

AGRICULTURE ON THE NEW SILK ROAD

Throughout its history, agriculture in South and Central Asia has been shaped by a diverse and unique mixture of climatic, geographic, political, and economic forces.

Soviet Union political and economic control left lasting impacts on the agricultural sectors of the Central Asian states of the New Silk Road region. The Soviet influence on agriculture in the region dates to the 1920's when state-controlled collective farms were established across the entire Soviet Union in response to food production and distribution issues.¹ Throughout the 1950's and 1960's the Soviet state implemented large-scale agricultural projects that permanently altered the landscape of the region. The 'Virgin Lands' campaign converted vast areas of the steppe to wheat cultivation.² Irrigation projects diverted water to arid regions ushering in extensive cotton cultivation.³ In the



1990's, as Soviet control and support disappeared with the Soviet Union itself, the newly independent Central Asia states were left to forge their own paths towards privatization of collective farms and integration into a global, market economy.⁴

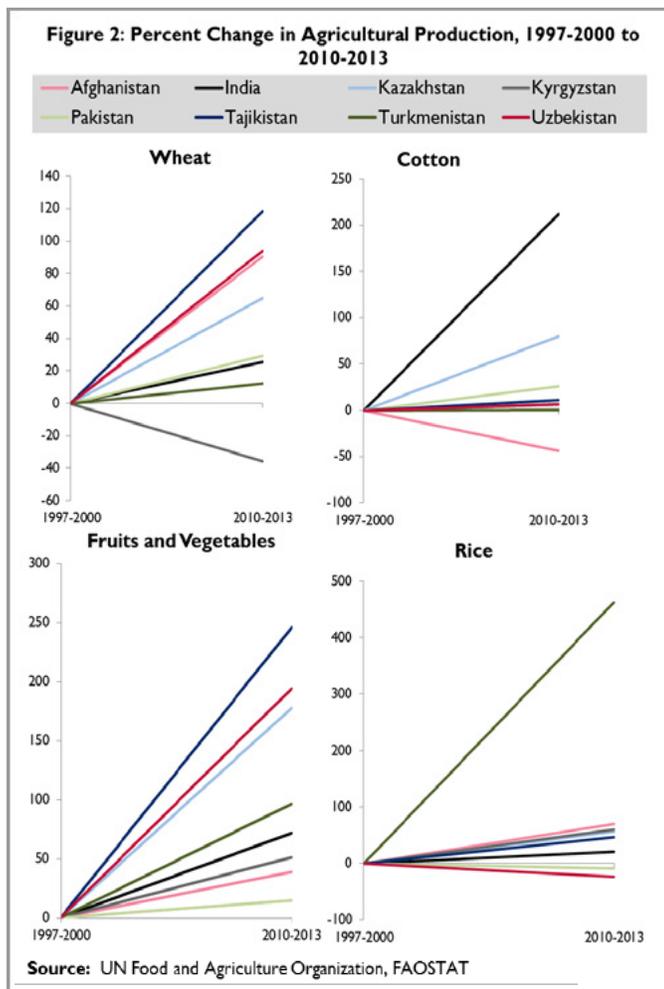
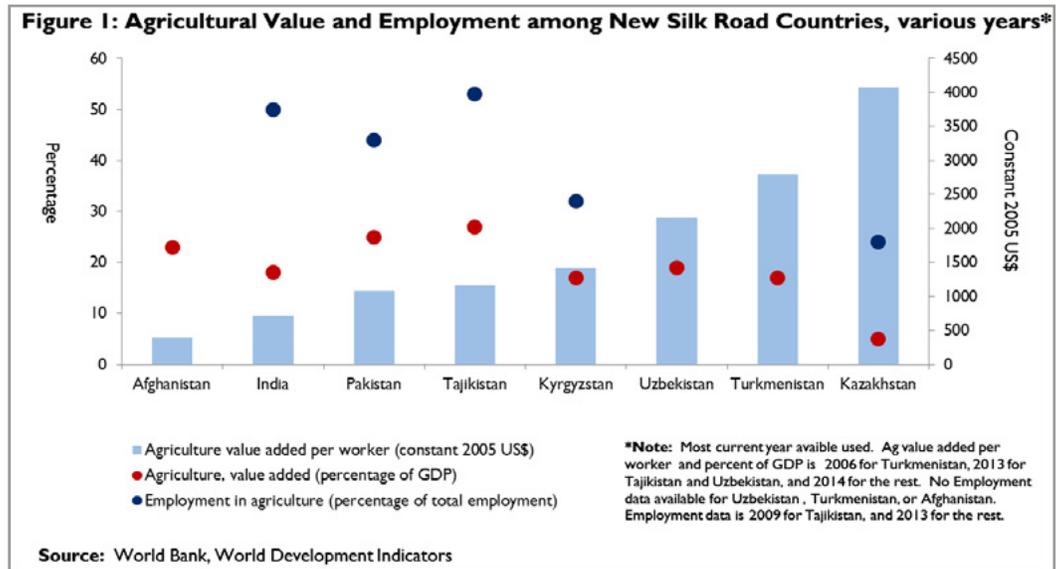
The modern history of the agricultural sector of India, and to a lesser extent Pakistan and Afghanistan, is marked primarily by the 'Green Revolution' initiated by Norman Borlaug and other agronomists in the 1960's and 1970's in an effort to stave off looming food crises projected at the time for much of South Asia and sub-Saharan Africa. The introduction of high-yield dwarf wheat and rice varieties, chemical fertilizers, and mechanization allowed the region to dramatically increase crop yields.⁵ Despite increased productivity, the rural population of South Asia still suffers from low incomes and poor food security. This lasting poverty has been exacerbated in Afghanistan by the turmoil and conflict that has consumed the country for the past 30 years.⁶

The New Silk Road is a U.S. government initiative seeking to improve economic linkages between the five Central Asian countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, and the South Asian countries of Afghanistan, India, and Pakistan.

This analytical brief will cover different aspects of agriculture among the countries of the New Silk Road region, including production, land use, trade, food security, US foreign assistance, and prospects for the future.

PRODUCTION

Agricultural productivity and its share of the overall economy vary greatly across the New Silk Road region. Unfortunately, countries where the agricultural sector plays a larger role in the economy and provides more employment tend to also have the lowest productivity. As seen in Figure 1, the four countries with the lowest productivity, as measured by value added per worker, also have 3 of the 4 highest agricultural shares of the economies. Agriculture plays an especially important role in India and Tajikistan, where more than half of the working population are employed in the agricultural sector. On the other hand, Kazakhstan has the highest productivity in the region, with a value added per worker of just over 4,000 US dollars, yet agriculture constitutes only 5 percent of the Kazak economy and employs under a quarter of the working population.



Moreover, the World Bank data also show that agriculture has been decreasing as a share of the overall economy in Kazakhstan as other sectors grow. This trend is generally true of the entire region. Agricultural output as a share of total Gross Domestic Product fell in all New Silk Road countries between 2005 and 2014 except for India, where it increased by 2 percent. Kyrgyzstan saw the largest fall where the agricultural share fell 7.5 percent during that time.

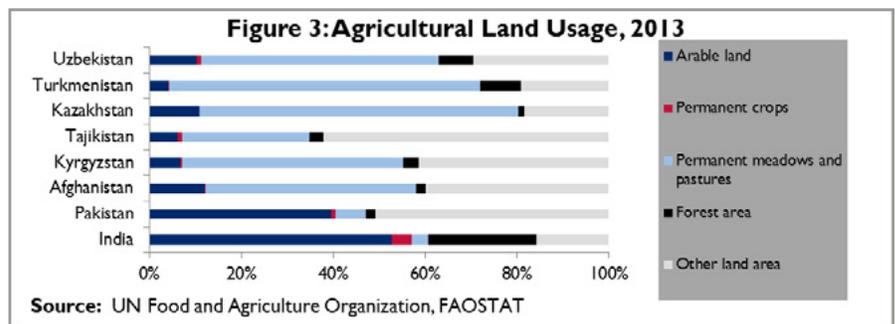
Cotton, wheat, and rice have traditionally been the staple agricultural commodity crops grown in the region. However, horticultural production of fruits and vegetables has been gaining a larger share of overall output over recent decades. To examine how production levels have changed over time, it is prudent to compare production output across year ranges because ranges smooth the variance in production caused by extraneous factors such as weather. Comparing two four-year periods starting in 1997 and 2010 show several notable trends.

During this time, India more than doubled their cotton production. Through 1997 to 2000, India only produced 11 percent more cotton than Pakistan, the next largest producer, but they produced approximately 175 percent more than Pakistan 10 years later. Furthermore, Uzbekistan, the third

largest producer during both time periods, only increased their production by 6 percent. All the region's countries saw some increase in wheat production except Kyrgyzstan, which saw a fall of 36 percent in their domestic production. On the opposite end, Tajikistan saw an 118 percent increase in their production, though they are still the region's smallest producer by far. Rice is a crop primarily grown in the warmer climates of regions in India, Pakistan, and Afghanistan. However, while other New Silk Road countries experienced decreases or only modest increase in rice production, Turkmenistan's production increased by almost 5 fold over the 10 year period. However, their production is still only .1 percent of the volume of Indian rice production. Horticultural production has increased across the region with Tajikistan, Uzbekistan, and Kazakhstan all seeing 100 percent increase in production of fruits and vegetables. Tajikistan experienced an impressive two and a half fold increase in their horticultural production. This expansion of fruit and vegetable production is particularly noteworthy because horticultural production has been shown to increase incomes among farmers in the developing world.⁷

LAND USE

The lands of the New Silk Road region are a diverse mixture of mountains, deserts, grasslands, and fertile river valleys. The majority of arable land⁸ and land dedicated to permanent crops are in India and Pakistan. While these two countries only constitute 45 percent of the New Silk Road land area, they together hold 80 percent of the arable lands. The colder, more arid climate of the Central Asian countries means that much of the land is only suitable for permanent pastures. Mirroring their southern neighbors, Kazakhstan, Turkmenistan, and Uzbekistan altogether contain approximately 80 percent of all pastures within the New Silk Road region while only comprising 43 percent of the total land area. The mountainous, dry climates of the New Silk Road region also mean that much of the land is simply unsuitable for any type of agricultural usage. The extremely dry climate of Turkmenistan and mountainous terrain of Tajikistan and Kyrgyzstan mean that less than 10 percent of the land area in each of these countries is currently cultivated excluding lands for pastures.

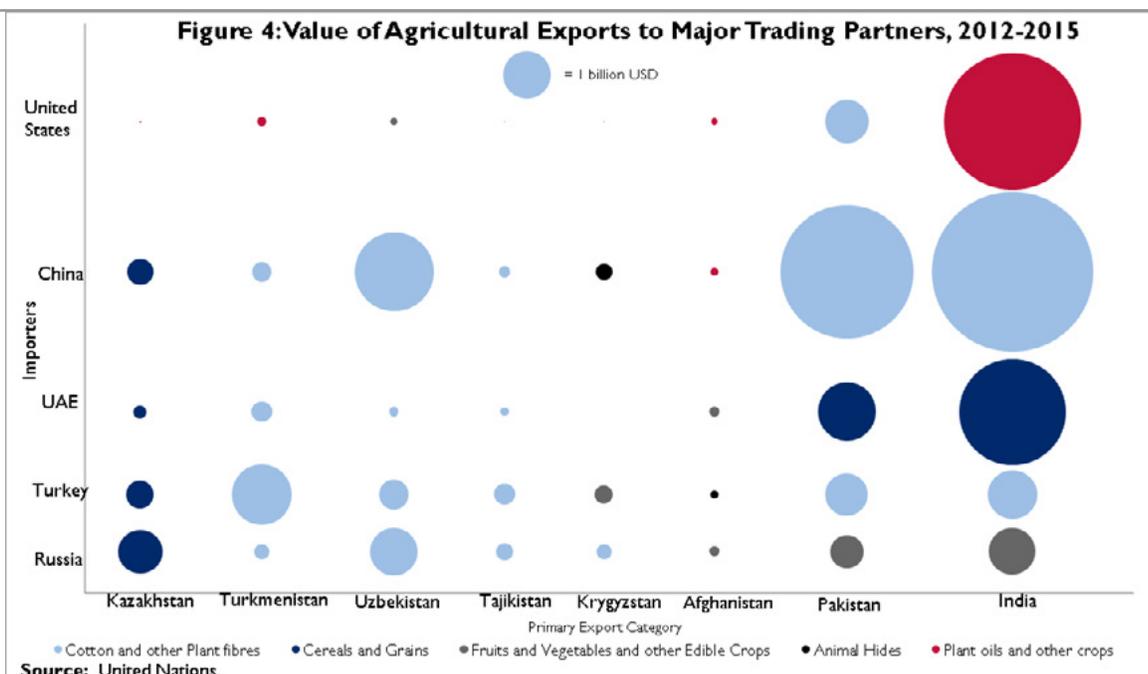


The relatively dry climate, chiefly that of Central Asia, means that irrigation is particularly important to a region where many agricultural areas cannot rely on rain. The annual average precipitation levels of between 150 to 700 millimeters⁹ for the Central Asian countries are roughly similar to the annual averages of the American Southwest and Central Plains.¹⁰ Respectively, 80 and 75 percent of Tajik and Kyrgyz agricultural lands are irrigated.^{11,12} While there is no data on irrigation in Turkmenistan and Uzbekistan, the vast amounts of water used by their agricultural sectors would suggest that irrigation is as important to these countries as it is to their neighbors, if not more so.¹³ Even in India, where much of the sub-continent receives seasonal monsoon rains, 40 percent of the agricultural lands are irrigated. Only the relatively moist arable lands of Kazakhstan make do without irrigation. Only 4 percent of Kazak agricultural lands are irrigated. Another exception is Afghanistan where only one-fourth of agricultural lands are irrigated, though the low productivity of Afghan agriculture would suggest this is most likely due to a lack of infrastructure rather than a lack of need.

TRADE

Agricultural trade displays several distinct patterns as shown in Figure 4. India and Pakistan are by far the largest exporters in the region by virtue of the size of their economies and their access to the sea. Additionally, because the

other Central Asian countries are landlocked, regional neighbors are more important than if a country has access to the sea.¹⁴ China and Russia have an outsized importance to these countries because the shared borders offer easier trade access.¹⁵ What is also clear from this figure is that cotton plays an important role in the region's



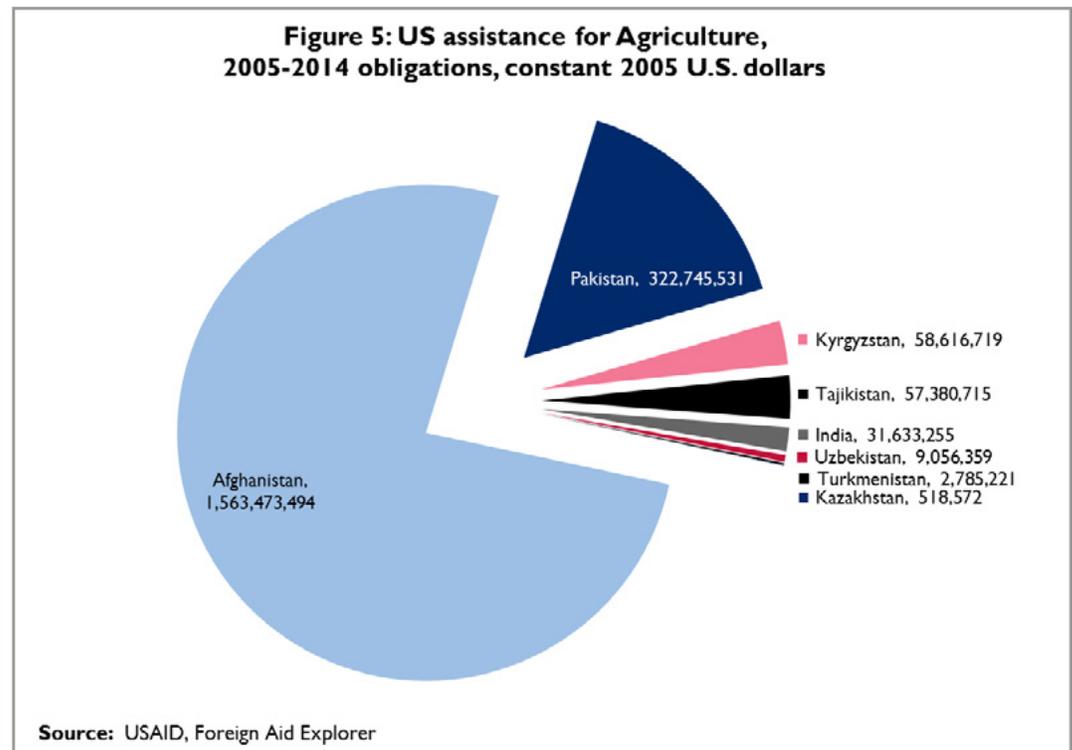
agricultural exports. In all countries except for Kazakhstan and Afghanistan, cotton is the main export category to at least one trading partner. For Turkmenistan and Uzbekistan, it is the top export category for all mentioned importing partners, except for only the United States which is a large cotton exporter itself.

Agricultural imports to the region during the same time period examined in Figure 4 share some similar characteristics with export patterns, but also some important differences. Like with exports, large economies and regional neighbors such as the United States, China, and Russia are some of the region's biggest trading partners. Interestingly, some of the largest imports to India and Pakistan from countries like the United States and China were cotton.¹⁶ While South Asia is a large cotton exporter, demand for cotton driven by the large textile industries in the region also drives imports to the region. In this vein, silk from China is a major import to South Asia. Most notably, the entire region is also very dependent on foodstuffs imports. Fruit and vegetable imports to India constitute 29 percent of all agricultural imports by value to the entire region. Fifty-nine percent of those imports were from just three countries: the United States, Canada, and Australia. Forty-three percent of all imports to the Central Asian countries by value were cereals, meats, or dairy products. Russia alone supplied 32 percent of those food imports to Central Asia. These numbers illustrate that the region's current dependence on food imports comes from a relatively small number of countries.

FOOD SECURITY

One of the more obvious objectives of agriculture is to provide people with a sufficient and consistent source of nutrition, in other words, to grant people food security. To those ends, IFPRI's Global Hunger Index assesses a country's food security by measuring certain key indicators such as rates of undernourishment and child mortality. This Index shows two distinct food security stories in the New Silk Road region. India, Pakistan, Afghanistan and Tajikistan all still struggle with food security issues much more than their northern neighbors. All four of these countries are ranked in the bottom fourth of countries in the index and consistently rank in the bottom half of the indicators. On the other hand, the four countries of Kazakhstan, Uzbekistan, Turkmenistan, and Kyrgyzstan all score in the top third of countries included in the index. While this does not mean these four countries are not without food security issues, they are in a distinctly better position than their southern neighbors.

While it is simple to show which countries suffer from food insecurity, it is a much more difficult task to assess the role of agriculture in determining food security. This is exemplified by the counter-intuitive situation where the New Silk Road countries ranked more food secure are also the countries that tend to have land less suitable for agriculture. These situations can arise because the relationship between food security and agriculture depends on interwoven and often counteracting forces. For example, changes in agricultural production that in turn affect food prices can either have a net positive or negative effect on food security. Agricultural price increases could have a net positive effect on food security in countries like India and Tajikistan where a significant portion of the workforce is employed in agriculture. The rise in incomes from higher prices could offset any potential loss of buying power. Yet, for a country like Kazakhstan where agriculture plays a much smaller role in the economy, food price increases could erode food security. This simple example illustrates the complex interplay between agriculture and food security; a relationship that can only be touched upon here.



Through the fiscal years of 2005 to 2014, Afghanistan received the vast majority of US government aid to the New Silk Road region. During that time they received nearly 80 percent of all U.S. government agricultural aid. USAID provided the majority of Afghan agricultural aid at 85 percent, while the Department of Agricultural and the Army evenly provided nearly the entirety of the remaining 15 percent of agricultural support to Afghanistan. Much of the funding to Afghanistan was for alternative farming activities aimed at weaning Afghan farmers from opium poppy cultivation and processing. While Afghanistan has received the most aid, Tajikistan and Kyrgyzstan received the most as a percentage of total U.S. assistance during the same time period. Respectively, agricultural aid made up 12 and 10 percent of all US foreign assistance received, and 19 and 14 percent of USAID assistance.

US ASSISTANCE

As U.S involvement in Afghanistan draws to an end, agricultural aid has also diminished. Agricultural support in Afghanistan in 2014 was 83 percent less than in 2010 when agricultural aid peaked at almost 600 million US dollars.¹⁷ Assistance to the entire region has similarly fallen, dropping 79 percent during that period. While Afghanistan and Pakistan have seen substantial decreases in agricultural support, assistance to countries like Tajikistan and Kyrgyzstan has remained stable, albeit at substantial smaller levels. Respectively, they received on average 9.6 million and 9 million in agricultural assistance over the 5 year period.

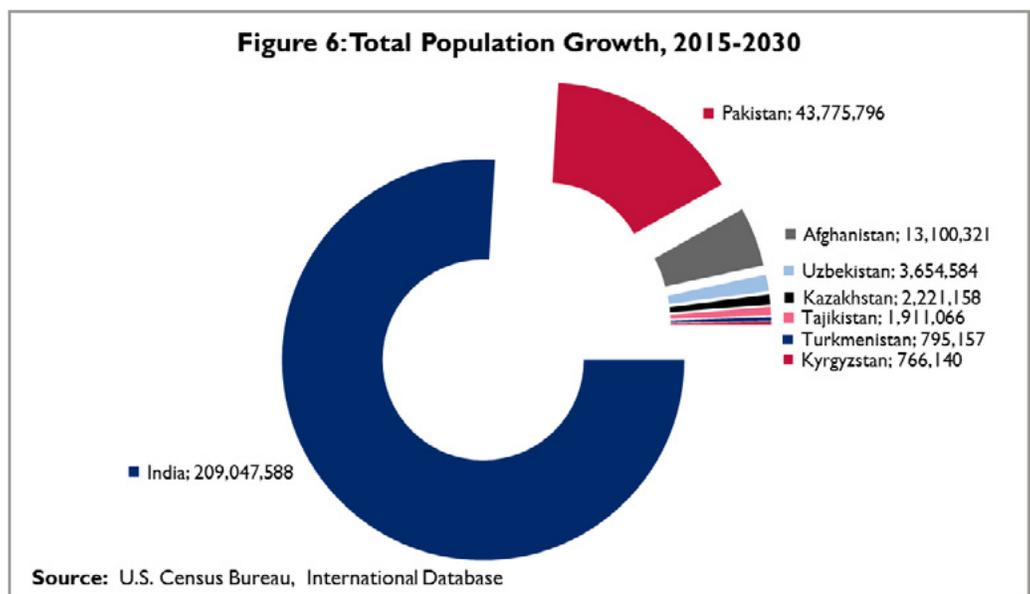
SPOTLIGHT: Feed the Future - Tajikistan

Feed the Future (FTF) is a US government initiative aimed at increasing agricultural production and the incomes of rural populations that rely on agriculture for their livelihoods.¹⁸ Tajikistan is one of 19 countries where the initiative is active and the only FTF country in the New Silk Road region. Within Tajikistan, FTF focuses its activities in the rural province of Khatlon where poverty and undernourishment are prevalent among the population. Among other activities, FTF is working to develop fruit and vegetable value chains, crops that give farmers the best opportunity to increase their incomes. The FTF initiative assisted in the repair of Soviet constructed irrigation systems that had fallen into disrepair and established 56 community water user associations so that farmers can better utilize the nation's water resources. USAID continues to support the strengthening of the water users associations to promote more effective water-resource management. In order to improve capacity among farmers, FTF is promoting best practices and new technologies across production techniques, resource management, nutrition-sensitive agriculture and access to markets. Lessons learned through the FTF activities in the Khatlon region can be applied throughout Tajikistan and across the New Silk Road region.¹⁹

FUTURE PROSPECTS

Future opportunities for agricultural growth and development in the New Silk Road region could be tempered by the threats posed by population growth, resource constraints and climate change.

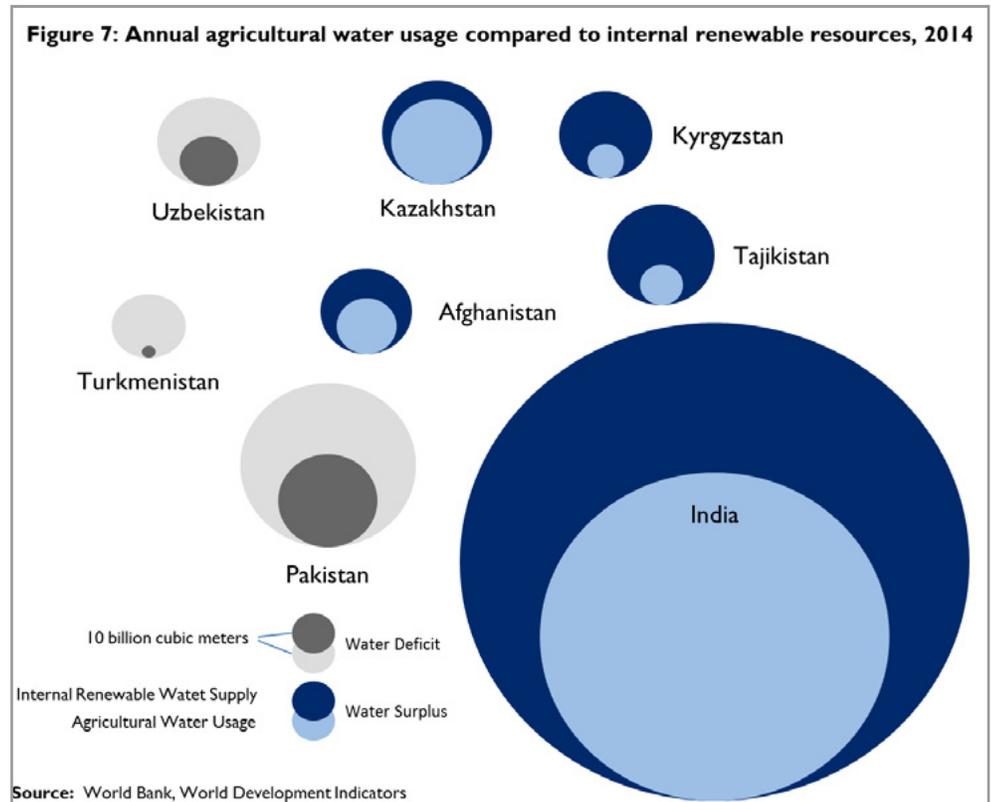
As shown in Figure 6, the region's population is projected to grow by approximately 275 million people by the middle of 2030. Nine out of ten of these additions will occur in either India or Pakistan where the vast majority of region's population currently reside. Afghanistan is projected to grow the fastest, increasing its population by 40 percent over the next 15 years. Such a high growth rate is a real outlier in the region. The next fastest growing countries are Tajikistan and Pakistan, whose populations are projected to grow by 23 and 22 percent, respectively.



Population growth presents a challenge to agriculture. Not only do more people demand more food, especially as incomes rise, they also compete for the same resources, namely land and water. Water, in particular, represents a significant challenge to the arid region. As Figure 7 shows, the agricultural sectors of Pakistan, Uzbekistan, and Turkmenistan annually draw more water than their territory can internally replenish. Turkmenistan, in particular, has barely any available internal resources at all. To supply enough water, these countries must either depend on external sources or draw down internal supplies like aquifers. It must also be noted that even though countries like India may appear to have sufficient water resources at a national level, there may be certain regions within the country that are suffering shortages. For example, the Haryana and Punjab regions, both major wheat producing regions, are facing

particularly damaging water shortages.^{20,21} Climate change is only expected to exacerbate water constraints as the region is predicted to become drier and hotter over the next century leading to less rainfall and smaller mountain snowpacks.²²

While the challenges are apparent, so are the opportunities. It can be safely assumed that demand for agricultural products will increase within the New Silk Road region and in neighboring countries like China, the Arab Gulf states, and Russia as the economies of these countries grow. New road and railway networks will integrate the region with the wider global economy, allowing agricultural exporters to penetrate new markets.^{23,24} The updating of irrigation systems and introduction of irrigation techniques that conserve water usage can help diminish the pressure on water resources.²⁵ Improved farming methods and new technologies disseminated through activities such as Feed the Future have the potential to raise agricultural productivity, increase household incomes, and even improve the environment. For example, the implementation of farming techniques, such as low or no tillage, can repair damaged soil and reverse some of the lasting impacts of Soviet agriculture that did little to prevent soil erosion or nutrient degradation.^{26,27} Yet, these opportunities can only be realized if adequate attention is paid to the potential threats to agriculture in the New Silk Road region.



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To access the data, please visit the EADS International Data & Economic Analysis (IDEA) website at idea.usaid.gov.

DISCLAIMER: The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government

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10 National Oceanic and Atmospheric Administration, National Centers for Environmental Information, U.S city annual averages, 1981 -2010.

11 FAOSTAT measures amount of irrigated agricultural land which includes arable land, land dedicated to permanent crops and permanent pastures and meadows. It is safe to conclude almost no permanent pasture and meadows and irrigated, therefore we subtract that land area to calculate percentages of agricultural land irrigated.

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