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Institutional Change, Rural Services, and Agricultural Performance in Kyrgyzstan

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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ABSTRACT

The institutional change in rural Kyrgyzstan during the transition period included farm reorganization, land reform, building markets, and community institutions. The land reform established private property rights to land, including the rights to transfer, exchange, sell, lease, and use the land as collateral for credit. These key features of Kyrgyzstan's agrarian transition are in sharp contrast with those of other transition countries in Central Asia. This paper reviews the process of institutional change in rural Kyrgyzstan, examines its impact on agricultural performance and discusses some remaining major institutional and policy constraints on agricultural growth in this country.

Keywords: Institutional change, land reform, agricultural growth, rural services, Kyrgyzstan.

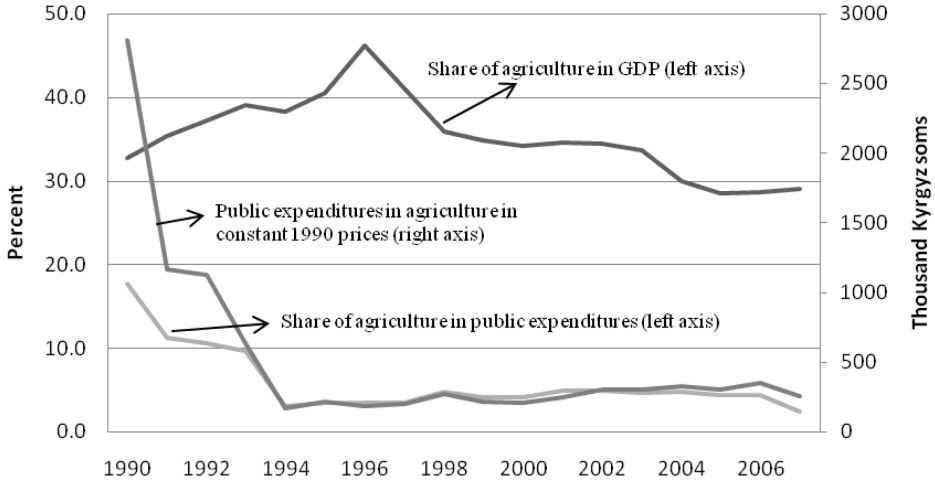
1. INTRODUCTION

There is a consensus among economists that the transition from a command economy to a market economy is a large-scale institutional change (Murrell 2008; Dewatripont and Roland 1997). In the agricultural sector, this transition involves several distinct aspects of institutional change, including the decollectivization and individualization of land use, the introduction of private property rights, and the building of market institutions (Lerman, Csaki and Feder 2004; Roselle and Swinnen 2004). In most transition countries, including Kyrgyzstan, agricultural development has been determined by the success of the decollectivization and individualization of land use. However, there is ongoing debate concerning the effects of decollectivization and individualization on agricultural performance. On the one hand, the literature claims that individualization of agriculture in transition economies increases productivity by solving the incentive and governance problems pertinent to large farms. Furthermore, evidence suggests that smaller individual farms attract more labor per unit of land than collective farms, and transition countries with higher shares of land in individual use have achieved better results in agricultural growth and productivity (Lerman, Csaki and Feder 2004;Lerman 2004, 2008; and Macours and Swinnen 2002). On the other hand, some argue that individualization of agriculture may lead to subsistence farming, which is considered to be a survival strategy and is usually associated with low productivity (Sarris, Doucha and Mathijs 1999). The literature also suggests that the beneficiaries of land reform not only need access to land, they also need access to working capital, input and output markets, and traditional and new agricultural services (Deininger 2002). Policymakers in some transition countries blame the individualization of agriculture for the fragmentation of farmland and disorganization in the supply chain.[1] In this regard, Kyrgyzstan's experience is very interesting, as the far-reaching land reforms implemented in the mid-1990s initiated the individualization of agriculture in this country.

Agriculture is an important sector of Kyrgyzstan's economy, employing more than 40 percent of the country's labor force and generating about one-third of its GDP (Figure 1). Prior to 1991, as was the case elsewhere in the former Soviet Union, all land in Kyrgyzstan was the sole property of the state, and the agricultural sector was dominated by large-scale socialist farms that managed thousands of hectares of farmland and employed hundreds of workers. Transformation of the agricultural sector began in the early 1990s and initially focused on the liberalization of agricultural markets and prices. Starting in the mid-1990s, the agricultural reforms shifted to focus on property rights reform, the individualization of agricultural production, and (later) the creation of market institutions. The major institutional changes during this period included the abolition of state and collective farms, and the transition to a private farming system through equitable land distribution and the introduction of private ownership of agricultural land. In the mid-1990s, individual peasants received land use rights for up to 99 years. Later, in 1998, a constitutional amendment introduced private land ownership. Another important change was the establishment of institutions for collective action, such as water users associations that operate and maintain on-farm irrigation facilities and regulate water allocation.

[1] This assertion is based on the authors' personal observations.

Figure 1. Share of agriculture in GDP and total public expenditures, 1990-2007



In the early 1990s, Kyrgyzstan experienced a dramatic decline in agricultural output. However, agricultural production rebounded quickly following land reform, and showed a clear upward trend between 1995 and 2001. Indeed, during the first decade of transition, agricultural performance in Kyrgyzstan (in terms of gross output, increased labor productivity and improved yields) was one of the best among all former Soviet republics (Rozelle and Swinnen 2004). The rates of agricultural growth, however, slowed significantly after 2002. Some argue that significant declines in agricultural growth rates are associated with the fragmentation of land use and the apparent inability of small peasant farms to sustain growth in agricultural productivity (Government of the Kyrgyz Republic 2004). There is widespread concern among national and local policymakers in Kyrgyzstan that "small peasant and individual farms are not able to apply high technology of production because of the small sizes of the farms, low income and lack of access to high quality agricultural machinery."[2] In fact, the evidence presented in this paper shows that small peasant farms face difficulties in accessing agricultural machinery and inputs. Another essential problem in Kyrgyzstan's rural sector is that the decollectivization of agriculture was accompanied by a significant decline in agricultural public expenditures (Figure 1), leading to significant declines in the availability of agricultural services.

In this paper, we review the process of institutional change in rural Kyrgyzstan, examine its impact on agricultural performance, and discuss some major constraints limiting agricultural growth in this country. The impacts of institutional changes on land use and agricultural performance are examined using official statistical data from both national and international sources. The constraints to agricultural growth are analyzed using secondary data from various household- and farm-level surveys. The paper is organized as follows. We start with an overview of the institutional changes in rural Kyrgyzstan, and then show how these changes might have impacted the agricultural performance in the country. We then discuss the challenges and constraints in the agricultural sector that emerged after land reform, preventing Kyrgyz farmers from fully utilizing the benefits of private land ownership. The final section of the paper provides conclusions and highlights directions for future research.

[2] Agrarian Policy Concept of the Kyrgyz Republic to 2010, approved by the Resolution of the Government of the Kyrgyz Republic, No. 465, 22 June 2004.

2. INSTITUTIONAL CHANGE IN RURAL KYRGYZSTAN

The transformation of the agricultural sector in Kyrgyzstan began in the early 1990s and continues to present day. This transformation has included several distinct aspects of rural institutional change, including the abolition of state and collective farms, the transition to a private (individual) farming system, land distribution on an equity principle, the introduction of private property rights to agricultural land, and the construction of collective action institutions and market infrastructures.

The Rural Institutional Framework prior to 1991

Prior to 1991, in Kyrgyzstan, as seen elsewhere in the former Soviet Union, land was solely state owned and the agricultural sector was dominated by large-scale socialist farms that managed thousands of hectares of farmland and employed hundreds of workers. As of January 1, 1991, there were several hundred large-scale state and collective farms in Kyrgyzstan. These farms managed over 15 million hectares of agricultural land, including arable land (about 1.3 million hectares), perennials and pastures (Bloch, Delehanty and Roth 1996). Alongside these large farms, hundreds of thousands of rural households cultivated small plots, collectively accounting for about 3-4 percent of the country's arable land. Despite their small share in agricultural land, household plots achieved relatively high levels of productivity. According to official statistical data from the National Statistics Committee of Kyrgyzstan (NSC), in 1990, the household sector produced about two-thirds of the country's total production of fruits, over 50 percent of potatoes and milk, over 45 percent of meat, and about 40 percent of vegetables. The state and collective farms, on the other hand, dominated the production of cereals and technical crops (NSC 2008b).

In terms of formal organization, these large farms were classified as state or collective farms. The productive assets of state farms were generally owned by the state, while members of collective farms jointly owned the productive assets. Technically, there were some other formal organizational differences between these two forms of agricultural farms with respect to farm management, employees' status and compensation, and the financing of capital investment. These differences, however, were often symbolic. Both state and collective farms enjoyed soft budget constraints and purchased their inputs at subsidized prices and in quantities determined by state production plans. In fact, the state and collective farms were not pure business operations. In addition to agricultural production, they were also directly or indirectly responsible for the construction, maintenance and operation of rural infrastructure, as well as the provision of different public services in their vicinities. The cost of maintaining rural infrastructure and services were normally absorbed into the overall production and farm-wide operating expenditures. The socialist farms received extensive price subsidies for inputs and enjoyed access to subsidized state financial instruments for the funding of their long-term capital expenditures.[3]

While the state and collective farms provided a certain standard of working and living environment for their member-workers, they were often economically inefficient enterprises, "…apparently because of their inherent inefficiency stemming from variety of behavioral and governance features."[4] The major reasons for this economic inefficiency were a lack of market orientation, soft budget constraints, insufficient individual incentives, and agency problems. The latter were an issue at all levels of socialist agriculture; agency problems existed, for example, between the district administration and the managers of state and collective farms, between the management of large farms and the managers of smaller in-farm units, and between the unit mangers and individual member-workers. These different participants in agricultural production all had their own objectives and private information flows. Although attempts were made to introduce incentive contracts into the agricultural sector under the

[3] For a detailed discussion of organization of agriculture in the Soviet period and the institutional characteristics of socialist farms, see Lerman, Csaki and Feder (2004).

[4] Lerman, Z., Csaki, C. and Feder, G., 2004. Agriculture in Transition: Land Policies and Evolving Farm Structures in Post-Soviet Countries, p. 45.

socialist system, the enforcement of these contracts was highly problematic due to high monitoring costs and the lack of adequate incentives associated with property rights.

Farm Reorganization and Land Reform

The collapse of the socialist economic system and the shift to a more market-oriented system in the early 1990s created the need for structural and institutional reforms in the country. In the earlier phase of rural reform (1991-1995), the government eliminated most of the state subsidies for agricultural inputs, and deregulated the markets and prices for agricultural output. However, institutional reform during this period was limited to the restructuring of state and collective farms into agricultural cooperatives and peasant farm associations (Bloch, Delehanty and Roth 1996). While these reform attempts started quickly, they were inconsistent.[5] An examination of the farm structure that existed in 1995 provides evidence of the inconsistent reforms and limited progress made during the first half of the 1990s. After four years of reform, only 12 percent of Kyrgyzstan's arable land was under cultivation by individual farms, while the rest of the arable land was still controlled by large agricultural enterprises. In practical terms, there was little difference in the organizational structure and management of the agricultural cooperatives and peasant farm associations compared to the old state and collective farms (Bloch, Delehanty and Roth, 1996). These inconsistent and limited reforms, together with significant declines in the terms of trade for the agricultural sector (due to large differences in agricultural input and output prices), led to a dramatic drop in agricultural production. Over the course of a few years, poverty dramatically increased in Kyrgyzstan, especially in rural areas (Anderson and Pomfret 2003).

The second phase of the reform, which started in the mid-1990s, focused on land reform. In the aftermath of the significant declines in agricultural production, the Kyrgyz government began to implement historic institutional changes in the form of land distribution (i.e., decollectivization of agriculture and creation of individual peasant farms). Starting in late 1994 and through most of 1995, the government passed several legal and policy directives[6] that introduced serious measures aimed at dismantling most of the state and collective farms. Within a short period of time, 262 state farms and 190 collective farms were liquidated and 75 percent of all agricultural land (except pastures) was distributed to eligible rural people[7] under an equity principle (USAID 2008). The amount of land allocated to each individual depended upon the number of eligible people living the vicinity of the state or collective farm, the size of the farmland, and the years of experience of the farm workers. The resulting land holdings varied from 0.1 ha/person to 1 ha/person, with the smallest holdings located in the more densely populated southern region (Gioveralli 1998).

The remaining 25 percent of the agricultural land was preserved in state ownership as part of the Agricultural Land Redistribution Fund (LRF) under the Ministry of Agriculture, Water Resources and Processing Industry of the Kyrgyz Republic. The management of the LRF land was given to local councils,[8] who were tasked with leasing this land to individual and other farmers through auction, tender or direct allocation. This process is now regulated by the Model Regulation on the Conditions and the Procedure of Leasing out of LRF Land[9] adopted by the Parliament of the Kyrgyz Republic (USAID 2008).

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[5] Spoor (1995) argued that these were "hasty" and "unprepared reforms."

[6] The most important governmental decrees on rural reform passed during this period include: the 1994 Presidential Decree on Measures for Intensification of Land and Agrarian Reform; the Regulation on the Procedure for the Determination of Land, and the Regulation on Reorganization of Agricultural Enterprises.

[7] Individuals eligible to receive land shares included those working and living on a given farm, those retired from or disabled by work on a given farm, persons born on a given farm working elsewhere who decided to return and take up permanent on-farm residence, and people living on the farm but working in other sectors.

[8] In 1996, these local councils were transformed to local self-government units (called *Ayil Okmotu*) as part of the comprehensive decentralization reform initiative.

[9] The initial Model Regulation was adopted by Parliament on April 15, 2002. The revised version of the Model Regulation was developed with assistance from USAID and adopted by Parliament on June 29, 2007. The regulation requires all LSGs to develop a Strategic Plan (including classifications and a map of the LRF land) for the LRF's use (USAID 2008).

Early in the reform process (1995), there were no private ownership rights to land; instead, land use rights (certificates) of up to 99 years were conferred for agricultural land.[10] These land use certificates granted five legal rights to individual farmers, namely the rights to transfer, exchange, sell, lease, and use the land as collateral for credit. Later (in 1998) there was a country-wide referendum to adopt a constitutional amendment that allowed private land ownership. According to this constitutional amendment, all land-use certificates were converted into private land ownership documents. However, an important amendment to the Land Code (in 1999) introduced a five-year moratorium for sales and purchases of agricultural land. This moratorium was lifted as of September 1, 2001 with the adoption of a law entitled "On Agricultural Land Regulation." Currently, agricultural land may be owned by the state, by citizens of Kyrgyzstan who are at least 18 years old and have permanently resided in rural areas for at least two years, and by agricultural cooperatives. The agricultural land shares and parcels may be leased out, sold or donated, but must be used exclusively for the purposes of agricultural production. The land shares and parcels may be traded for other land shares or parcels, but only within the boundaries of a given local self government (LSG). Thus, although land reform is not yet complete, Kyrgyzstan has made significant progress in privatizing land and creating markets for agricultural land.

Irrigation Reform and Water Users Associations

Irrigated agriculture, which comprises slightly more than 1 million hectares of arable land in Kyrgyzstan, is a major component of the country's rural economy. However, the irrigation system in Kyrgyzstan was built to serve the large socialist farms and was not suitable for the needs of the numerous small-scale farmers that emerged following land reform. Prior to reform, the irrigation system was managed jointly by the Rayon (district) Irrigation Departments and the former state and collective farms. All inter-farm and off-farm irrigation networks, including the main canals, were operated and maintained by the Rayon Irrigation Departments and funded through the state budget. The Rayon Irrigation Departments were responsible for delivering irrigation water through the off-farm and inter-farm networks to the head gates of the state or collective farms. In contrast, the on-farm irrigation systems were constructed, operated and maintained by the state and collective farms (Johnson, Stoutjesdijk and Djailobayev 2002; Johnson and Stoutjesdijk 2008).

The individualization of agricultural land use in the mid-1990s created an institutional vacuum, as no organization was responsible for the operation and maintenance of the on-farm irrigation networks. This problem was heightened by the collapse of public funding for the operation and maintenance of such networks, and the subsequent deterioration of the inter-farm irrigation systems. In order to address this problem, the Kyrgyz government introduced two important measures. First, in August 1994, the Ministry of Agriculture and Water Resources gave the local councils the ownership of and the responsibility for operating and maintaining on-farm irrigation infrastructures. It was assumed that the local councils would collect land taxes from farmers and use a portion of these revenues to maintain the on-farm irrigation infrastructures. Second, in 1995, the government instituted an irrigation service fee that was to be paid to irrigation water providers, and used to operate and maintain the off-farm irrigation networks.

However, merely introducing these measures proved insufficient to ensure the sustainable management of irrigation infrastructures. The local councils did not have adequate staffing or funds to fill the institutional vacuum, making it unfeasible for them to properly operate and maintain the on-farm irrigation networks. As a result, the on-farm irrigation infrastructures continued to deteriorate. In recent years, donors and governments have widely supported collective action management solutions based on water users associations (WUAs) (Theesfeld 2004; Samad and Vermillion 1999). Following the advice of donors, the Kyrgyz government enacted a resolution on the establishment of WUAs on August 13, 1997. This resolution was driven by the state's motivation to encourage collective action and decentralize the formerly centrally planned irrigation sector by involving farmers in the management of on-farm irrigation networks. It created a formal base for creating WUAs and transferring on-farm irrigation infrastructure to

[10] Local self-governments in rural areas were responsible for issuing formal certificates of land use rights.

the ownership of formally established WUAs. Later, the law entitled "On Unions (Associations) of Water Users," which was adopted in early 2002, reflected the legal status and organizational basis for the establishment of WUAs as non-commercial organizations to operate and maintain irrigation systems in rural areas in the public interest.

The new Water Code of Kyrgyzstan, which was adopted on January 12, 2005, provided a legal basis for further giving farmers the responsibility for operating and maintaining irrigation network. Within the new institutional structure of rural Kyrgyzstan, WUAs are responsible for managing the on-farm irrigation infrastructures, while the government generally retains responsibility for the inter-farm irrigation networks and main canals. At present, there are more than 400 WUAs in Kyrgyzstan (Johnson and Stoutjesdijk 2008). The WUAs are expected to collect water fees, share water equitably among their members and other water users within their service area, and operate/maintain on-farm irrigation infrastructures using fees collected from water users. However, anecdotal evidence suggests that these associations are still weak and face huge problems in collecting water fees from farmers. The introduction of irrigation water fees seem to have created opportunities for 'elite capture' in some areas by allowing 'elites' to gain better access to irrigation water.

3. AGRICULTURAL PERFORMANCE[11]

Changes in Land Use and Livestock

According to official classification,[12] farms in Kyrgyzstan are currently classified into three major organizational categories: household plots, peasant farms, and corporate farms. The latter are also called 'agricultural enterprises,' and include both state and cooperative (collective) farms. Household plots and peasant farms are two different types of individual (family) farm; they are differentiated largely based on their commercial orientation, size and legal status. Household plots are generally smaller and more subsistence-oriented than peasant farms, although there is some overlap between the two groups. In legal terms, household plots[13] are treated as physical entities, whereas peasant farms must be registered as legal entities. In household plots, the main farmland is a small plot of land attached to rural residence. Peasant farms operate mainly on family-owned land obtained through farm reorganization and land reform, although growth can be achieved by leasing additional land from other owners. Collective (cooperative) corporate farms have two main sources of land: land shares invested by individuals in the equity capital of enterprise, and the leasing of additional land from other owners.

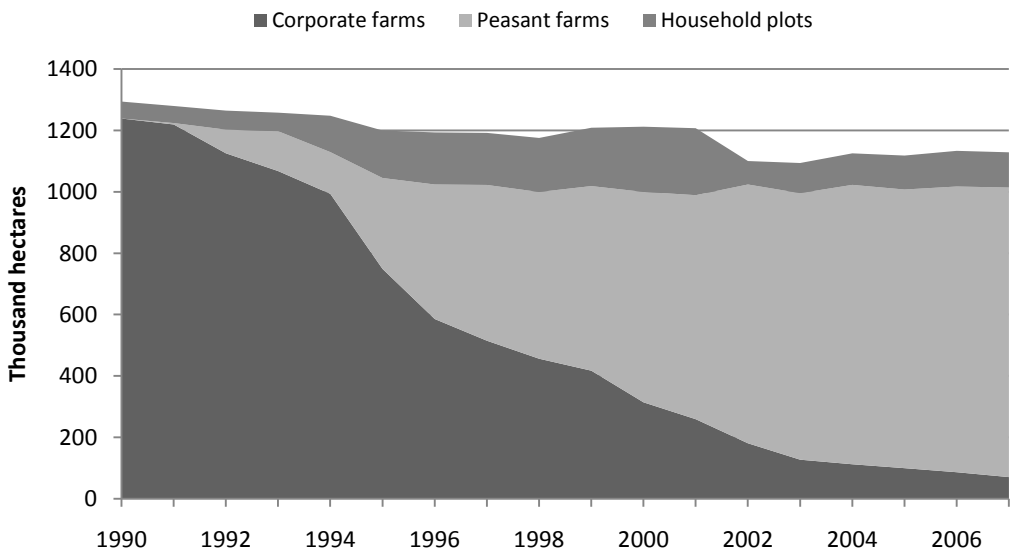
The net effect of land reform was a dramatic shift in the distribution of agricultural land use among these farms types. The total amount of agricultural land allocated to corporate (state and collective) farms started declining almost immediately upon the inception of transition. This trend accelerated after 1995, when the government passed several legal and policy directives aimed at dismantling most of the state and collective farms. As shown in Figure 2, the land controlled by corporate farms dropped dramatically from about 95 percent of the total arable land in 1991 to 6 percent in 2007. Most of this land was shifted to peasant farms in the process of land reform. Currently, more than 300,000 peasant farms, with an average farmland size of 2.9 hectares, control about 84 percent of the total (sown) arable land in the country. The remaining 10 percent of total arable land is controlled by more than 900,000 traditional household plots having an average size of 0.11 hectares per holding. Another important feature of the changes in arable land use during 1991-2007 is the overall decrease in total sown area. As evident in Figure 2, between 1991 and 2007, the total sown arable land declined by about 165,000 hectares, which accounts for more than 13 percent of the total area sown in 1991.

[11] The analyses provided in this section are mainly based on official data obtained from official statistical publications of the National Statistical Committee of the Kyrgyz Republic (NSC 2008a and 2008b).

[12] The National Statistical Committee of the Kyrgyz Republic. Methodological explanations (in Russian), Available at http://www.stat.kg/stat.files/tematika/Сельхоз/пояснения.pdf.

[13] Household plots (or subsidiary household plots) are common in most transition countries of Eastern Europe and the former Soviet Union. For more information on their origins and development, see Lerman, Csaki and Feder (2004).

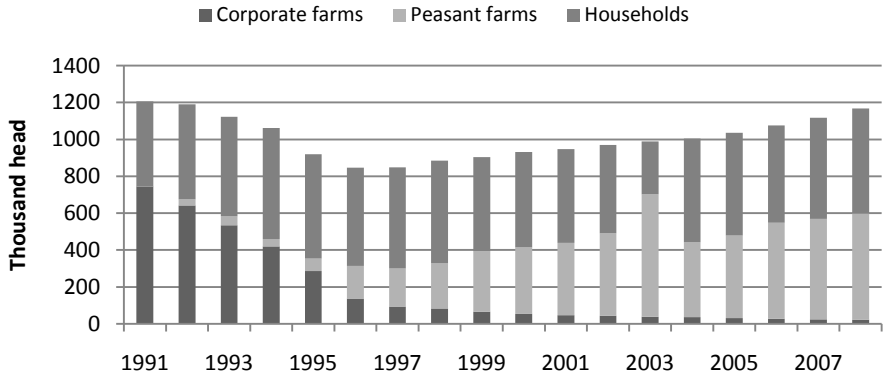
Figure 2. Distribution of (arable) sown area across farms of different types, 1990-2007



Source: NSC 2008

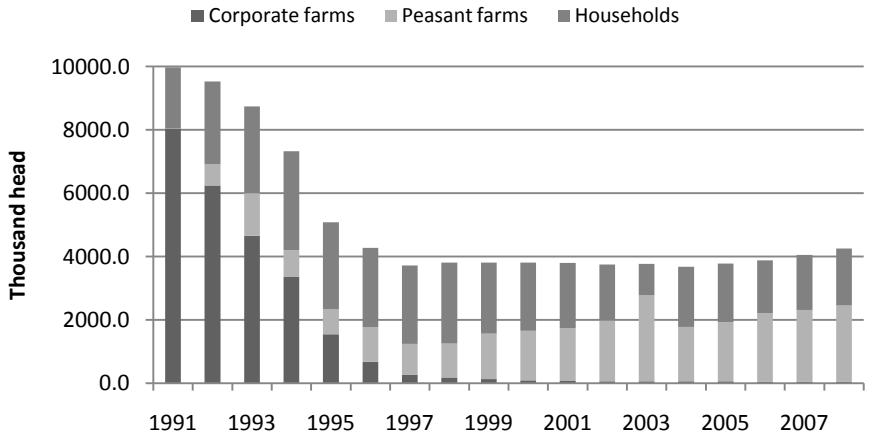
Alongside the increase in land use by individual farms, the reform led to a substantial increase in livestock grazing on peasant farms and in the household sector. However, the specific pattern of the changes in livestock distribution across the different farm types differed from that seen for land use. Prior to the transition, about two-fifth of the country's cattle and about one-fifth of the sheep and goat stocks were in the care of rural households, with the remainder held by state and collective farms. After 1991, as the large corporate (state and collective) livestock farms were privatized, the number of cattle held by corporate farms decreased radically. However, the number maintained on peasant farms and the household sector increased only moderately. As a result, by the mid-1990s, the total number of cattle in Kyrgyzstan had decreased markedly (by 30 percent relative to the 1991 level). Since then, the number of cattle held by households and peasant farms has increased substantially, almost totally offsetting the decline in the corporate farm sector (Figure 3). Yet another pattern is seen among the sheep and goat herds. The stocks held by the corporate sector (state and collective farms) declined dramatically from more than 8 million animals at the beginning of transition to less than 1 million in the mid-1990s, and eventually to about 52,000 in 2007. The number of sheep and goats held by households and peasant farms modestly increased during this period. These increases did not offset the decline in the corporate sector (Figure 4), yielding a marked decrease in the total number of sheep and goats in Kyrgyzstan (from about 10 million in 1991 to 4.3 million in 1996. At present, the livestock sector is dominated by peasant farms and households, with the corporate sector playing a distinctly marginal role.

Figure 3. Cattle herds across farms of different types, 1991-2008



Source: NSC 2008

Figure 4. Sheep and goat herds across farms of different types, 1991-2008



Source: NSC 2008

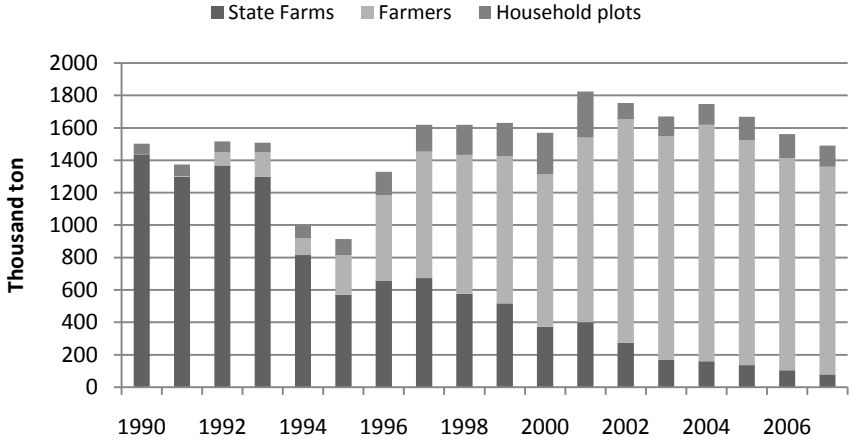
The dramatic declines seen in the sheep and goat herds was largely due to shrinkage of the feed base for livestock, which forced farmers to slaughter livestock as they were unable to feed them through the winter. There are two possible explanations for the shrinkage of the feed base. First, a significant portion of the pre-transition sheep- and goat-farming sector comprised centrally funded support of fine wool sheep breeds on state and collective farms. This support helped carry the sheep herds through the winter by facilitating the importation of manufactured feed, the construction and maintenance of shelters, and the transportation of sheep (via publicly owned trucks) to and from summer pastures. After independence, the government was obviously no longer able to provide this support to sheep and goat breeders. Second, during the transition period, the crop patterns changed to favor the production of food and high-value crops. In the Soviet economy, Kyrgyzstan's agriculture had mainly specialized in the production of livestock products, while wheat and other important food products were mainly imported from outside. However, in the 1990s, the collapse of international trade and economic relations in the former Soviet Union encouraged countries to focus on food security, leading to the increased cultivation of wheat and other food crops. As a result, the area sown to wheat, potatoes, and vegetables increased at the expense of the areas sown to barley and feed crops. Specifically, the area sown to wheat increased

from 15 percent of the total sown area in 1991 to 32 percent in 2001. The land devoted to vegetables, potatoes and cotton increased from a combined 8 percent of the total sown land area in 1991 to 22 percent in 2001. In contrast, the area sown to feed crops and barley declined from about 71 percent of the total sown area in 1991 to 28 percent in 2001.

Agricultural Growth and Productivity

The changes in the distribution of arable land and livestock by farm type led to remarkable modifications in the structure of agricultural production in Kyrgyzstan. Between 1991 and 2007, the share of the individual sector (household plots plus small peasant farms) in agricultural production increased dramatically, to the point that this sector presently produces about 97 percent of the aggregate agricultural output in Kyrgyzstan (NSC 2008a), including almost 95 percent of the crop production and nearly all of the livestock production. This change largely reflects the massive expansion of the peasant farms that replaced the former state and collective farms. While this trend started in the early 1990s, it accelerated significantly after 1995 when full-scale land reform began. In the crop sector, the decrease in corporate farm production was mainly offset by a corresponding rise in production by peasant farms. The phenomenon of peasant farms taking over from state and collective farms is shown with respect to grain production in Figure 5. As can be seen in this graph, the decrease in grain production by the corporate sector was fully compensated by the corresponding rise in peasant farm-based production.

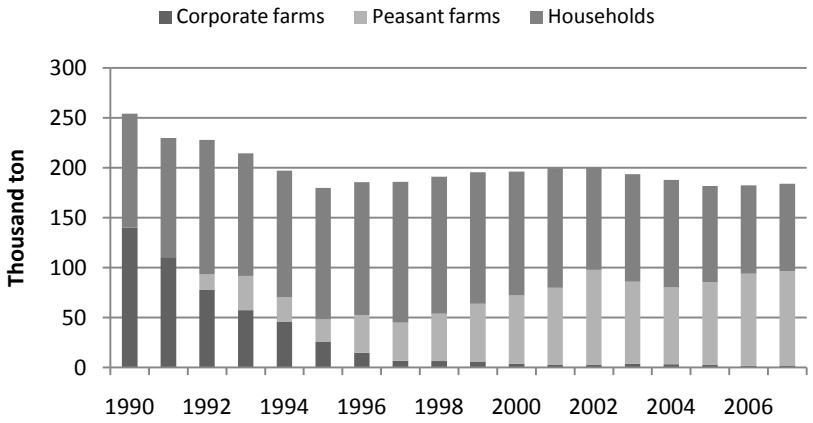
Figure 5. Dynamic structure of grain production across farm types, 1990-2007



Source: NSC 2008

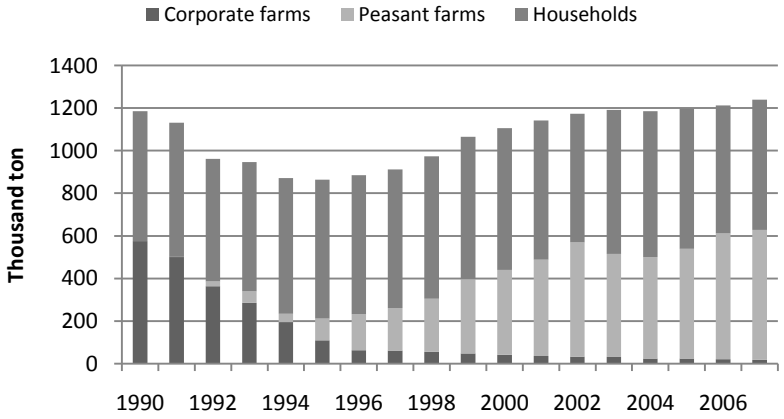
However, the trend is quite different for livestock production, where the individual sector was not able to compensate for the decrease in livestock production by state and collective farms. Figure 6 illustrates this phenomenon with respect to meat production, which declined dramatically (by almost 30 percent) during the transition period. This trend was even more dramatic in the poultry and wool production, which dropped by about 50 percent and 70 percent, respectively, compared to their pre-transition levels. In contrast, the individual sector successfully compensated for the decrease in milk production by the corporate sector (Figure 7). Currently, the corporate sector plays a strictly marginal role in livestock, while the peasant farms and the household sector play equally significant roles in livestock production. This composition of livestock production is consistent with the distribution of herds over farms of different types.

Figure 6. Dynamic structure of meat production across farm types, 1990-2007



Source: NSC 2008

Figure 7. Dynamic structure of milk production across farm types, 1990-2007



Source: NSC 2008

The impressive shift in the composition of agricultural production does not simply reflect the dramatic changes in the composition of land holdings and livestock across different types of farms. The evidence suggests that small peasant farms are more productive[14] than collective farms, with the former producing almost two-fold more output per hectare of arable land (Table 1) and experiencing more than five-fold higher labor productivity (World Bank 2004). This could be because small farms have lower transaction costs[15] than the larger farms, and/or because large farms are less efficient due to governance and agency problems. Indeed, the literature suggests that as farms become larger, the cost of monitoring the production operations and enforcing labor discipline increases, eventually offsetting the gains from economies of scale (Lerman, Csaki and Feder 2004; Allen and Lueck 2002). Thus, the individualization

[14] However, according to official data, peasant farms appear to be significantly less (about 6-fold) productive than household plots in terms of land productivity. This is consistent with the findings of the World Bank (2004) study. At the same time, peasant farms are gradually closing the gaps with household plots, especially in terms of labor productivity. The gap in labor productivity between household plots and peasant farms is about 40percent (World Bank 2004).

[15] Transaction costs are the costs of running the economic system (in this case agricultural farms). They are distinguished from the production costs. Transaction costs include information, bargaining, policing and enforcement costs.

of agriculture might have effectively solved the agency problems of collective agriculture and freed previously depressed private incentives, which, in turn, may have stimulated agricultural production.

Table 1. Main characteristics of the farm types in Kyrgyzstan, 2007

	Household plots	Peasant farms	State & collective farms
Number, thousand	924.1	323.6	1.3
Average size of arable land holdings, hectares	0.11	2.9	58.9
Total sown area, thousand hectares	101.2	951.5	76.1
Share in total sown area, %	9	84.3	6.7
Agricultural output, million som	32931.8	53275.6	2430.8
Share in agricultural output	37	60	3
Agricultural output per hectare, thousand som	325.4	56.0	31.9

Source: NSC of the Kyrgyz Republic 2008b and authors' estimates.

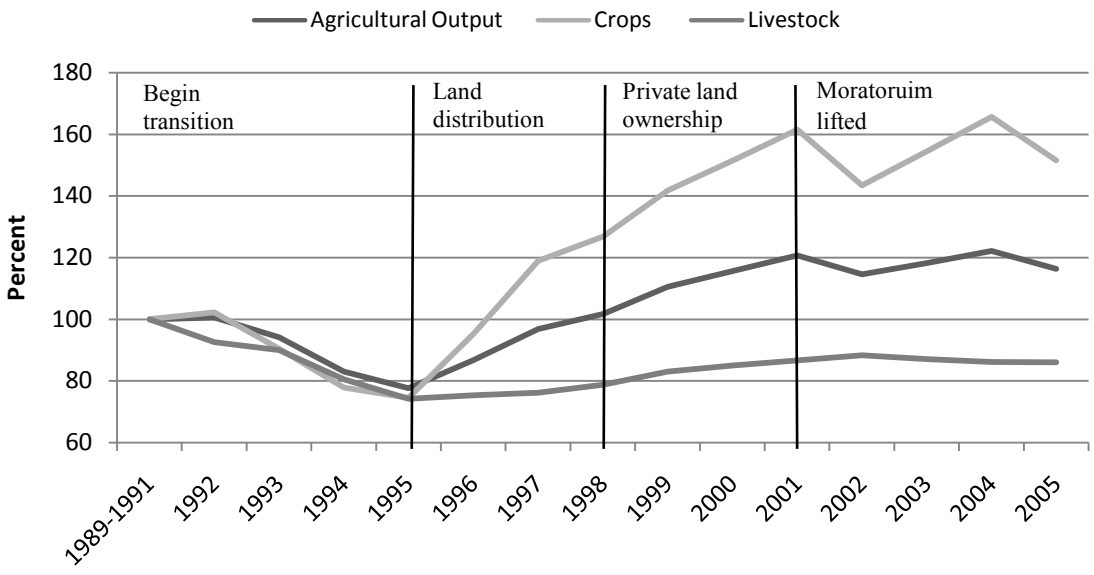
Agricultural GDP (aggregate value added in agricultural sector) and productivity growth are the ultimate measures that are often used to evaluate the overall performance of the agricultural sector. Over the entire study period (1990-2007), agricultural GDP in Kyrgyzstan grew by an average of 1.4 percent per year. However, as shown in Table 2 and Figure 8, there were three distinct sub-periods within this agricultural growth. First, from 1991 to 1995, when the government was inconsistent with its agricultural policies, agricultural GDP collapsed by about 27 percent and showed an average negative growth rate of 6 percent per year. As can be seen in Figure 8, production in both the crop and livestock sectors plummeted during this sub-period. The evidence suggests that most transition countries see such production collapses, due to disproportionate increases in the prices of agricultural inputs and outputs, declining terms of trade for the agricultural sector, and dramatic declines in budgetary support for state and collective farms (Roselle and Swinnen 2004).

Table 2. Agricultural GDP and productivity growth[1] in Kyrgyzstan

	Agricultural GDP	Land productivity[2]	Labor productivity[2]
1990-2007	1.4	2.3	0.9
Sub-periods:			
1990-1995	-6.0	-4.5	-8.5
1996-2001	8.0	7.9	4.5
2002-2007	1.5	2.6	5.7

Notes**:** [1]The growth rates are annual averages for a given period. [2] Land and labor productivity are defined as the average annual agricultural GDP per ha of land and per worker, respectively.
Source**:** World Bank (2008), NSC of the Kyrgyz Republic (2008b, and authors' estimates

Figure 8. Gross agricultural output, crops and livestock output, 1991-2005, in percentage of the 1989-1991 average



Source: FAOSTAT & authors' depiction

During the second period, which coincided with serious systematic changes in land use (i.e., the liquidation of state and collective farms and the distribution of agricultural land to the members of these farms), agricultural growth rebounded after 1995 and showed a steep upward trend between 1996 and 2001. By 1999, the agricultural value added exceeded the pre-transition (1990) level, and Kyrgyzstan shifted in status from a net importer of primary agricultural products to a net exporter. Overall, agricultural GDP over this period rose by almost 60 percent (8 percent per year). This recovery of agricultural production was mainly due to shifts in the sector's institutional structure; these changes solved the incentive problems of the former collective farming system and increased the returns to labor. This augmented the labor efforts, both in terms of quantity and quality, yielding increases in labor supply and agricultural productivity.[16] Furthermore, by transferring decision-making power from the state to farmers, land reform allowed farmers to improve their resource allocation based on market conditions and the profitability of particular crops. This led to substantial changes in cropping patterns. The land devoted to high-value crops, such as vegetables, potatoes and cotton, increased from a combined 8 percent of the total sown land area in 1991 to 22 percent in 2001, almost a 2.5-fold increase. The change in crop patterns to favor high-value crops played an important role in improving agricultural growth.[17] In this regard, the

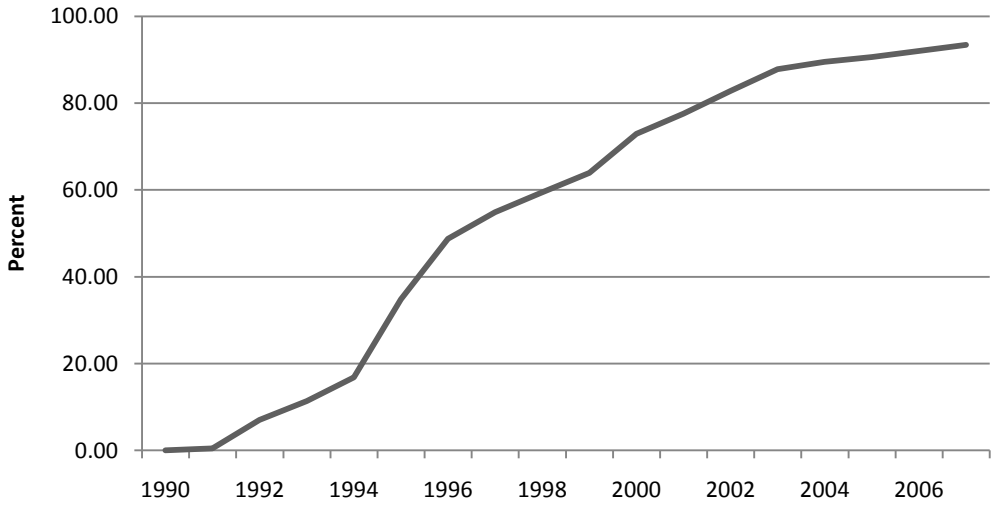
[16] Similar phenomenon was observed in Chinese agriculture in 1980s when the household responsibility system was introduced. For a theoretical and empirical analysis of the effect of institutional change in Chinese agriculture from the collective team system to an individual farming system, see Lin (1988).

[17] One cannot simply claim that the entire increase in agricultural output and productivity in Kyrgyzstan between 1995 and 2001 was due to changes in farmers' incentives and the decision-making structure in the agricultural sector. The available evidence from other countries suggests that other factors, such as the liberalization of prices and input use, might also have impacted agricultural growth. For example, China saw a rapid average annual agricultural growth of 7.7percent from 1978 to 1984 (compared with an average of 2.9percent between 1952 and 1978) due to a package of market and institutional reforms that included price reform and a transition from the collective agricultural production system to an individual household-based farming (household-responsibility) system. The literature suggests that individualization of agriculture was the dominant source of the high agricultural growth rates seen in China from 1978 to1984 (Lin 1992, Fan 1991, McMillan et al. 1989). It was also found that the changes in agricultural prices, improvements in availability of inputs, and changes in crop patterns also had impacts

recovery of agricultural production was mainly due to the remarkable growth in crop production. The crop output in this period rose by 116 percent (13.8 percent per year), while livestock production rose by only 17 percent (2.6 percent per year).

In the third period, agricultural growth in Kyrgyzstan slowed significantly after 2002, with an average growth rate of 1.5 percent per year. Indeed, the growth rates of both crop and livestock production became very small. Several explanations may account for this slowdown in agricultural growth. First, the initial distribution of land from the large-scale state and collective farms to the peasant farms was completed in the early 2000s (Bloch 2002). This is shown in Figure 9, which illustrates the dynamics of the individualization of land use in Kyrgyzstan. This graph shows that by the early 2000s almost 90 percent of the agricultural land was being used by individual farmers. Thus, it is plausible that the one-time positive discrete effect[18] of individualization of land use on agricultural growth in Kyrgyzstan ended in the early 2000s. Second, during this period, rural households often allocated labor to various non-agricultural activities, such as wage labor in urban centers within the country or seasonal labor migration abroad. Overall, from 2001 to 2007, approximately 200,000 workers exited the agricultural sector. Finally, during the same period, the arable land area sown declined by about 6 percent. The combination of these factors probably contributed to the observed slowdown of agricultural growth in Kyrgyzstan.[19] Moreover, the remaining institutional and structural constraints barred peasant farmers from exploiting the full potential of private land ownership. These constraints are discussed in Section 4.

Figure 9. Decollectivization (individualization) index (DI), 1990-2007



Source: Authors calculations

Note: DI is calculated by dividing the difference between the share of land in individual use in total agricultural land for a given year and in 1990 by 100, minus the share of individual farms in total agricultural land in 1990: $DI=(IND_t - IND_{1989})/(100-IND_{1989}) * 100$. See Mathijs and Swinnen (1998).

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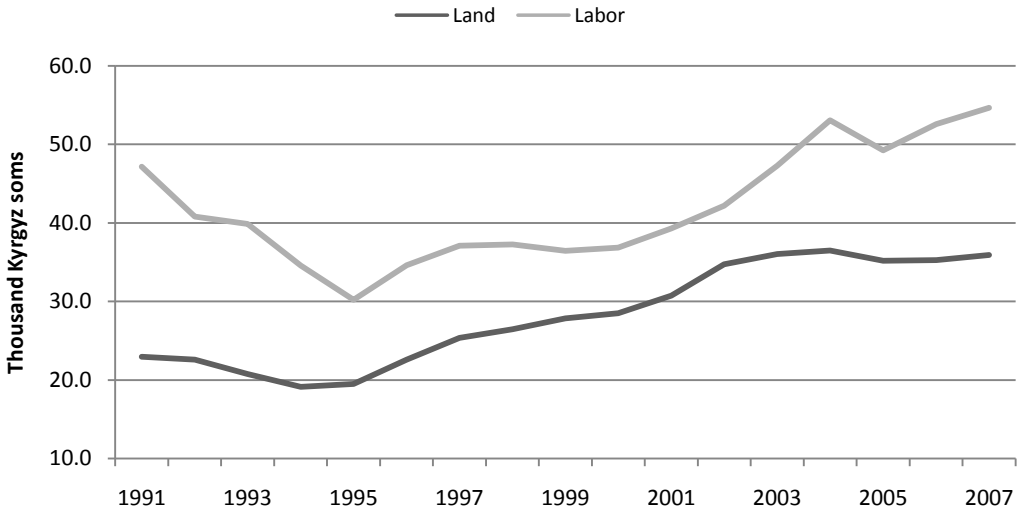
on output growth. In Kyrgyzstan, however, the prices of agricultural inputs and outputs were liberalized 3-4 years before land reform, although this did not produce any positive growth under the collective agricultural production system. Indeed, the evidence suggests that high input prices, limited inputs, and deteriorating governance in former state and collective farms prior to land reform led to drastic cuts in livestock numbers and falling outputs, especially in poultry products, sheep and goats (Christensen and Pomfret 2008).

[18] By 'one-time discrete impact of the individualization of land use,' we mean the behavioral and decision-making responses of peasant farmers to improved incentives resulting from the changes in the institutional setting of the agricultural sector.

[19] Similar phenomena have been observed in other transition countries, such as China and Albania. Lin (1992) argued that the one-time discrete effect of the introduction of household-responsibility system ended in 1984, and this change was largely responsible for the slowing of agricultural growth in China.

An examination of growth performance in land productivity provides a slightly different picture (Table 2 and Figure 10). Between 1990 and 2007, land productivity (measured as agricultural GDP per hectare of land) grew at 2.3 percent per year. Similar to agricultural GDP, land productivity declined significantly before the mid-1990s, at an average rate of -4.5 percent per year. While agricultural GDP increased dramatically between 1996 and 2001, the agricultural sown area did not change much. As a result, during this period, the average growth rate of the partial productivity of land was practically equal to the agricultural GDP growth rate. However, between 2002 and 2007, agricultural land declined while agricultural GDP continued to grow, resulting in relatively higher growth rates (2.6 percent per year) for land productivity. Overall, land productivity in Kyrgyzstan is relatively low at 35.9 thousand Kyrgyz soms (in 2007) per hectare of sown land area (Figure 10), which is equal to about 1000 US dollars.[20]

Figure 10. Productivity of agricultural labor and land, 1991-2007, in constant 2007 prices



Source: NSC and authors estimates

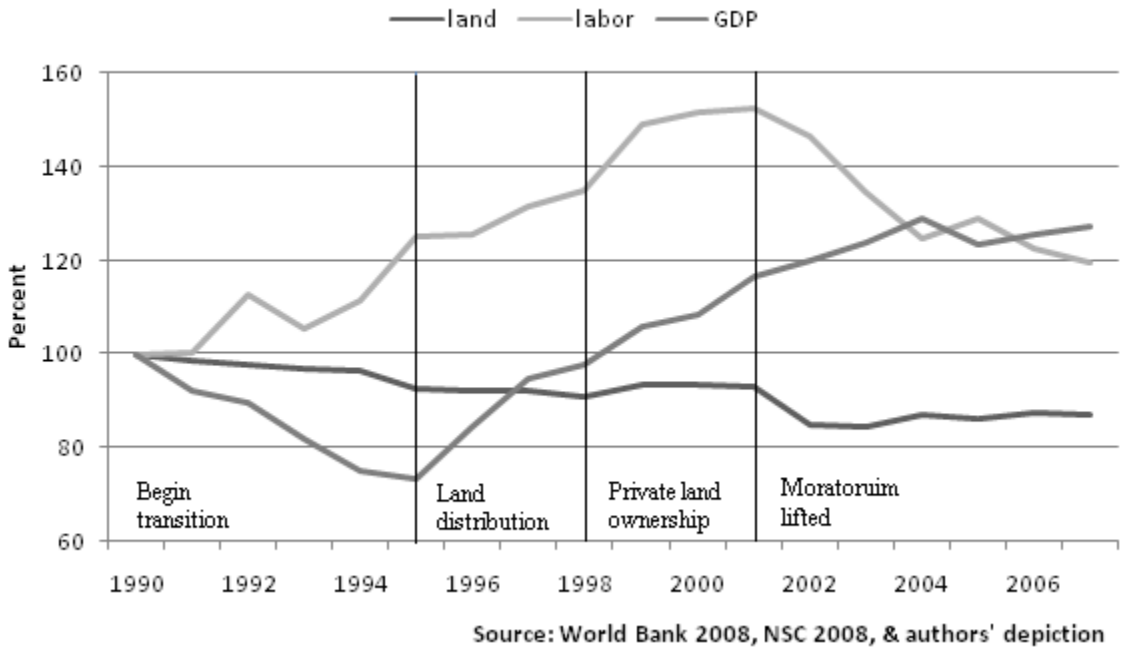
In terms of labor productivity, the average worker employed in the agricultural sector in 2007 produced an agricultural value added of about 54.6 thousand Kyrgyz soms (measured in constant 2007 prices); this was approximately 16 percent, 81 percent, and 39 percent higher than the levels seen in 1991, 1995, and 2001, respectively (Figure 10). The pattern of labor productivity[21] growth was considerably different from the growth patterns seen for agricultural GDP and land productivity. In the early 1990s, the agricultural sector absorbed the unemployed population, which had increased significantly due to the collapse of the industrial sector in the beginning of transition. This coincided with substantial declines in sown area and agricultural output (between 1991 and 1995). The combined result of these trends was a large decline (on average, -8.5 percent per year) in labor productivity. As a result, in 1995, the level of labor productivity in the agricultural sector was about 60 percent of the pre-transition (1990) level.

Decollectivization and the distribution of land to members of former state and collective farms attracted even more labor to the agricultural sector from other sectors of the economy; total employment in the sector reached almost 950,000 persons in 2001, which was about 50 percent higher than the pre-transition level (Figure 11). Despite the massive increase in the agricultural workforce and the relatively stable sown area, labor productivity rebounded due to the higher growth rates in agricultural GDP. The average growth rate of labor productivity between 1996 and 2001 was 4.5 percent per year. After 2002, sown arable land area declined, the trends in agricultural employment reversed, and labor started to move

[20] Kyrgyzstan's average annual exchange rate in 2007 was equal to 37.3085 Kyrgyz soms per US dollar.
[21] Labor productivity is measured as the value of agricultural GDP per worker employed in the agricultural sector.

out of agriculture to other sectors of the economy. Although agriculture still remains the main productive activity undertaken by most households in rural Kyrgyzstan, many households augment their agricultural incomes with a wide array of other productive activities. At present, rural households frequently allocate labor to various self-employment activities, to wage labor in urban centers within the country, or to migration. With the recovery of the industrial sector and construction in Russia and Kazakhstan, demand for seasonal labor has increased. Many rural households in Kyrgyzstan allocate labor to seasonal migration, because the economic returns to this activity are often significantly higher than those from agriculture[22] (ADB 2008). During this period, agricultural employment and sown area declined by about 22 percent and 6 percent, respectively (Figure 11). The combined effect of these trends was a moderate increase in the land/labor ratio from 1.21 hectares per worker in 2002 to 1.52 hectares in 2007 (the latter is still 26 percent below the 1991 level). As a result, despite a relatively small increase in agricultural GDP, the partial productivity of labor over the study period increased by about 5.7 percent per year.

Figure 11. Agricultural GDP, land, and labor, 1990-2007 (1990=100)



Comparing Agricultural Performance in Kyrgyzstan and Neighboring Countries

Prior to 1991, agricultural land in the Central Asian countries, as elsewhere in the former Soviet Union, was formally state owned and agricultural production was organized under state and collective farms. Thus, the agricultural sectors in these countries had the same socio-economic, institutional and policy settings as those in Kyrgyzstan. However, these countries were no longer a single, integrated region of the former unified country, but rather had become a group of increasingly distinct states with different development strategies and reform approaches.[23] In the agricultural sector, these countries chose different approaches to market, land and institutional reforms, and achieved different outcomes. As mentioned above, Kyrgyzstan quickly liberalized its agricultural markets and prices, then (four years later)

[22] Currently, Kyrgyzstan is one of the world's largest recipients of international remittances. According to a recent World Bank-commissioned study, remittances measured in the balance of payments constitute about 10percent of Kyrgyzstan's GDP (Quillin, B., Segni, C., Sirtaine, S. and Skamnelos, I. 2007).

[23] For a general overview of the region and comprehensive accounts of the transition strategies and outcomes of individual countries, see Pomfret (2006).

distributed land to farmers, and eventually came to recognize private property rights to land and allow restricted agricultural land transactions. The other countries in question[24] (Kazakhstan, Tajikistan and Uzbekistan) lagged in the implementation of agrarian reforms and generally (with some minor exceptions[25]) still do not recognize private property rights to agricultural land. However, they differ in their attitudes toward land use rights and farm structure. On the most recent World Bank agrarian reform metric,[26] Kyrgyzstan belonged to the advanced reformer group, with an average reform score of 7.2; this was significantly higher than those of its neighbors in Central Asia, which were rated as moderate (Kazakhstan, with average score of 6.2) or slow (Tajikistan, 4.4 and Uzbekistan, 4.8) reformers (Csaki, Kray and Zorya 2006).

In Kazakhstan, the principle of state ownership of land with private use and transfer rights under long-term (up to 99-year) leases is formalized. Nevertheless, the government still seems to favor large agricultural enterprises, and very little (less than 10 percent) of the farmland is cultivated by individual farmers. The agricultural sector was neglected from the 1990s up to the early 2000s, when the government introduced a price-support system for wheat and other agricultural products (Pomfret 2008). In Tajikistan, individuals have the theoretical right to withdraw from the state or collective farm to establish individual farms. However, in order to exercise this right, they must get approval from the farm chairman and the district government, and undertake a portion of the debt accrued by the former state or collective farm. Furthermore, the general marketing and price policies continue to neglect agricultural producers through quotas and unfavorable contracts (USAID 2004). In Uzbekistan, the state allocates agricultural land to users along with the right of inheritance, but without any rights of sale, transfer as a gift, or exchange. Despite these restrictions on land reform, however, Uzbekistan's agrarian reforms proved resilient enough to gradually change the farm structure in the country towards individual farming. First, the government expanded household plots and reorganized large state and collective farms by allowing intra-farm family-based leases (1991-1997). Second, traditional collective farms were simultaneously reorganized into agricultural cooperatives, allowing the establishment of peasant farms as an entirely new rural institution (1998-2002). Third, between 2003 and 2006, the agricultural sector was shifted to predominantly individual farming based on peasant farms (Lerman 2008). The government also gradually reduced the existing price and market distortions towards agriculture (which were especially heavy in the cotton and wheat sectors in the 1990s) by introducing reforms aimed at reducing the negative incentives affecting farmers[27] (Pomfret 2008).

In this regard, it is interesting to compare Kyrgyzstan's agricultural performance with those of its Central Asian neighbors. As can be seen in Figure 12, the cumulative agricultural growth trends over the study period in the four Central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) show very different patterns. Similarly to Kyrgyzstan, agricultural production in Kazakhstan and Tajikistan collapsed in the early 1990s. However, different from Kyrgyzstan, agricultural output in these two countries, which seemed to favor large agricultural enterprises, exhibited a steady downward trend throughout the 1990s, with the first signs of modest recovery appearing only in the late 1990s. While recovery raised the volume of agricultural GDP in these countries, they have not yet reached their pre-transition levels.

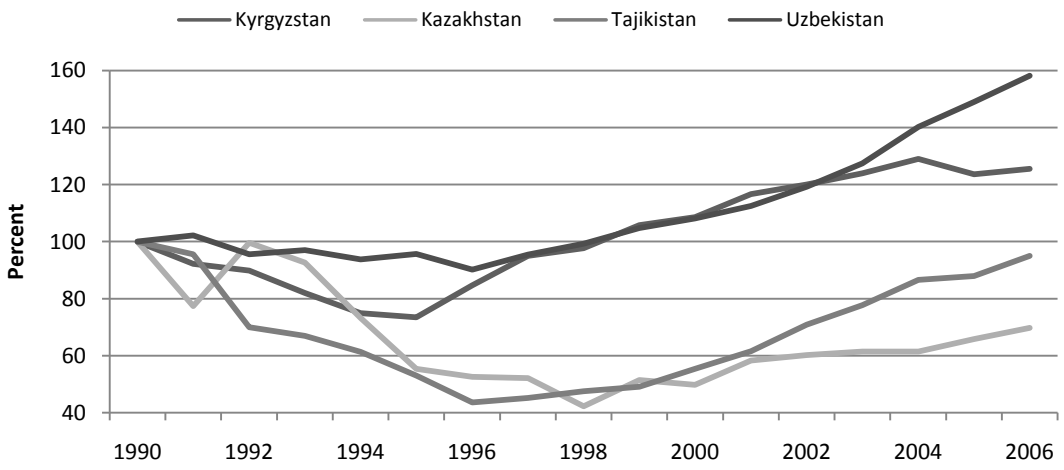
[24] Central Asia includes five countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. In this brief comparative analysis, we exclude Turkmenistan due to the lack of reliable statistical data.

[25] Kazakhstan restricts private land ownership to small household plots (average size: 0.2 ha), whereas Uzbekistan and Tajikistan basically retain full state ownership of land.

[26] Each year beginning 1997, the World Bank assessed the dynamics of agrarian reforms in the transition countries of Eastern Europe and the former Soviet Union by assigning scores in five areas of agricultural reform: prices and markets, land reform, agro-food processing and input supply, rural finance, and institutions. These scores range from 1 (a centrally planned economy) to 10 (a market economy) (Csaki, Kray and Zorya 2006).

[27] Although price and market distortions to cotton and wheat producers still remain, the magnitudes of the distortions have declined dramatically since 2001.

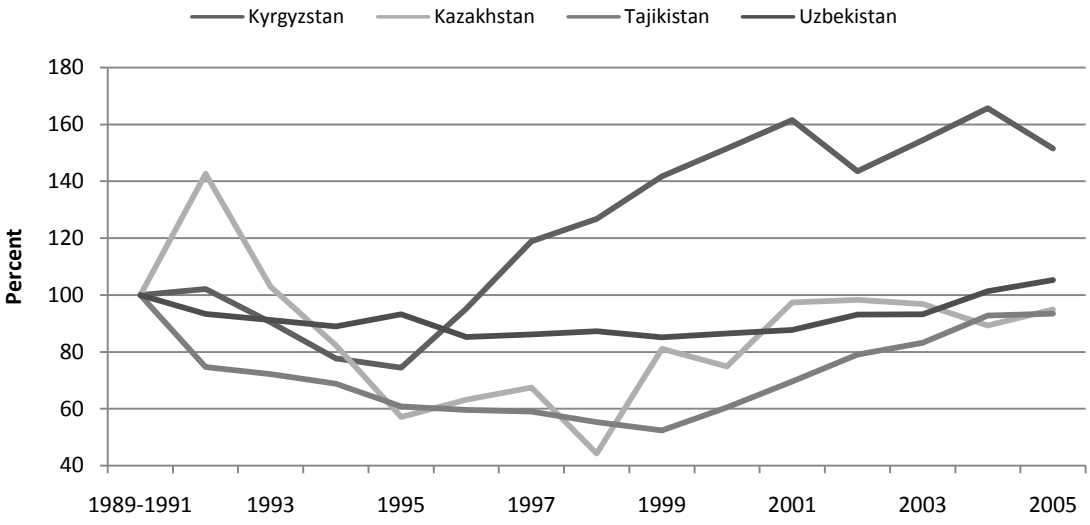
Figure 12. Agricultural GDP in four Central Asian countries, 1990-2006 (1990=100)



Source: World Bank 2008

In contrast, Uzbekistan did not experience any dramatic collapse in agricultural production, perhaps due (at least partially) to its gradual reform strategy. Although the land distribution to households in the early 1990s was very limited in scale, and households were not entitled to private property rights, the country allowed the rise of small-scale farming by absorbing the unemployed population and mitigating the economic declines in the agricultural sector. Nevertheless, agricultural output in Uzbekistan was effectively stagnant throughout the 1990s, probably due to heavy price and market distortions towards agricultural producers. Only full-scale decollectivization and individualization of agriculture, which started after 2002, combined with declining market and price distortions, produced noticeable results in agricultural growth. The differences in agricultural growth between Kyrgyzstan and other Central Asian countries are even more visible in the context of crop production (Figure 13).

Figure 13. Crop production in four Central Asian countries, 1991-2005, in percentage of the 1989-1991 average



Source: FAOSTAT 2008

Although the data are insufficient to thoroughly establish a causal link between the individualization of agriculture and agricultural growth in Central Asia, the evidence presented herein suggests that individualization of agriculture in Kyrgyzstan (rapidly) and Uzbekistan (gradually) produced significantly higher growth rates than those seen in Kazakhstan and Tajikistan, where the governments favored (at least until recently) large agricultural farms.

4. CONSTRAINTS TO AGRICULTURAL GROWTH IN KYRGYZSTAN

There is a certain consensus among economists that better property rights institutions lead to better economic outcomes. The literature considers three channels for this positive link (Besley 1995; Deininger and Feder 2001; Do and Iyer 2008). First, stable property rights provide greater incentives for labor efforts and long-term investments in land and new agricultural technology. A second channel is through the enhanced possibilities for transfer of land to more efficient users. Third, if better property rights make it easier to use land as collateral, then agricultural growth might be improved through better access to credit and reduced constraints on investment.

Our examination of agricultural performance in the previous section showed that land reform in Kyrgyzstan played an important role in the recovery of agricultural output, resulting in remarkable growth between 1995 and 2001. The shift in the sector's institutions created greater incentives for additional labor efforts, leading to the recovery of agricultural production and growth. However, problems with inadequate institutions and an imperfect market environment have not allowed private farmers to fully realize the benefits of private land ownership to date. In the following, we discuss the remaining institutional constraints limiting agricultural growth in rural Kyrgyzstan. This analysis uses secondary data from existing surveys such as a farm-level survey conducted by the M` Vector Consulting Company (2007) based in Bishkek.

Fragmentation of Farmland and Land Consolidation

One negative impact of land reform in Kyrgyzstan was its contribution to the fragmentation of land use and its impact on collective action in the rural economy. The distribution of agricultural land based on universal and equitable principles inevitably fragmented land holdings in the country, creating hundreds of thousands of small peasant farms. The average size of the land holdings for peasant farms is about 2.9 hectares, while a recent World Bank study using data from a nationally representative household survey showed that about 80 percent of Kyrgyzstan's individual farmers' land holdings are less than 2 hectares (World Bank 2007). Another survey conducted by a local consulting company in Kyrgyzstan showed that almost half of the individual farmers use less than 1 hectare of arable land, while another 40 percent use between 1 and 3 hectares (M` Vector Consulting 2007). Land fragmentation is an even more serious issue in the southern provinces of the country, which have higher population densities. For example, in Osh province, about 70 percent of farmers' land holdings are less than 1 hectare.

The fragmentation of agricultural land has important implications for agricultural productivity and growth. The relationship between farm size and labor productivity has not been clearly established in the literature. One popular stylized fact suggests that small farms are more productive per unit of land than large farms. This inverse relationship between farm size and land productivity is usually explained by differences in factor endowments between small and large farms. This inverse relationship suggests that more equal allocation of landholdings may yield higher land productivity (Ellis 1993; Fan and Chan-Kang 2005). However, the literature also suggests that the relationship between farm size and productivity depends on opposing cost economies and diseconomies for a given technology (Ellis 1993). Cost economies might result from the indivisibility of a fixed capital, and the specialization of tasks, labor divisions, and marketing economies in the bulk of input purchases or output sales. Cost diseconomies relate to the limits of effective management and labor supervision, and the changing nature of risks as the farm scale increases. With the transformation of agriculture toward a science-based approach, labor becomes less important in shaping land productivity, while other inputs such as machines, fertilizer, and irrigation play greater roles (Ellis 1993; Fan and Chan-Kang 2005).

The potential impact of the decollectivization of agriculture and the fragmentation of land use on productivity depends on which prevail: cost economies or cost diseconomies. The strong growth in Kyrgyzstan's agricultural sector since the initiation of land reform suggests that any negative impact has been offset by improvements in labor efforts and resource allocation. However, in the presence of inadequate institutions, imperfect markets for land, credit, input and output, and deficiencies in property

rights, fragmentation may hamper the expected long-term benefits of land reform and limit future growth in the sector.

The evidence from other transition economies suggests that, in the individual sector, peasant farms cultivating larger holdings are more efficient and produce relatively higher family incomes compared to farms with relatively smaller allotments (Lerman 2002; Lerman and Climpois 2006). Since the distribution of land in the 1990s, Kyrgyzstan has developed appropriate institutional and legal arrangements for the development of a land market, including the establishment of a system for registering property rights. In 1999, the State Agency for Registration of Rights (Gosregister) was established, along with a nationwide network of local registration offices. In 2001, the moratorium on agricultural land sales was lifted. Nevertheless, the evidence suggests that legal and policy impediments are still restricting the development of an efficient agricultural land market (USAID 2008). As mentioned in Section 1, the law states that only citizens of Kyrgyzstan who are residents of rural areas and at least 18 years old, residing in a given rural community for no less than two years, can own agricultural land. This requirement clearly restricts activity in the market by limiting the pool of potential buyers of agricultural land. However, land consolidation cannot be limited to the buying and selling of agricultural land. The experience of market economies shows that leasing can play an important role in enlarging the size of landholdings (Allen and Lueck 2002). As Lerman (2004) noted, leasing has emerged as an important mechanism for the enlargement of individual farms' landholdings in transition economies, such as those in Moldova, Hungary and Poland.

In Kyrgyzstan, the law permits the lease of agricultural land, and market-driven land consolidation through leasing has already begun. According to USAID (2008), approximately 50 percent of corporate and peasant farmers lease land from others, including the lease of LRF land from local governments (indeed, most of these are probably leases of LRF land). The findings from a recent farm-level survey suggested that about 10 percent of farmers lease additional agricultural land from other private land owners (M' Vector Consulting 2007). The evidence also suggests that short-term term land lease agreements, especially between private land owners and individual farmers, prevail in Kyrgyzstan (USAID 2008). This could be a serious obstacle to land consolidation and agricultural growth, as it discourages long-term investment by lessees. Government policy, therefore, should encourage longer-term leasing. However, formal government-sponsored land consolidation programs should not be based on coerced cooperation; rather they should augment the market-driven process that has already begun.

Access to Agricultural Services

The lack of adequate institutions and markets can create significant problems for small peasant farmers without access to machinery and traditional agricultural services. During pre-transition times, all state and collective farms had their own units and specialists responsible for the delivery of such services. Due to the limited size of small peasant farms, however, it is difficult (if not impossible) for them to support such units or purchase machinery. In addition, individual farmers may need other services, such as marketing, legal, and extension services, to fully exploit the new economic paradigm of the market economy. Unfortunately, the agrarian reforms in Kyrgyzstan were inconsistent, and this dimension of transformation to private farming was mostly neglected during the earlier phases of transition. For example, with the reorganization of large farms into small individual farms, there was little or no linkage between the new farms and agricultural research due to the lack of extension services (Schmidt 2001).

The government and donors soon recognized this problem, giving rise to the evolutionary-institutional approach, which emphasized the crucial importance of institutions and markets.[28] In the late 1990s, with support from external donors, the government started to emphasize the construction of an

[28] Actually, there appears to be a widespread tendency across transition countries to focus primarily on macroeconomic stabilization, price liberalization, deregulation and privatization during the earlier years of transition. However, the continuing decline in economic activity and the difficulty of explaining the cross-country pattern of transition dynamics by the degree of devotion to standard policy prescriptions gave rise to the evolutionary-institutional approach, which emphasized the vital importance of institutions for the nature and timing of reform measures (Murrell 2008).

institutional and market environment for a market-based agricultural sector. This included the initiation of several programs aimed at creating institutions to provide agricultural support services for farmers. Such institutions included: the Rural Advisory Service (RADS), which provides advisory (extension) services to peasant farmers; the Kyrgyzstan Agricultural Market Information Services (KAMIS), which supports farmers by providing market and price information; and Legal Assistance to Rural Citizens (LARC), a donor-supported institution that provides legal services to rural citizens. Currently, these institutions have offices in most rural districts. However, only few farmers appear to be aware of these institutions, and only a fraction of them actually use their services. According to M' Vector Consulting (2007):

(i) About 20 percent of farmers are aware of the RADS and only 16 percent use its advisory (extension) services.
(ii) Less than 10 percent of farmers are aware of KAMIS and less than 2 percent actually use its marketing and information services.
(iii) Only 7 percent of farmers know about LARC and less than 3 percent use its legal services.

Furthermore, both economic theory and the experiences of market economies suggest that small farmers can make use of scale economies by establishing service cooperatives (Lerman, Csaki and Feder 2004). This strategy creates a cooperative machinery pool and allows small farmers to share the burden of capital expenditures. The literature suggests that there is strong psychological resistance to cooperation in transition economies, due to years of abuse of the concept of 'cooperation' prior to transition (Lerman 2004). Nevertheless, the experience of some transition countries suggests that, given appropriate legal and institutional arrangements, cooperation might significantly improve the access to machinery and agricultural services (Lerman, Csaki and Feder 2004). This is especially important for Kyrgyzstan, where only about 50 percent of peasant farmers use agricultural machinery services (M' Vector Consulting 2007). The appropriate legal basis for the development of such cooperatives was finally created in Kyrgyzstan by the adoption of the "Law on Trade and Service Cooperatives."[29] A recent farm survey (M' Vector Consulting 2007) found that many farmers appear to be keen to join service cooperatives. While only 1 percent of farmers reported that they were already members of a service cooperative, an additional 44 percent indicated that they would be willing to join a service cooperative if such an institution were established in their community. Thus, promoting the establishment of trade and service cooperatives may be a promising direction for fostering improvements in farmers' access to agricultural machinery and services.

Another important problem is related to collective action in the delivery of and access to irrigation water, which has been drastically affected by the fragmentation of land use. As mentioned in Section 2.3, following the land reform, the government started to reform the irrigation sector through establishment of WUAs. However, institutional reform in the irrigation sector was significantly slower than land reform, and the facilities were already largely deteriorated by the time reforms were initiated in the irrigation sector. There are currently about 400 WUAs in Kyrgyzstan; they are responsible for the operation and maintenance of on-farm irrigation facilities and the allocation of irrigation water to peasant farmers in most parts of the country (Johnson III and Stoutjesdijk 2008). However, anecdotal evidence suggests that the WUAs are still weak and financially unsustainable, due to problems with the collection of irrigation service fees. Moreover, merely changing a regime and creating laws can prove insufficient for successful institutional change. Theesfeld (2004) argued that important societal features inherited from socialism and amplified during the transition process, such as incongruities between formal and informal rules, power abuse, rent seeking, information asymmetry, and distrust between community members, played a crucial role in evolution of social capital and collective action in Bulgaria's irrigation sector. The volume of anecdotal evidence encountered by the authors of the present paper suggests that similar problems related to collective action are applicable to Kyrgyzstan's irrigation sector. Problems

[29] The draft version of this law was developed with technical assistance from the German Technical Cooperation Agency (GTZ).

with information asymmetry and inadequate access to information seem to lead to insufficient or delayed water access for peasant farmers in Kyrgyzstan. Thus, it is not surprising that about 36 percent of peasant farmers reported that access to irrigation water is the most important problem in the agricultural sector (M' Vector Consulting 2007).

Access to Credit

The impact of land privatization on the access to credit for Kyrgyzstan's small farmers, as elsewhere, is subject to two important constraints (at least in the short and medium terms). The first constraint is high transaction costs to financial institutions when dealing with small-scale borrowers. Obviously, loan processing usually involves a strong scale of economy, making it costly to collect information on the past behavior of small farmers and to assess the potential profitability of their small projects. This is perhaps one of the reasons why commercial banks in Kyrgyzstan often refuse to take small land plots as collateral. Furthermore, under existing law, commercial banks cannot own agricultural land, and they have only a limited right to take a possession of pledged land in foreclosure (USAID 2008). By limiting agricultural land ownership only to residents of rural areas residing in a given rural community for no less than two years, the law restricts the market value of agricultural land. Property rights to land can enhance the collateral value of land only if the lender is able to gain full possession of mortgaged land in case of default.

The second constraint is the overall shortage of credit supply in Kyrgyzstan.[30] In general, the country's formal financial sector is very small, especially in rural areas. The total credit to the economy from banks and non-bank financial institutions comprises about 20 percent of GDP. Moreover, the broad money supply is comprised mostly of currency outside banks (about 70 percent of the money supply), with deposits in the financial sector comprising only 30 percent of the money supply. This low level of financial intermediation is usually attributed to a general lack of confidence in the banking system, stemming from various banking crises that occurred during transition. The absence of banks and their branches in rural areas is also an important component of the relative lack of credit. Among the commercial banks, only Ayil Bank (formerly Kyrgyzstan Agricultural Finance Corporation or KAFC) has a considerable involvement in rural financial markets. As a result, agricultural credit consists of only 12 percent of total bank credits in Kyrgyzstan, while the sector employs about 40 percent of the country's labor force and contributes about one third of the country's GDP. The government and donors (e.g., the World Bank, ADB and USAID) are presently promoting credit unions and microfinance institutions in rural areas, to the point there are now some 270 credit unions and 230 microfinance institutions available in the country.

Despite these constraints, survey results indicate that access to credit among farmers is gradually expanding in Kyrgyzstan. For example, the farm-level surveys conducted by M` Vector Consulting Company suggest that the proportion of farmers who used credit to finance their farming activities rose from just 7 percent in 2003 to about 20 percent in 2007.[31] The survey findings also suggest that there is significant variation in credit use across provinces. This can be attributed to the fact that the size of farmers' landholdings in the North is significantly greater than in the South. However, our regression analysis using the above-mentioned survey data shows that the between-province differences in credit access remain even after we control for land size and other farmer characteristics. For example, the results provided in Table 3 suggest that farmers in the Talas province are about 5-fold more likely to use credit than farmers from provinces such as Naryn and Osh. The results from our logistic regression (dependent variable: credit use) also suggest that the size of farmland has a significant impact on the likelihood of a farmer to use credit. Farmers with landholdings of less than 1 hectare and 1-3 hectare are about 3-fold and

[30] The analysis in this paragraph is based on data obtained from the official website of the National Bank of the Kyrgyz Republic: www.nbkr.kg.

[31] The household surveys conducted by the National Statistical Committee of Kyrgyzstan also show similar trends (NSC 2005).

1.6-fold less likely to use credit compared to farmers with landholdings of more than 3 hectare. These results are not surprising in light of the above discussion.

Another interesting regression result indicates that farmers who lease additional farmland are almost 2.7 times more likely to use credit than farmers who farm only on their own land. Also, farmers who engage in non-farm activities in addition to farming are about 1.4 times more likely to use credit than those who do not, and farmers with post-secondary education are more likely to use credit compared to less-educated farmers.

The evidence suggests that non-bank financial intermediaries, such as credit unions and microfinance institutions, are playing an important role in expanding access to credit in rural Kyrgyzstan, as they have done in so many other countries. Nearly 40 percent of farmers that used credit to finance their farming activities received the credit from such financial institutions. Thus, policies that support the further expansion of such institutions and the removal of institutional and legal constraints on commercial bank credits to agriculture could help further promote the rural financial markets in Kyrgyzstan.

Table 3. Determinants of farmers' credit use in Kyrgyzstan (logistic regression, dependent variable: credit use)

	Coefficient*	Standard error	P-value
Land size**			
Less than 1 ha	0.33	0.08	0.000
1-3 ha	0.58	0.12	0.008
Additional land lease	2.68	0.53	0.000
Additional non-farm activity	1.41	0.22	0.025
Family size	1.05	0.03	0.098
Education	1.45	0.25	0.035
Age	1.13	0.06	0.009
Age squared	0.999	0.001	0.020
Gender	0.88	0.12	0.348
Province-fixed effects***			
Batken	0.39	0.12	0.002
Chui	0.44	0.13	0.007
Jalalabad	0.57	0.16	0.045
Issyk-kul	0.32	0.09	0.000
Naryn	0.18	0.06	0.000
Osh	0.19	0.06	0.000
Log-likelihood	-692.96		
LR chi square	145.73		
Pseudo R sq	0.10		
Number of observations	1484		

*Odds ratio. **Reference category is land size > 3 ha. ***Reference category is Talas province.
Source: Authors' estimation using farm survey data from M` Vector Consulting (2007).

5. CONCLUSION

The institutional change in rural Kyrgyzstan during transition consisted of the complete liquidation of former large-scale state and collective farms and the distribution of land to rural households. The reforms established private property rights to land, with rights to transfer, exchange, sell, lease and use the land as collateral for credit. In addition, reforms in the irrigation sector established an institutional and legal environment in which collective action management solutions may be implemented based on water users associations. These key features of Kyrgyzstan's reform are in sharp contrast with those seen in other transition countries in Central Asia, where decollectivization was not complete and the reforms were implemented gradually.

The institutional modifications in Kyrgyzstan led to remarkable changes in the structure of agricultural production, and the individual sector now produces about 97 percent of the country's agricultural output. Coinciding with these changes, growth in agricultural output and productivity rebounded, showing steep upward trends between 1996 and 2001. This remarkable outcome was the result of the sector's institution shift, which augmented labor efforts and triggered substantial changes in cropping patterns. However, although labor productivity continued to grow by a respectable 5.5 percent per year after this point, the growth rates of agricultural GDP and land productivity slowed after 2002. This was probably due, at least in part, to the combination of three factors: the end of the one-time positive discrete effect of the individualization of land use; an exodus of labor from the agricultural sector; and a slight decrease in sown area.

Some argued that significant declines in agricultural growth are associated with excessive fragmentation of land use and the apparent inability of small peasant farmers to sustain growth in agricultural productivity (Government of the Kyrgyz Republic 2004). However, our analysis of official data suggests that this assertion is inaccurate, given that the small peasant farms produce almost 2-fold more agricultural output per hectare of sown area than the larger corporate farms in Kyrgyzstan. Thus, we argue that the problems associated with inadequate institutions and an imperfect market environment may have contributed to the slowing of agricultural growth. In order for farmers to fully realize the benefits of their improved property rights, policymakers must remove the remaining institutional and legal barriers for land consolidation and access to bank credit, promote collective action and the expansion of producer organizations, trade and service cooperatives, and help improve farmers' access to agricultural services.

There is very little evidence in the literature examining how institutional and structural changes in rural Kyrgyzstan have affected the country's agricultural production and productivity. In the future, research that further illuminates the role of these changes in advancing agricultural productivity could potentially advance the policy debate in Kyrgyzstan. In this regard, empirical analysis based on province- and district-level panel data, seeking to identify the differences and variations in agricultural productivity across sub-national jurisdictions, will be interesting. Additionally, research that further explores institutional reform in irrigation water management and the effects of water users associations on agricultural productivity may be fruitful areas of inquiry. Finally, it could be useful to focus on improving institutional mechanisms and incentives with regard to rural service delivery, paying special attention to problems of political economy and fiscal decentralization.

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