on where to sell and also contribute to better market integration. Greater connectivity to mobile phones and the Internet can play an important role in price information dissemination, as seen in other developing countries (Minten, Reardon, and Chen 2011).

Regional Cooperation

Improved regional cooperation is very important to achieve sustainable long-term food security in Tajikistan. However, the evidence suggests that regional cooperation in Central Asia is adversely affected by the presence of various barriers to trade, including restrictions to cross-border movements of goods, people, and transport equipment among the countries of the region (ADB 2006). Past studies have observed that limitations on the volume of goods that can be traded, restrictions on the period of open border markets, and rent-seeking behaviour of border officials are also critical factors that limit cross-border cooperation in the region (World Bank 2007c). While some of these limitations are beyond Tajikistan’s control, however, others can be reduced by unilateral or collective action in the region.

In this regard, regional initiatives supported by international organizations, such as Central Asia Regional Economic Cooperation (CAREC)19, can play important roles in fostering regional trade and cooperation in the region. For example, CAREC Transport and Trade Facilitation Strategy for 2008-2018 endorsed by the Sixth Ministerial Conference on CAREC on November 3, 2007 in Dushanbe aims (i) to facilitate efficient and free movement of people and goods across borders, and (ii) to significantly reduce transaction costs and time by developing competitive and people-friendly transport systems and by simplifying, standardizing, and harmonizing cross-border and trade procedures (CAREC 2007).

The success of such programs may help to create an environment that allows to take advantages of innovative mechanisms such as regional strategic grain reserves and virtual food reserves. Such options may ensure sustainable long-term food security of the region, especially net food importing countries like Tajikistan. The establishment of regional strategic grain reserves was attempted by the South Asian Association for Regional Cooperation countries and more recently in the Middle East and North Africa region (Wright 2009; Wright and Cafiero 2011). This may be an especially important policy option for

19 CAREC includes eight countries: Afghanistan, Azerbaijan, China, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, and Uzbekistan. It is supported by six multilateral institutions: ADB, EBRD, IMF, Islamic Development Bank, UNDP, and World Bank.
Tajikistan, in cooperation with other Central Asian and CIS (Commonwealth of Independent States) countries, as establishing self-sufficiency may be a less efficient strategy than managing strategic reserves along with other neighbors. Further, options such as managing virtual and actual food reserves may be tested to smooth price volatility (von Braun and Torero 2008).

**National Food (Grain) Reserves**

The government of Tajikistan started to plan the establishment of strategic grain reserves in reaction to the global food crisis and the export bans and export taxes observed recently. This indicates that it does not view international market futures as reliable substitutes for local accumulation of stocks. This is easy to understand in a landlocked country such as Tajikistan, which relies on transport infrastructure of neighboring countries. International futures contracts eliminate counterparty risk with respect to performance of the futures contract, including delivery at the designated delivery point. But for a remote country, risks related to other counterparties, including financiers, agents, transport providers, and neighboring governments, remain very important and often impossible to hedge. Further, a futures market might be shut down or exports banned by the exporters. A national food (grain) reserve is thus an essential element of a prudent national food security policy for Tajikistan.

Building effective strategic food (grain) reserves would enable the government to address the negative impacts of external shocks such as a global food crisis. Existing evidence from other countries suggests the need to address three key challenges that arise with maintaining effective strategic food (grain) reserves: the determination of optimum stock levels, the level of costs and losses associated with these reserves, and the uncertainties that strategic reserves can bring out in the marketplace. In addition, predicting supply, demand, and potential market shortfalls requires the use of sophisticated research methods and techniques. Further, uncertainties and market distortions that strategic food (grain) reserves can introduce into the marketplace can be problematic. The answers to these questions must depend on the diversity of food supplies, dependability of traditional suppliers and transportation channels, and cost of the program. Strategic food (grain) reserves tie up capital for substantial intervals between releases and can be expensive to maintain. The efficient management of strategic reserves also requires scarce human capital, and temptations for corruption can easily arise. Institutional setup of strategic grain reserves should address governance issues properly.

Two factors mentioned elsewhere are important for the design of Tajikistan’s strategic grain reserves. The first is its extraordinary dependence on imported wheat for domestic food supply. The second is people’s heavy and continuing dependence on wheat and wheat products in their diets. The latter exacerbates dependence on their importation. Overall, efficient food (grain) reserves policy should consider evidence-based solutions on stock management and potential linkages between strategic reserves and food markets, and between strategic reserves and other food security and social safety programs. In addition, issues related to the impact of grain reserves on agricultural prices and interregional grain movement should be properly examined.
6. SUMMARY AND DIRECTIONS FOR FUTURE RESEARCH

In the early post-Soviet years, prolonged civil war caused Tajikistan to suffer much longer interruptions in economic development, and the decline in the country’s economic growth was more severe than in other former Soviet Union countries. By the mid-1990s the country’s GDP had plummeted to about one-third of its pretransition level (in real terms) and poverty has risen as per capita income collapsed. The signing of the peace agreement in 1997 signaled the end of the civil unrest and provided a foundation for economic recovery. Since then Tajikistan has had considerable economic growth, which has led to substantial improvements in welfare and food security. The real GDP growth averaged 8.9 percent per year between 2000 and 2008. The national poverty headcount ratio declined from 72 percent in 2003 to 47 percent in 2009; the poverty headcount ratio in rural areas also declined from 74 percent to 49 percent for the same years. The incidence of extreme (food) poverty declined from 42 percent in 2003 to 17.5 percent in 2009 (Statistical Agency 2007, 2009). While poverty equally declined in both urban and rural areas, about three-quarters of the poor still live in rural areas.

Despite considerable growth in the recent years, per capita GDP level in 2010 is still significantly below pretransition levels (in real terms, per capita GDP in 2010 was about two-thirds of the 1990 level). Nearly half of the population still lives under the absolute poverty line. Moreover, the recent food and financial crises have negatively affected Tajikistan’s economy and food security in many aspects. Economic growth slowed down to 3.4 percent in 2009. Reduction in poverty and improvement in household welfare also significantly slowed down. In addition, the country’s terms of trade considerably deteriorated in 2007–2008 when relative prices of its major imports (fuel and foods) with respect to its main exports (aluminum and cotton) significantly increased. While part of the negative terms-of-trade effect was compensated by increased remittance inflows in 2007 and 2008, the global financial crisis in 2008–2009 led to a significant decline in remittance incomes. Compared with the previous year, remittance receipts fell by more than 30 percent in 2009, negatively affecting both national and household incomes (World Bank 2011a). Further, rising global food and fuel prices led to significant inflationary pressure in the country, and double-digit inflation was observed in the second half of 2007 and throughout 2008 and early 2009. Furthermore, approximately 60 percent of households affected by the crisis reduced their food consumption. By this measure, the impact of the crisis was significantly greater on Tajik households than on households in other Central Asian countries.

In addition, property rights and market reforms in the agricultural sector are still not complete, and the population growth rates are still high. As a result, the sector continues to face considerable institutional, policy, and natural resource constraints. These factors challenge Tajikistan’s progress toward food security and healthy nutrition, especially when economic growth slows down and the country faces significant macroeconomic challenges as a consequence of the recent global crises.

This study has considered only some macroeconomic and sectoral factors as drivers of food and nutritional security in Tajikistan. Other drivers of food security include education and health services. Moreover, linkages and interactions among various drivers are also important. In addition, at the micro level, given that individual nutritional status is important and determined by household-level factors, the immediate causes of food and nutritional insecurity need to be studied at the household level. In addition, the evidence suggests that vitamin and mineral deficiencies are highly prevalent in Tajikistan, which can have serious and long-lasting consequences for individual welfare and for the country’s socioeconomic development (UNICEF 2010). This issue deserves greater attention and requires future research.

Further, ensuring resilience to external shocks and achieving long-term food security are not possible without reducing poverty and expanding employment opportunities in rural areas. Evidence shows that in countries that achieved long-term sustainable food security, rural nonfarm employment provides more than 50 percent of household incomes in rural areas (Haggblade, Hazell, and Reardon 2007). The experiences of these countries show that rural nonfarm employment tends to be heterogeneous in nature and develops via rapid economic and spatial transformation of rural areas through consumption,
production, and investment linkages. The constraints on expanding rural nonfarm employment and limitations of risk mitigation through labor migration require more research in the context of Tajikistan.

The land reform transferred a considerable amount of arable land to households and individual *dekhan* (peasant) farms. This led to recovery of agricultural production and relative increase in productivity, structural changes in crops and livestock, and positive effects on family incomes and poverty reduction. However, a large portion of agricultural land is still occupied by unreformed large agricultural enterprises (about 35 percent of total arable land) and collective *dekhan* farms (about 20 percent) (World Bank 2011c). In addition, public support to agricultural input and service provision has been significantly reduced, and knowledge and infrastructure assets have significantly deteriorated during the post-Soviet period. Moreover, agricultural input markets in Tajikistan are underdeveloped, and market failures are widespread. The inability of individual farmers to access modern inputs and agricultural advisory and marketing services has become a major constraint to improving agricultural productivity. Major challenges also exist in linking individual farmers and households with remunerative markets. Evidence-based research on the above-mentioned areas can effectively contribute to further improvement of farmers’ incentive structures, reduction of transaction costs, and enhancement of agricultural productivity in Tajikistan.
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