



## Tajikistan: Background Study

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## Executive summary

The Innovation for Agricultural Training and Education (innovATE) project has been invited by the USAID Tajikistan mission to conduct a scoping assessment during the fall of 2014. This report has been developed in preparation for this assessment. The purpose of the scoping visit is to assess the current state of agricultural education and training (AET) in Tajikistan, with the goal of identifying key opportunities for building human and institutional capacity in AET and the agricultural workforce. This report is the first step in the innovATE methodology that will link long-term AET human and institutional capacity development (HICD) with short-term agricultural value chain economic growth. This report begins the process of characterizing the economic and agricultural education sectors, using available qualitative and quantitative metrics, to better understand the supply and demand for AET graduates.

The background presented here suggests that water stress and lack of irrigation maintenance shape the agricultural production possibilities in Tajikistan and influences the potential for value chain diversification and development. The contemporary political context, with economic liberalization and land reform following the dissolution of the Soviet Union not yet complete and continued effects of a civil war in the 1990s, means that there is room for improvement in terms of modernizing the educational sector. Socially, Tajikistan has seen a decline in overall educational levels and in interest in AET degrees in particular, as economic growth has slowed and employment opportunities outside of the country appear more lucrative.

This report highlights several opportunity areas for building AET capacity. On the supply side of AET, there is a need to update both physical and pedagogical infrastructure across educational institutions. Appropriate changes can be best identified by linking agricultural labor market demands (via the private sector) to innovations in the supply of AET (through curriculum development and the establishment of new courses). Demand for AET in Tajikistan comes from several emerging sectors within the agricultural economy. The fresh fruit and vegetable value chains, for example, have growth potential in terms of domestic and export demand, and will require skilled labor all along the value chain, a finding that mirrors trends in the region more generally. A second opportunity is the increased interest in providing agricultural extension and advisory services, and the need for technicians with both hard and soft skills training. The scoping visit will continue to identify opportunities and challenges on both the supply and demand sides of AET in Tajikistan, and will generate innovative recommendations for creating and expanding linkages that will build institutional and human capacity in agriculture for increased food security and economic well-being.

## Introduction

The population of Tajikistan is largely rural and agriculture remains the single largest employment sector in the country, but the economic performance and impact of agriculture has decreased over the past two decades. There are opportunities to modernize and strengthen the agricultural sector, but these will require overcoming environmental, institutional and human capacity challenges. Formal AET institutions could be key players in the modernization of agriculture in Tajikistan if they can develop the capacity to better serve the growing need for highly qualified professionals in the agricultural workforce. USAID Tajikistan is seeking assistance from the Innovation for Agricultural Training and Education (innovATE) project to provide specialized and strategic thinking on how to make formal agricultural education and training (AET) more relevant to the current and future needs of agriculture in Tajikistan.

The purpose of this report is to outline the current state of agricultural production systems and employment opportunities in agriculture, in order to evaluate the strengths and limitations of AET in

Tajikistan. The report provides background on the history, demographics and natural environment of Tajikistan, as well as detailed overviews of the country's current economic situation and the current state of agricultural production systems. We then evaluate AET from both from the supply side and the demand side, by identifying key institutions in the AET system and their current capacities for education and skills training, and by highlighting labor market needs in the agricultural sector. Finally, we synthesize the information overviewed in the report to highlight next steps in terms of AET assessment as well as initial recommendations for areas within which innovATE can focus to build AET capacity in Tajikistan. This report provides the first step to assess the critical challenges facing the AET system and identify potential ways forward for innovATE to build capacity in AET in Tajikistan. The information analyzed in this study will be used in preparation for the innovATE scoping visit to Tajikistan in the fall of 2014.

## Background

### *History and demographics*

The Tajiks are of Persian origin and descent, making them ethnically and linguistically distinct from the Turkish-origin ethnic and language groups that dominate much of Central Asia. Historically, Tajiks were more settled than the nomadic Turkish peoples and they claim a historical homeland that covers an area stretching from present day Uzbekistan through to northern Afghanistan (Malashenko, 2012). The country was first created as an autonomous republic within Uzbekistan in 1924, but the USSR designated Tajikistan a separate republic in 1929. Because of the policies and practices of the USSR, Tajikistan had a more heterogeneous population through Soviet times, with Uzbeks and Russians comprising significant minorities in the republic. Tajikistan became independent in 1991 following the breakup of the Soviet Union, and experienced a very damaging civil war between regional factions from 1992 to 1997 (CIA, 2014). The United Nations, with particular support from Russia and Iran, assisted in brokering a settlement between the regional fighting groups to put an end to the civil war in 1997 (USAID, Feed the Future Initiative, 2012).

Due in part to out-migration during and after the war, the Tajik ethnic group today makes up about 80% of the population, with Uzbeks representing the largest minority group (Nichol, 2012). Tajik is the national language, spoken by all Tajik ethnic peoples and the majority of other ethnic groups. Russian is spoken by most of the older generation, and is often used as a common second language across ethnic groups and in business. Today, over 90% of the population is Muslim, with the vast majority (85%) following branches of Sunni Islam. The remaining Shiite (Ismaili branch) Muslim population resides mostly in the eastern autonomous region of Gorno-Badakhstan (CIA, 2014). The long history of strong religious sentiment and practices has meant that Islam has returned more intensely to Tajikistan than to many other Central Asian countries following the collapse of the Soviet Union (Malashenko, 2012). In recent years, the secular government has intensified the monitoring of practicing Muslims on claims of fighting Islamic radicalism.

Tables 1 and 2 present several trends in the population of Tajikistan over the past five to ten years as reported by the country's statistical agency, Tajstat (2012). With a population of 8 million people in 2014, contemporary Tajikistan is faced with a young and rapidly growing (1.75% annually) population (CIA, 2014). Population growth has made improved public services in social sectors (education, health, and social protection), as well as job creation, imperative components of the Government's Poverty Reduction Strategy (World Bank, 2014b). In addition, and unlike in much of the rest of the world, the majority of the population has lived and continues to live in rural areas, with only just over a quarter of the population residing in urban areas. This makes the provision of social services and economic

development costly and requires additional investment in infrastructure to connect urban centers and rural outlying areas.

Table 1. Demographics (percent of population) by gender and age of the population of Tajikistan, 2008-2012

	2008	2009	Year		
	2008	2009	2010	2011	2012
<b>Gender (% of total population)</b>					
Men	50	51	50	50	50
Women	50	49	50	50	50
<b>Age (% within gender)</b>					
Men					
Under 30	68	67	67	67	67
Over 30	32	33	33	33	33
Women					
Under 30	66	66	66	66	65
Over 30	34	34	34	34	35

Data from Tajstat (2012) and authors' calculations

Table 2. Demographics (percent of population) by place of residence of the population of Tajikistan, 2002-2012

	Year										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Place of residence (% of total population)</b>											
Rural	73.6	73.5	73.6	73.6	73.7	73.7	73.7	73.6	73.5	73.5	73.6
Urban	26.4	26.5	26.4	26.4	26.3	26.3	26.3	26.4	26.5	26.5	26.4

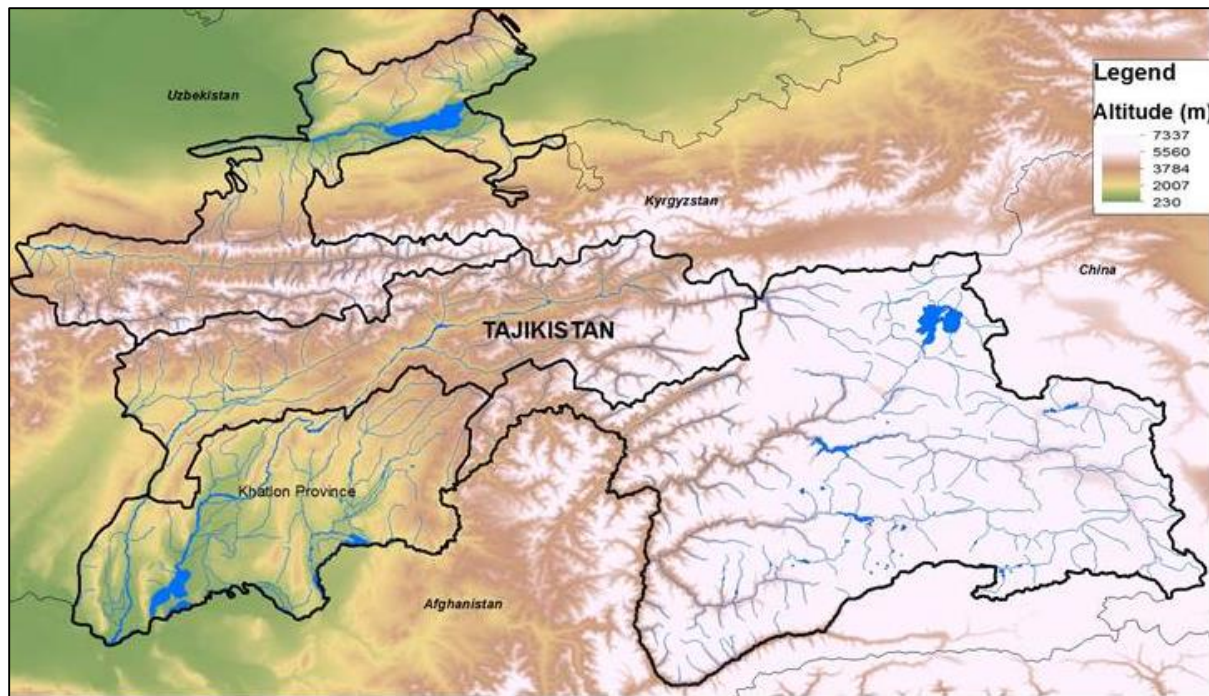
Data from Tajstat (2012)

### *Geography and natural environment*

Tajikistan is a landlocked country in Central Asia, at the intersection of the Alay and Pamir mountain ranges. Ninety percent of the country is mountainous, with lower elevation river valleys and steppes in the north (the Fergana Valley) and southwest (the Vaksh and Panj river valleys) parts of the country providing the best possible space for agricultural production. Figure 1 shows a map of elevation and major water resources in Tajikistan. The Khatlon Province, located in the southwest, is the country's primary agricultural zone, and the main focus of the Feed the Future initiative (USAID, Feed the Future Initiative, 2011). Tajikistan shares a 1400 km border with Afghanistan in the south, making Tajikistan a strategic partner for the United States and other western countries over the past ten years in trying to contain and decrease the threat of Islamic militants in Central Asia (Nichol, 2012). Tajikistan's other borders, with China and Kyrgyzstan, provide some possibility for economic growth, while the border with Uzbekistan is often closed or embroiled in conflict over water and energy (UNDP, 2010).

Figure 1. Map of Tajikistan by elevation (in meters) and water resources

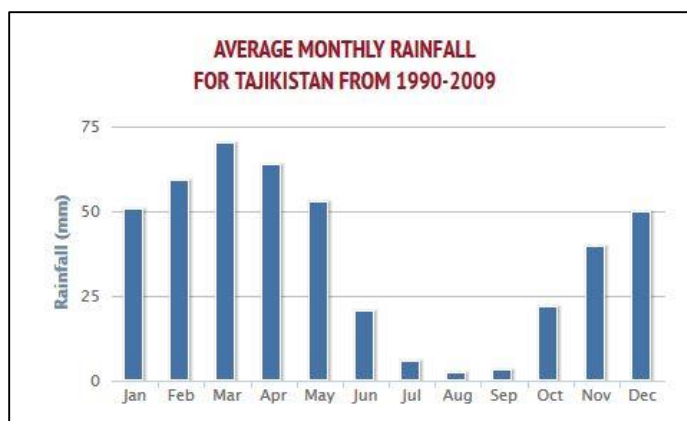




Data from DIVA-GIS (2014) and authors' representation

Water availability is a key constraint for agriculture and industry in the country, and the rights to the water in rivers that start in the mountains of Tajikistan and flow through several Central Asian countries to the Aral Sea are consistently contested in the region (Laldjebaev, 2010). With increasing climate variability, flooding has become more of an issue in the country, and there is ongoing interest in managing water resources to account for higher variability in rainfall and runoff, which would include both dam building and repairing irrigation infrastructure (World Bank, 2014b). Tajikistan receives between 400 and 600 mm of rain per year, largely during the late winter and early spring (see Figure 2 shows the average annual rainfall over the past 30 years). Variability and decreases in rainfall threaten agricultural production, and Tajikistan's lack of adaptive capacity to deal with these shocks rank it the country in the region most vulnerable to climate change (World Bank, 2014b).

Figure 2. Average annual precipitation for Tajikistan, 1990-2009



Data from World Bank (2014a)

## Economy

### General

Tajikistan has one of the lowest per capita GDPs among the 15 former Soviet republics (US \$2,300 per capita in 2013) and its economy continues to face major challenges, including dependence on remittances from Tajiks working in Russia, pervasive corruption, and the major role of narco-trafficking in the country's informal economy. Vulnerabilities to external market shocks, susceptibility to natural disasters, underexploited economic diversification potential, limited arable land, and its landlocked location make Tajikistan one of the poorest countries in the Europe and Central Asia region, with a GNI per capita of US \$800 in 2011 (World Bank, 2014b). However, although the costly independence period and civil war devastated Tajikistan's economy until the late 1990s, the economy performed strongly in the decade following the end of the civil war in 1997. The country saw strong economic growth, averaging nearly 8 percent annually between 2000-2008, which was made possible by favorable world prices for the country's main export items of cotton and aluminum. In 2013, the economy grew by 7.4 percent (World Bank, 2014b). Table 3 shows the major sectors that comprise Tajikistan's annual GDP and compares the economy to others in the region.

Table 3. GDP and poverty indicators by country, 2012

	Country				
	Tajikistan	Kazakhstan	Russia	Kyrgyzstan	Uzbekistan
<b>Total GDP</b> (USD billions)	7.632	203.5	2,014.7	6.47	51.18
<b>Agriculture</b> (% of GDP)	26.5	4.7	3.9	20.2	18.9
<b>Industry</b> (% of GDP)	25.9	39.5	36	26	32.3
<b>Services</b> (% of GDP)	47.6	55.8	60.1	53.8	48.8
<b>Exports</b> (% of GDP)	18.2	47.6	29.4	49.5	27.8
<b>Imports</b> (% of GDP)	64.5	30.3	22.1	99.7	29.8
<b>Inflation</b> (annual %)	11.9	4.8	8.5	7.4	15
<b>Headcount at national poverty line</b> (% population)	47.2	3.8	11	38	---
<b>Net Migration</b> (number of people)	-99,999	0	1.1 million	-175,003	-200,000

Data from World Bank (2014c)



As Table 3 demonstrates, agriculture is a much more economically important sector in Tajikistan than in other Central Asian countries, which is due in part to the history of cotton production in the country as both an employment and economic driver (Densiova et al., 2013). The manufacturing sector comprises 26% of GDP, a smaller share than in other countries in the region. The main industries include aluminum, cement and vegetable oil. Hydroelectric enterprises are also important industries (given the water resources originate in Tajikistan) and account for 91% of electricity production in the country, much of which is exported to neighboring countries. Services account for nearly 48% of the country's GDP and include wholesale and retail trade, hotels and restaurants, transport, government, financial, professional, and personal services such as education, health care, and real estate services (World Bank, 2014b).

The largest driver of the economy of Tajikistan, however, is not a domestic sector but the sending of remittances from economic migrants who have left Tajikistan to find employment. Estimates of the number of individual working abroad range from 900,000 to more than one million (over ten percent of the population of Tajikistan); almost all of them work in Russia (World Bank, 2014b; EDB, 2012). Record high remittance inflows in 2013 were estimated at about USD \$4.1 billion, equivalent to almost 49 percent of GDP (World Bank, 2014b). The remittances contribute to the economic and political security and growth of the country, and at the same time have shifted the economic and social dynamics (Coulibaly, 2012). Danzer et al. (2013) estimate that 50% of households in Tajikistan have had at least one member go abroad for work in the 23 years since independence, and that almost two-thirds (59%) of these economic migrants have general secondary education. For the economy as a whole, this means that many of the semi-skilled workers who could go on to specialized training and growth-generating domestic jobs instead leave the country, decreasing the skilled labor pool. For households and families, economic migration has shifted the gender dynamics of livelihoods, with an increasing number of women working in wage labor. These jobs, however, are generally low-paid and unskilled, and the combination of a decrease in educational attainment for women and a resurgence in traditional gender roles over the past 25 years has meant that women remain dependent on male migrants to support their households (Baskakova, 2007; De Young, 2012).

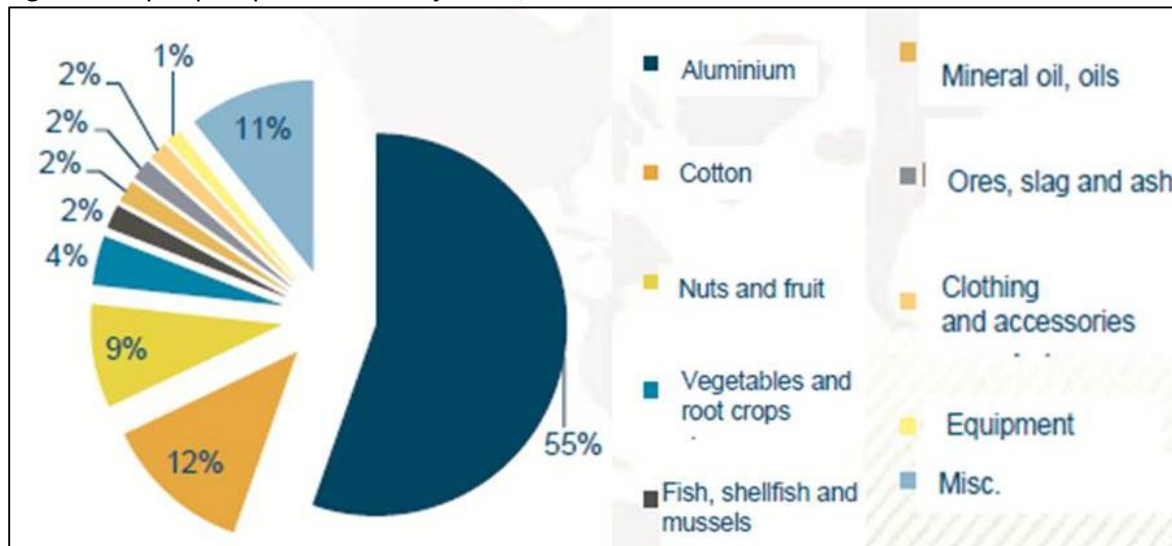
At a macroeconomic level, the current question facing Tajikistan is if and how to integrate their economies into regional and international economic frameworks. Tajikistan was accepted into the World Trade Organization in 2012, and has long been a member of the Eurasian Economic Community, both of which facilitate the free movement of goods across national borders (World Bank, 2014b). In the past two years, there has been movement by Russia, Belarus and Kazakhstan to formalize and enlarge a Customs Union and Single Economic Space, which would integrate not only trade and customs regulations across member states but would also create a single social space, with a common labor market, pension system and investment regulations (EDB, 2013). Though Tajikistan has made no clear commitment or move toward accepting or rejecting integration, initial analyses of benefits of integration suggest that the main economic benefit will derive not from increased access to markets or financial capital. Instead, the creation of a regional labor market would increase safeguards for economic migrants and eventually help to harmonize labor costs and benefits across member states, increasing interest in employment opportunities in Tajikistan (Densiova et al., 2013).

### *Exports*

Tajikistan's top export products during the Soviet era and continuing through to the present have been aluminum and cotton, both of which have been officially and de facto subsidized and emphasized by the national government, and both of which draw on the country's natural resource base (Densiova et al.,

2013; Coulibaly, 2012). Figure 3 depicts top export products from Tajikistan in 2010 as a percentage of the total value of exports, and shows the relative economic value of raw material (aluminum) over agricultural exports. In 2012, exports from Tajikistan totaled around \$1.359 billion (USD) in 2012 and the top exports continued to be aluminum and cotton, with fruits, vegetable oil and textiles also important (CIA, 2014). In addition, electricity claims a small share of the export sector, but shows room for growth if cooperative agreements about water and energy resource management can be worked out in the region.

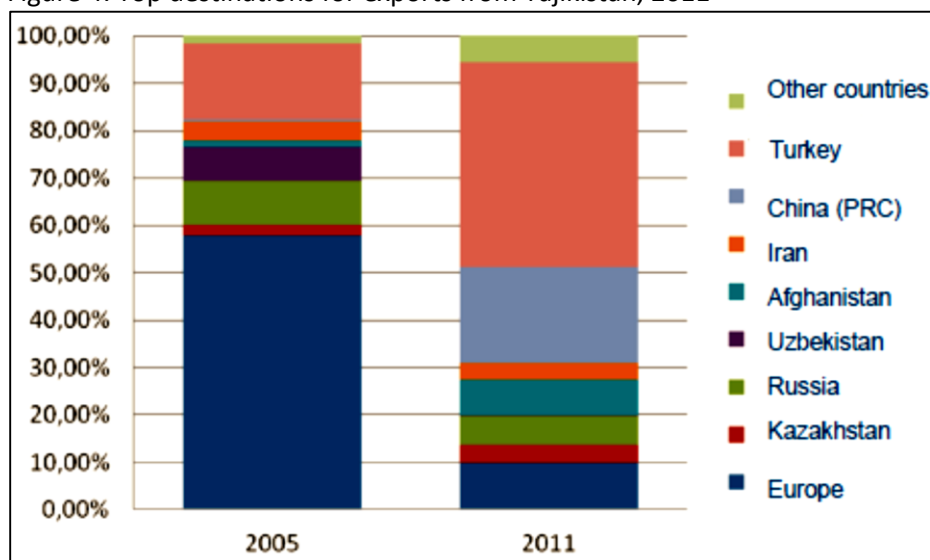
Figure 3. Top export products for Tajikistan, 2010



Data and figure from EDB, 2013

Figure 4 depicts the primary export destinations for products from Tajikistan: Turkey, Russia, Iran, Afghanistan and China. Turkey and Tajikistan have maintained positive and functional relations since Tajikistani independence in 1991, and Turkey was the first non-former Soviet Union country to open an embassy in Tajikistan following independence (Curtis, 1996). Over the past ten years, Turkey has surpassed any other regional or global trading partner for exports from Tajikistan (EDB, 2013). Trade with Tajikistan's immediate neighbors has been hindered by the conflict in Afghanistan, and regional tensions between Tajikistan and Uzbekistan, especially with regards to water and energy resources (Makhmedov et al., 2012). China remains a key trading partner, and there is the potential for export growth to Russia if products (especially agricultural products) can meet increased quality standards set by the new and expanding Customs Union.

Figure 4. Top destinations for exports from Tajikistan, 2011



Data and figure from EDB, 2013

Export growth has been hindered by infrastructure and resource challenges as well as geopolitical issues. Tajikistan is one of the most landlocked countries in the world (the closest port is 3100 km away), and so must rely on regional trade for economic growth. Additionally, road and rail infrastructure is sparse (see Figure 5) and international routes are often hampered by uncertain political relationships. For example, due to tension between Tajikistan and its neighbor, Uzbekistan closed one of the rail lines into Tajikistan in late 2011, hindering the transit of goods to and from the southern part (Khatlon Province) of the country (CIA, 2014). Food and fuel prices in 2011 also increased to the highest levels seen since 2002, due in part to an increase in rail transport tariffs through Uzbekistan.

Figure 5. Road and rail infrastructure in Tajikistan



Data from DIVA-GIS (2014) and authors' representation

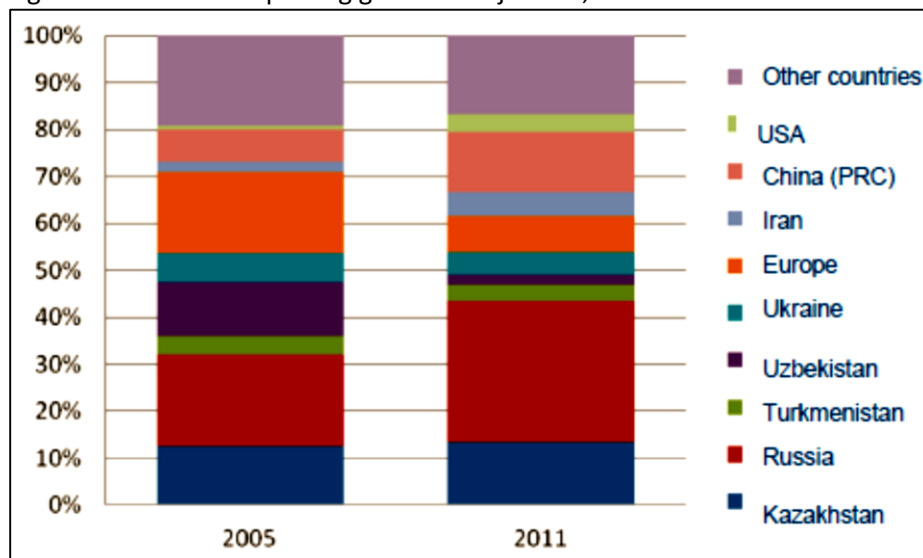
Given the challenging natural, political and social environment that currently exists in Tajikistan, Coulibaly (2012) summarizes the economic analysis of many observers of the country: there is a need for a “parsimonious export diversification strategy” that makes the best use of scarce resources. As will be discussed in the section on agricultural production below, much of the comparative advantage identified for Tajikistan’s export growth comes from high-value agricultural crops that can more efficiently use the country’s dwindling water resources. In addition, Densiova et al. (2013) suggested that the industrial history and infrastructure in the country could support the growth of manufacturing of low-tech industrial goods like building materials and textiles, as well as small equipment, like refrigeration, that could be sold both domestically and regionally. One benefit to joining the Single Economic Space proposed by Russia, Belarus and Kazakhstan would be the encouragement of regional investments in manufacturing in Tajikistan. There are currently several Kazakh enterprises investing in agricultural services and processing in Tajikistan, as well as large-scale industrial (non-mining) investments by China, Iran, the United States and South Korea (EDB, 2013).

### *Imports*

According to the World Trade Organization, the value of imports to Tajikistan was more than twice the value of exports in 2012 (WTO, 2014). Key imports over the past several years include petroleum products (10% of the overall value of imports), grain, which is primarily wheat for flour (6%), and equipment and machinery (5%) (EDB, 2013; Tajstat, 2012). In addition, the demand for processed foodstuffs and animal products (due to increased household incomes from remittances) has increased the import of these products (World Bank, 2014b). The realities and potentials for developing various agricultural value chains and the possibility of moving away from food imports will be discussed in the agricultural systems section below. There is interest in moving toward a more balanced terms of trade in Tajikistan, and this is likely to happen more from increased exports than decreased imports, given the country’s natural resource base that limits food production and the generation of petroleum products (EDB, 2013).

The primary countries from which imported products originated were Russia, Kazakhstan, China, Lithuania and Kyrgyzstan. Figure 6 shows primary trade partners and changes in those relationships over the past ten years. Imports from Russia and China have grown substantially, following the economic growth of those economies’ share of global trade, while imports from Europe and Uzbekistan have fallen. The latter is likely due to increased tensions with Uzbekistan over water, energy and customs regulations. Analyses of the Single Economic Space proposed by Russia, Belarus and Kazakhstan suggest that Tajikistan would not benefit greatly in terms of import potential with accession to the economic union. However, the harmonization of banking and investment infrastructure and regulations could help to ‘import’ regional investments, as overviewed above (Densiova et al., 2013; EDB, 2013).

Figure 6. Countries exporting goods to Tajikistan, 2005 and 2011



Data and figure from EDB, 2013

## Agricultural Systems

### *Agricultural production systems*

Agriculture in Tajikistan has gone through major transitions since independence from the former Soviet Union. Although some heavy industry was moved to the region during the Second World War, Moscow mainly dedicated the Tajik Soviet Socialist Republic to growing cotton, which it had been doing since coming under Russian control in the late 1800s (USAID, Feed the Future Initiative, 2012). Throughout the first part of the 20<sup>th</sup> century, people were relocated to Tajikistan from other parts of the Soviet Union, and a vast irrigation network in the two main river valleys of Tajikistan was set up to increase yield and output of cotton. In the 1980s the Tajik SSR boasted some of the world's highest-yielding cotton, which was noted also for its very high quality. Tajikistan became so specialized that it grew almost nothing else, including food, thereby setting the stage for later food shortages during the civil war and leaving food insecurity as one of the most pressing challenges facing the country today. Much of the infrastructure that survived the Soviet collapse was devastated during the civil war (UNDP, 2012).

Total agricultural area, which includes annual field and horticultural crops, permanent (tree) crops, and pasture lands, comprises just over one third of Tajikistan's total area (Table 4 provides descriptive statistics for land resources). This is due to both the high elevation of much of the east of the country and the need for water control for both flooding and irrigation in order to grow many types of field crops. When permanent crops and permanent pasture lands are removed, the arable land area is reduced to just 6% of the country's total area. Agricultural land and arable land areas have both increased slightly over the past ten years, largely due to repairs and expansions of the irrigation infrastructure (Table 4). The World Bank (2014b) estimates, however, that only two thirds of the land equipped for irrigation is in use because of the remaining poor infrastructure, further decreasing the amount of arable land in the country. Because of the necessity for irrigation and the relatively slow increase in irrigation infrastructure, agricultural efficiency and economic returns to agriculture have decreased over the past ten years. As agriculture has become a less viable economic option, Rowe (2010) estimates a decrease in the number of individuals and households that depend on agriculture for their livelihoods from 2000 to 2010.

Table 4. Agricultural land resources in Tajikistan

Area (1000 ha)	Year									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Country area	14255	14255	14255	14255	14255	14255	14255	14255	14255	14255
Agricultural area <sup>1</sup>	4571	4596	4650	4672	4735	4729	4727	4750	4844	4855
Arable land <sup>2</sup>	781	782	778	757	737	746	741	742	839	850
Total land equipped for irrigation <sup>3</sup>	719	720	725	728	730	735	740	742	742	742

Data from FAOSTAT (2014)

<sup>1</sup> Agricultural area includes arable land, permanent crops, and permanent pastures<sup>2</sup> Arable land includes temporary (annual) crops and kitchen gardens, temporary (less than five years)<sup>3</sup> Land equipped for irrigation includes all areas that can be fully or partially irrigated

Land reform has been a key goal for Tajikistan throughout the independence period, and there has been a fitful transition away from various types of quasi-state run and large-scale landlord-tenant arrangements, toward the assurance of private land rights and the creation of a genuine market for agricultural land. The main transition has been away from collectivized agricultural production and toward *dekhan* ('peasant') farms, land rights to which are held by individuals or groups of individuals in a private ownership arrangement (Table 5 shows the change in absolute numbers of dekhan farms over the past several years, as well as the gender breakdown of ownership). Lerman (2012) describes the four types of production systems currently operated in Tajikistan: household plots, individual and family dekhan farms, collective dekhan farms, and agricultural enterprises. The goal of land reform efforts over the past five to eight years has been to continue to identify collective dekhan farms and agricultural enterprises that are holdovers from the Soviet era and to facilitate their division into individual and family-held farms. As of 2012, the Government of Tajikistan reported that 65% of arable land is now under production as individual and family-held dekhan farms and household plots. The average size of these farms is 1 to 5 ha for dekhan farms and 0.3 ha for household plots (Lerman, 2012). The goals of continued land reform include the creation of a market for land acquisition, the establishment of clear property rights to encourage investments in efficient production, and increased income and nutritional standards for households in rural areas (USAID, Feed the Future Initiative, 2012; Lerman, 2012).

Table 5. Changes in organization of production systems in Tajikistan, 2008-2012

	Year				
	2008	2009	2010	2011	2012
<b>Number of dekhan farms</b>					
	30,842	37,958	51,372	58,313	73,806
<b>Proportion (%) headed by:</b>					
Men	87.7	88.0	89.4	89.7	92.2
Women	12.3	11.2	10.6	10.3	7.8

Data from Tajstat (2012)

Along with land reform and liberalization has come the diversification of agricultural production systems. This diversification is designed to promote food security and increased exports. World Bank (2014b) estimates suggest that 93% of agricultural produce is grown on household and family dekhan farms, while cotton continues to be grown mostly on collective farms and agricultural enterprises (see



also Boboyorov, 2012). Production of wheat, long grown in household plots for home consumption, has increased slightly but continues to be a crop for which Tajikistan does not have a comparative advantage (USAID, Feed the Future Initiative, 2012). Market opportunities for key crops and livestock will be discussed below, but it is important to note the fluctuations in cotton production are due largely to the uncertain irrigation infrastructure and financial realities of the domestic cotton market. However, Feed the Future (USAID, Feed the Future Initiative, 2012) notes that agricultural diversification has actually encouraged increased efficiencies for those farms that choose to continue with cotton. Wheat and potatoes, though economically less efficient to produce than to import, continue to be important in household plot production for household food security (USAID, Feed the Future Initiative, 2012). Stone fruit production continues to increase, as does all types of livestock production. Table 6 provides figures for the production of major agricultural products.

Table 6. Agricultural production of crops and livestock in Tajikistan, 2002-2012

	<b>Year</b>				
	2008	2009	2010	2011	2012
<b>Field crop area (ha)</b>					
Wheat	331766	358766	342566	311179	344000
Cotton	237130	168916	162428	204110	200000
Barley	64829	57894	69420	71334	68000
Forage	45000	45000	45000	45000	46000
Potatoes	28676	29838	31764	36720	41700
Rice	10261	14599	14854	13212	13000
Maize	14516	14411	12534	12776	12300
<b>Horticulture crop area (ha)</b>					
Watermelons	11570	19313	20951	17200	18400
Onions	12200	13600	14499	15595	16000
Tomatoes	11300	12000	11778	11799	12000
<b>Tree crop area (ha)</b>					
Apples	38000	37000	38000	40000	53200
Grapes	31944	31460	37134	36508	36000
Apricots	10000	9800	10000	10500	14000
Peaches/nectarines	10000	10000	10200	10500	14000
Plums/sloes	7000	7300	7400	7500	10000
<b>Livestock (head)</b>					
Sheep	2579	2617	2729	2288	2960
Goats	1568	1583	1666	1715	1773
Milk cows	933	952	985	1033	1049
Beef cattle	866	878	912	978	995

Data from FAOSTAT (2014) (for crops) and Tajstat (2012) (for livestock)

Greenhouse vegetable production is a specific innovation in the agricultural production systems in Tajikistan that has been emphasized over the past few years by several major development projects and funders. Greenhouse vegetable production can help conserve soil and water, increase economic growth through extended season and winter production, and can provide new employment opportunities in the agricultural sector based on the expertise required to construct and maintain the greenhouse structures and planting systems (Puette, 2013). Major horticultural crops currently grown in greenhouses in Tajikistan include tomato, cucumber, eggplant, bell pepper and cabbage (Puette, 2013). Greenhouses currently in use in northern, eastern and southern Tajikistan all rely on solar heat, as natural gas is not

readily available for heating purposes. Designs range from small, moveable tunnel greenhouses that cost around US\$1,000 to old and decaying glass-paneled structures left from Soviet farms, to major earthen structures often referred to as Chinese greenhouses, which cost upward of US\$15,000 (MicroFinance Centre, 2011; Puette, 2013). The upfront investment cost is often a major stumbling block to the development of greenhouse production systems by individuals, and several projects have focused on providing finance and matching funds for construction. The Productive Agriculture Project (USAID and ACDI/VOCA) have provided funding for rebuilding and updating already existing greenhouses, while the Aga Khan Foundation has invested in the construction of a modified greenhouse design that is permanent and makes maximum use of passive solar heat (ACDI/VOCA, 2014; Amirbekov, 2014). Additional investments in cold storage and transportation will also be needed to further develop the fresh vegetable value chains that can be expanded through the use of extended season greenhouse production (MicroFinance Centre, 2011).

The potential for and current use of greenhouse vegetable production is greatest in the northern areas of the country and in the Khatlon Province. In the latter, greenhouse tomatoes are a common crop, with much of the production used for canning purposes. Projects to support greenhouse vegetable production in Khatlon Province are currently being funded by CESVI (an Italian NGO), Save the Children, and Oxfam. However, although Khatlon Province is the country's single largest in terms of agricultural production, much of that production is dominated by cotton. The continued emphasis on cotton means that less land is devoted to food crops that could contribute to local food security and increased nutritional outcomes. As a result, Khatlon Province has the highest rates of undernutrition in Tajikistan and is the poorest region of the country (USAID, Feed the Future Initiative, 2011; UNDP, 2010). The relatively mild climate, access to water resources, and proximity to the capital of Dushanbe mean that Khatlon Province could increase and diversify its agricultural production in order to increase nutrition and economic outcomes. In addition, the recent push to further liberalize land holdings in the country as a whole provides opportunities for farmers to take control of their production (Lerman, 2012). These realities and the potential for agricultural development in the region have led to USAID-Tajikistan identifying Khatlon Province as a strategic region of focus under the USAID Feed the Future initiative.

### *Agricultural economic sector*

Agriculture continues to contribute to economic stability in growth in Tajikistan, accounting for roughly 20% of GDP each year and comprising 45-66% of the labor market (World Bank, 2014b; EDB, 2013). As overviewed above, there have been moves to liberalize land markets, repair and expand irrigation infrastructure, and identify opportunities for diversification and economic growth in the agricultural sector. Several agricultural value chains have been identified and targeted as having the potential for both domestic trade and export growth. Within Tajikistan, the continued role that remittances play in boosting GDP and household incomes means that domestic demand for high quality produce and livestock products continues to increase. Feed the Future (USAID, Feed the Future Initiative, 2012) recognizes this demand and is working with farmers to identify sustainable and efficient livestock feed options, given the inefficiencies in certain grain crops like wheat as livestock feed.

Internationally, economic growth in Russia and continued interest in economic integration through a Customs Union means that Tajikistan has the opportunity to increase agricultural exports if it can identify key demands. Figure 7 provides a market analysis of the potential export and domestic demand for fresh fruit and vegetables from Tajikistan. In terms of product demand, the World Bank (2014b) identifies stone fruit, both fresh and dried, and onions, fresh and dried, as products and value chains that can be expanded for export to Russia and Turkey. Feed the Future (USAID, Feed the Future

Initiative, 2012) adds tomatoes, cucumbers, early potatoes and cabbage as well. These and other vegetable crops could easily be cultivated in extended and winter season greenhouses, in order to capture higher prices for off-season produce both domestically and across the region. Value chains could be further developed if processing facilities for juice and wine are repaired or established, in order to create higher value-added fruit products (Shtalovna, 2013). An additional challenge to establishing and expanding international export markets will be the ease with which trade occurs between Tajikistan and specific partners. For example, export of food products will be increasingly difficult as countries like Russia adopt food safety standards and harmonize regional trade tariffs that prioritize economic integration (Coulibaly, 2012). These value chain opportunities and the challenges associated with them provide an entry point for identifying labor market and skills needs for employment in agriculture, and will be discussed in detail in following sections.

Figure 7. Potential export and domestic demand fruit and vegetable production from Tajikistan

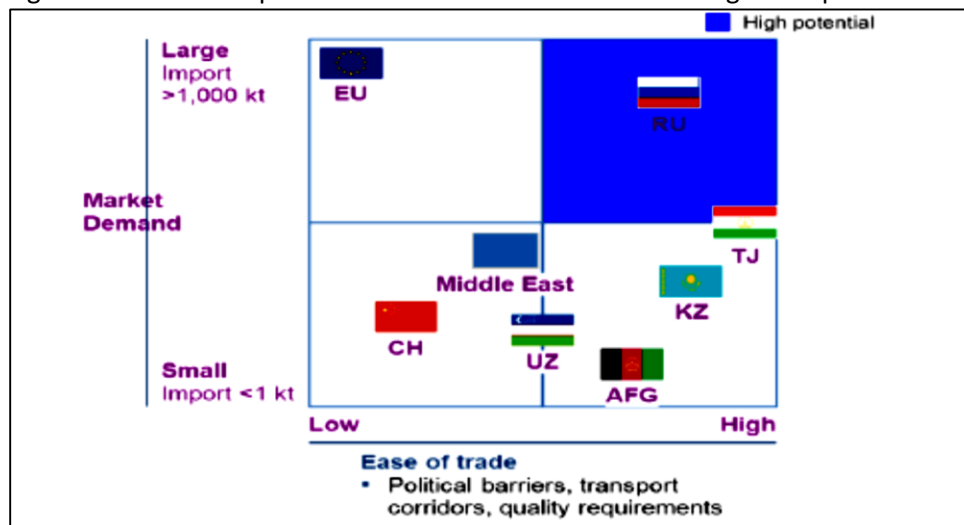


Figure from USAID, Feed the Future Initiative, 2012

In addition to identifying agricultural value chains with the potential for export expansion, it is important to note those value chains that will not be economically and environmentally viable for expansion in Tajikistan. As touched upon above, the case for efficiency in cotton is complicated by land reform and access to financial resources. However, those farms continuing to grow cotton are increasingly efficient and economically successful. The long-term viability of the cotton value chain will continue to be tied to the maintenance of irrigation infrastructure, and must be considered in the context of scarce water resources and the need to produce food crops for home and domestic consumption (Feed the Future, 2012). Not all field crop value chains are viable for Tajikistan, however. Grain imports will continue to be necessary, as wheat accounts for 60% of the average diet in Tajikistan, but wheat production is not scalable or as efficient in Tajikistan as it is in other countries in the region (USAID, Feed the Future Initiative, 2012). Other value chains analyzed by the USAID Productive Agriculture Project as potential growth areas include potatoes, milk and meat. The former simply has no export advantage, and so will not be the focus of export-oriented value chain development. Milk and meat, however, are products that are currently imported to meet domestic needs and demand, given the limited pasture area in Tajikistan and the lack of cold chains in rural areas (USAID, Feed the Future Initiative, 2012). Identifying the current limitations to the development of specific value chains can also provide information on potential growth areas for the agricultural sector and for employment opportunities within it.

In addition to impacts on national GDP that agricultural exports and imports have, the agricultural sector also provides employment for between half and two-thirds of the workforce in Tajikistan. Agricultural employment in the formal sector includes ownership and management on an individual or collective dekhan farm, wage labor (primarily in cotton), work in the transport and processing sectors, and increasingly (as will be discussed below) work in various private and public extension services. However, much of the employment in agriculture is informal, working in household plots and on individual and family farms as seasonal help (UNDP, 2010). The informal agricultural sector is increasingly female, as men migrate to Russia for work but retain ownership and control over land and what is planted on it. Women's employment in agriculture has steadily increased over the past several years, and as of 2012, there were equal numbers of men and women working in agriculture (Tajstat, 2012). However, as shown in Table 5 above, the proportion of women managing dekhan farms continues to decrease. As the agricultural sector grows and turns its focus to developing modern value chains, employment in the formal agricultural sector will increasingly require technical skills and secondary or post-secondary education. In combination with women's decreasing educational attainment over the past 20 years, suggests that special efforts will have to be made to ensure that women have access to the training they need to participate in the agricultural sector. This is just one example of the need to connect efforts toward labor market modernization with educational and training institutions. In order to understand the potential opportunities for building capacity in AET that can in turn support workforce development and economic growth, the following section focuses on the current state of education and AET in Tajikistan.

## Supply side for education

The educational system in Tajikistan during the Soviet era reflected the orientation toward central planning for all public activities. Educational institutions and the curricula they offered were highly specialized and tied to the specific occupations identified by state officials as necessary to manage and maintain economic and political growth. Specialization was especially dominant in agricultural education and training, since agricultural production occurred almost entirely on collective, state-run farms. The scale of these farms required that any single individual contribute specialized knowledge of one small part of the whole production system (Miller et al., 2000). Since its independence in 1991, Tajikistan has seen few changes from the Soviet education system, especially in the agricultural education and training sector. Given that the majority of the population of Tajikistan is under the age of 30 (Table 1) and that land reform has significantly decreased the presence of collective farms (Table 5), educational reforms are key to supporting economic and employment growth for youth and young adults in the agricultural sector. Currently there are several international organizations supporting the government of Tajikistan in reforming and improving the educational system in general and, in particular, the agricultural education and training (AET) system (World Bank, 2014b; UNICEF, 2013; UNDP, 2012).

### *Structure of education*

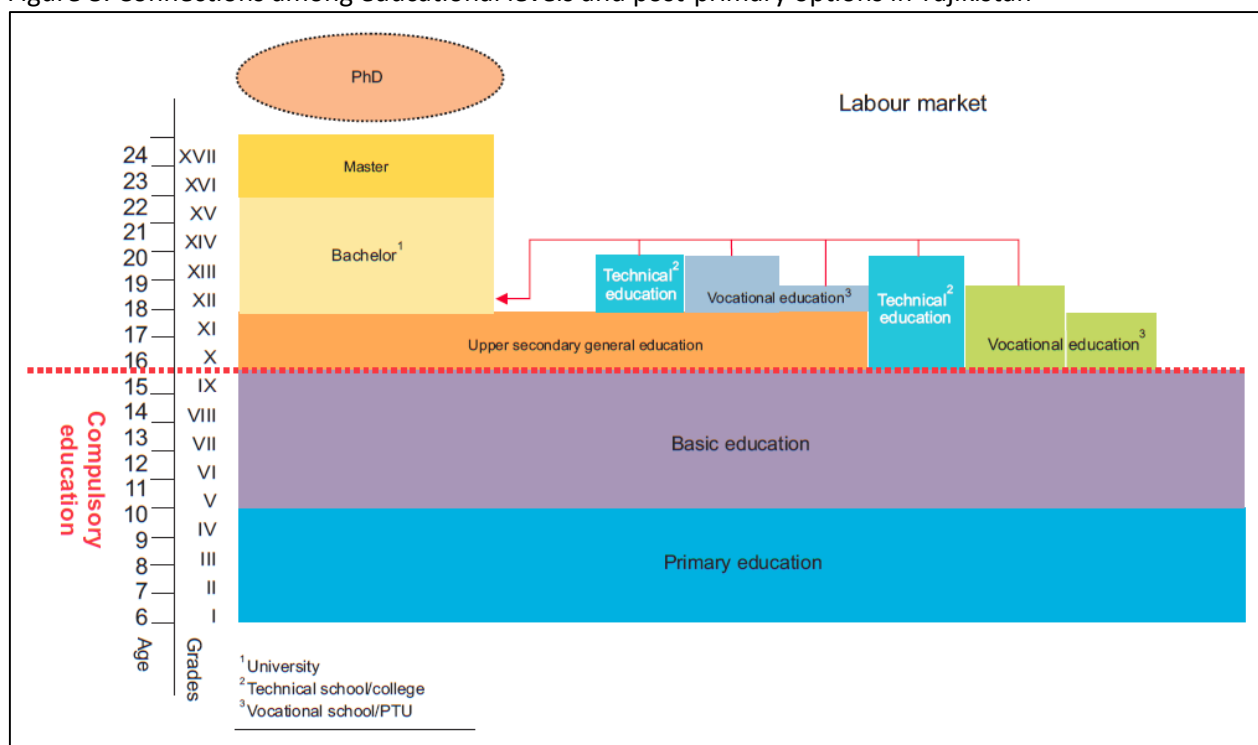
Tajikistan's education sector is comprised of several levels and options for its students. Initially, students can attend pre-schools, although this is not very common. Primary education spans grades 1-4 (ages 7-10) and is mandated, along with the lower level of secondary education. Lower secondary education, also known as basic education, is grades 5-9 (ages 11-15). Upon completion of basic education and receipt of an "incomplete secondary education" certificate, students have various options. They can complete the "secondary education" block by finishing upper secondary education (grades 10-11, ages 16-17) and earning a certificate of "complete secondary education." Only upon completion of (a minimum of) 11 grades of schooling, with whatever combination of the above listed options, can a student enroll in post-secondary higher education. Students can enroll in a junior specialist school (2

years) as an option of higher education. Four-year bachelor degrees can follow secondary education, initial vocational education, or either type of technical education. Two-year Master degrees can be pursued after completion of a bachelor degree and a PhD can be pursued upon completion of a master degree (Kuddusov, 2010).

Another option upon completion of basic education, or upon completion of upper secondary education, is vocational schooling (also known as PTUs – a Russian abbreviation for professional technical schools). Students can receive a certificate of “vocational qualification” after 1, 2, or 3 years of vocational education. Additionally, technical colleges are an option for students after completion of basic education or upon completion of upper secondary education. Technical colleges (commonly called as Tehnikum) are also known as specialist secondary schools and completion of such results in a certificate of “secondary professional education.” Students can enroll in basic technical education from grades 10-13 or from grades 12-13 after completing secondary education. They can also be enrolled in technical colleges after completing basic vocational education (grades 13-14).

Recent changes in the education system increased compulsory education from 9 years (primary + lower secondary) to 10 years and upcoming changes will add an additional year of general education, totaling 12 years through primary and secondary education, to be finalized in 2016 (IMF, 2011). Figure 8 below shows the connections among different levels of education in Tajikistan, as reflective of the current National Strategy on Education Development (GOTJ, 2012). Within the government of Tajikistan, the Ministry of Education sets curricular and degree standards, and manages the licensing of institutions and educators for primary, secondary and higher educational institutions (EC, 2012). In addition, the Ministry for Labor and Social Protection also manages some aspects of vocational and adult education and training (Kuddosov, 2010).

Figure 8. Connections among educational levels and post-primary options in Tajikistan



From Faudel et al. 2006

### *History of education*

As one of the several countries to suffer financial difficulties upon break-up of the former Soviet Union, Tajikistan had drastic cuts in funding for the social sector services, including education, in the early 1990s. Civil war in the country from 1992-97 meant the disruption of funding and state services, which continued into the early 2000s, as the government did not have control over all areas of the country for several years after the war ended (UNICEF, 2013). As a result of unrest and lack of investment, educational indicators like enrollment in primary school and literacy rates dropped substantially throughout the 1990s and early 2000s (Baskakova, 2007). Today, Tajikistan is one of the few countries in the world where literacy rates are higher for those over the age of 40 than for the population of people aged 20 to 30. Investment in education from both the government of Tajikistan and international donors has increased over the past five years, however, with strong emphasis on connecting the supply side of education to demands in the labor market (GOTJ, 2012; Baskakova, 2007).

One important theme in the evolution of the educational sector over the past two decades in Tajikistan is a gradual shift toward conservatism in social spheres, which influences perceptions of the role that education should play in civil society. De Young (2012) and others (UNICEF, 2013; Baskakova, 2007) highlight the relationship between increasing social conservatism during and after the civil war, as a result of renewed emphasis on the history and orientation of Islam in Tajikistan, and the resultant pedagogical and enrollment shifts in general and secondary education. The Soviet emphasis on gender equality in education and professional attainment slowly shifted toward more traditional gender roles that expect women to serve primarily as homemakers and wives, which has had the effect of dramatically decreasing the number of women receiving education at all levels. At the same time, economic migration of large numbers of men to Russia have increasingly created households that are de facto headed by women, who must then engage in various informal and formal employment options (UNDP, 2010). Low educational levels limit women's ability to earn steady and decent wages, and the government of Tajikistan has identified gender equality in education and employment as key priorities in educational reform (GOTJ, 2006).

### *Challenges in education*

The International Monetary Fund (2011) addresses several challenges to the Tajik education system in its 2010 progress report of the 2010-2012 Poverty Reduction Strategy for Tajikistan. Some of the issues that the IMF discusses in its report include:

- Low quality education, despite increased investments in the education system
- Lack of up-to-date curricula and student assessment methods
- Poor education management system and capacity
- Low quality teaching due to low salary levels of general education teachers
- Insufficient enrollment of girls to schools
- Inadequate funding and resources for up-to-date scientific and technical equipment and laboratories
- Crumbling infrastructure, especially during times of conflict (it is estimated that 20% of schools were destroyed during the civil war)

While progress has been made through strategic government planning and policy reforms, there still remain many concerns for Tajikistan's education system. UNICEF (2013) identifies specific supply-side barriers to educational attainment, including poor conditions of and access to educational facilities, the quality and applicability of curricula, and political and capacity issues in making decisions about



educational reform. Infrastructure issues that resulted from civil war and disorder for the first decade of independence continue to present the most immediate challenge to improving the state of the general primary educational system. These concerns then link to the longer-term challenge of how to reform both curricula and educational institutions to ensure that graduates at all levels have the skills and knowledge to further contribute to civil society development and economic growth (Huttova et al., 2002).

In 2007, it was noted that only 30% of students in general education schools had access to textbooks, many of which were from Soviet times (Baskakova, 2007). Lack of adequate teachers is also of major concern, with an estimated 13,000 extra teachers needed to educate the country's children adequately (Tajikistan, 2006). Student drop-out rates are an area of concern, especially for girls, as up to 25% of students drop out after 9<sup>th</sup> grade for various economic or academic reasons (USAID, 2014). In addition, the World Bank (2014b) has noted that even for students who are willing and able to remain in school through the end of secondary training, admittance to higher education has in the past been based largely on patronage and economic means, limiting the number of students that continue on to post-secondary education. Some of these students move into the vocational educational system, but over the past decade vocational institutions have been utilized more as a social safety net than as a means to gain skills and stable employment (Faudel et al., 2006).

### *Vocational education*

Vocational education in Tajikistan, as an optional extension of the general education system, has the potential to play a significant role in industrial and agricultural economic development. However, the vocational education system has faced many difficulties in the overall education system reform effort. There has been discussion since the nation's National Development Strategy in 2005 (GOTJ, 2006) to provide pedagogical and technical training, sourced from higher education institutions, to teachers and supervisors of the vocational and technical education system. The updated National Strategy of Education Development (GOTJ, 2012) focuses on developing the vocational education system to better meet the needs of the labor market. However, to-date, the vocational education and training system remains under-funded and disconnected from employment opportunities in the country (Wallenborn, 2009; Faudel et al., 2006).

### *Challenges in Vocational Education*

The Ministry of Education in the Republic of Tajikistan (GOTJ, 2012) outlines the following as some of the concerns for both basic vocational and secondary vocational education sectors within the national education system:

- Acute shortage of industrial training specialists and qualified teachers
- Lack of methodical literature and equipment
- Poor system to attract private sector investments in vocational education and staff training
- Physically and pedagogically obsolete training and production facilities
- Lack of educational resources in the state language
- Minimal uniformity in occupational training plans

In short, many of the challenges faced by the vocational education and training system mirror those throughout the education system in Tajikistan. Capacity and quality of vocational education institutions remain well below potential demand. Between 2005 and 2010, an average of 148,000 students graduated from basic education schools (lower secondary) and 82,000 graduated from (upper) secondary schools each year. The Basic Vocational Education (BVE) schools comprised 66 institutions

and could enroll about 14,000 students annually whereas Secondary Vocational Education (SVE) could enroll around 12,000 students annually and higher vocational education could enroll about 31,000 students. The Government calculates that this leaves approximately 90,000 youth (about 2/3 the graduates of basic and secondary schools), each year, without access to vocational education of all levels. Within the concern for increased access to vocational schools, there exists the concern of gender equality, as there are 2.4 times more men than women with vocational education experience (GOTJ, 2012).

Vocational education and training faces some unique challenges in addition to those shared across the educational system in Tajikistan. One issue concerns the inability of many citizens to see the relevance of education due to its poor connections with the job market. In order to overcome this challenge, sound analysis of the labor market should be conducted in order to improve and introduce appropriate vocational training programs (UNICEF, 2013). Both because of the lack of domestic jobs and the perception of higher wages in Russia, as well as the recent history of economic migration, many students in vocational education and training do not intend to enter the workforce of Tajikistan. This creates further disconnects between vocational education and economic growth for the country. Kuddosov (2010) makes the argument that the vocational education and training system could be used to certify migrants' skills learned abroad, which could incentivize the return home and increase the base of skilled workers in Tajikistan. Faudel et al. (2006) also note that the structure of the current educational system in Tajikistan isolates vocational education and training, because a vocational certificate obtained without a complete, general secondary education certificate means that a student cannot move on to post-secondary education. Without complementarity and integration across educational attainment types and levels, vocational education will likely remain unattractive to many students. Reforms that include the establishment of a National Assessment System in education have the potential to help integrate all types of educational attainment by providing common metrics for skill assessment and knowledge base (World Bank, 2014b).

### *Higher education*

According to the World Bank (2014c), about 20% of tertiary-aged Tajiks (ISCED 5 and 6) are enrolled in higher education. There has been a steady increase of enrollment, despite low GDP, since the nation's independence in 1991. Currently, there exist around 30 institutions of higher education in Tajikistan, a dramatic increase from 13 in 1991 (EC, 2012; UNDP, 2010). Higher education institutions are primarily broken down into the following categories: universities, academies, and institutes. Degree levels at these institutions comprise the Bachelor degree (minimum 4 years), Master degree (minimum 2 years), and specialist degree (minimum 5 years). Of the three types of institutions, universities and academies offer all three types of degrees whereas institutes only offer Bachelor and specialist degrees (EC, 2012). In addition, there has been a recent increased emphasis by the government on private business schools that would be available to those with secondary or post-secondary education (GOTJ, 2006). Emphasis on agriculture is severely lacking in higher education, and in 2012, the government of Tajikistan estimated that only 3% of students enrolled in higher education were in agrarian specialties (GOTJ, 2012).

### *Challenges in higher education*

The European Commission report (EC, 2012) on higher education institutions in Tajikistan states the following core challenges for the higher education system:

- Training of teaching and academic staff – lack of qualified professionals and low staff turnover leading to outdated curricula and pedagogy

- Graduates of international scholarship programs are not attracted to the poor social conditions of higher education employers and thus move into the private sector or international organizations
- Need to develop legislation in response to current economic status
- Coordinate, systemize, and update study materials and curricula
- Poor university governance and corruption
- Poor international relations and few bilateral agreements for exchange programs

In addition to these challenges, higher education in Tajikistan faces the added challenge of making degrees and certificates relevant in the labor market and for employment opportunities. Current labor market demands will be discussed below, but it is important to note that both the government of Tajikistan and international donors have identified the need to modernize curricula and better integrate the private sector into the development of educational programming and standards, in order to strengthen the relevance of higher education degrees in the labor market. The main priority is to encourage the private sector to participate in educational standards setting (EC, 2012; GOTJ, 2012). In addition, increased data collection about labor market demand for skills and occupations would further support the government in setting appropriate curricular standards (Bjarnason et al., 2012).

### *AET in Tajikistan*

Considering somewhere between one half and two thirds of the population is engaged in agriculture, and that agriculture is the only sector experiencing employment growth (EDB, 2013), AET is of vital importance in Tajikistan. However, within the Tajikistan National Development Strategy (GOTJ, 2006) and the National Strategy for Educational Development in the Republic of Tajikistan (GOTJ 2006; 2012), little to no reference is made to the need for agricultural training and education as a tool for strengthening the agricultural workforce. Regardless, evidence exists of a mildly diverse AET system that spans both academic and non-academic institutions. Within the general education system, technical colleges (specialized secondary schools) have seen a 10% enrollment increase between 1995 and 2004. According to Baskakova (2007), this is due to an increase in specialized agricultural education (technical agriculture colleges). However, other figures suggest that growth in enrollment in agricultural fields is less strong and consistent than in other fields, including education and health (UNDP, 2010).

### *History of AET*

Prior to the reformation of larger farms into many small or medium sized farms, the large farms in Tajikistan had specialists for each major area of work in agricultural processes (agronomists, hydro technicians, etc.) on the farm site. The AET system, therefore, reflected these specialties by graduating agricultural specialists of narrow fields in five year programs. Technical and vocational schools produced middle-level professionals that also reflected these specialized areas. After the land reforms that broke down the larger land units, however, individual farmers became responsible for almost all farm processes, eliminating the need for specialized agricultural graduates (Kazbekov and Qureshi, 2011). Graduates have declined from these institutions over the past several years: between 1998 and 2007, trained specialists in agriculture decreased by a factor of 1.3 in comparison to the total number of specialist graduates from higher education institutions (Kuddusov, 2010).

### *Challenges in AET*

USAID Feed the Future Initiative's multi-year strategy gives background on Tajikistan as containing the following concerns with regards to AET:

- Formerly state-supported farms are deteriorating (along with various other public services) due to lack of upkeep of infrastructure by new private owners
- Smaller, individualized farms have been developed from the larger farms of the Soviet era: formerly significant training of specialized farm occupations is now insignificant yet AET does not distribute the general farm management skills needed for the current market-oriented agriculture
- As a result of civil war times, rural youth and farm families have low access to quality general education and limited access to agricultural productivity information

Additionally, there exist several concerns for recruitment of youth into AET programs (Van Assche et al., 2013). Minimal interest in agriculture by various stakeholders (donors, government, civil society), combined with the deterioration of agricultural research institutes has resulted in low recruitment of students into AET programs. Students are also put-off by the perceived gridlock of fragmented agricultural land ownership and the difficulties in acquiring individual agricultural land. The Tajik Agricultural University is working to update curricula and programming, but changes take time and existing courses are not necessarily aligned with changing labor realities (Swanson et al., 2011). In addition, many young people feel that post-graduation job searching does not yield well-paying jobs in agriculture. Additionally, young men in agricultural universities are also said to attend only to avoid army service and not to actually gain an education in agriculture.

### Formal institutions in AET

Several formal institutions, both university and non-university, exist as centers for AET in Tajikistan. Appendix A includes a more in-depth description of the following targeted institutions with regards to history, mission, vision, graduates, academic programs, and other general information. Of the formal AET institutions, three types exist: public, teaching institutions; public, non-teaching institutions; and private, teaching institutions.

#### Public, teaching institutions

##### *Tajik Agrarian University*

The Tajik Agrarian University (also known as the Tajik Agrarian University named for Shirinsho Shotemur) is located in the nation's capital of Dushanbe. The University was established in 1931 and reorganized in 1934 to better represent the necessary specializations in agriculture. The student population is around 6,500 and there are 31 specialty areas within 9 faculties (departments) in the agricultural sciences (Yusupov, 2014). This institution is overseen by the Tajikistan Ministry of Education (MOE) and specializes in several fields of agriculture and specific trades. According to a 2004 USAID Workforce Assessment, the university maintains some connections with alumni (through an alumni association) to connect students to graduates and give feedback on market demands in agriculture (Yusupov, 2014).

##### *Bokhtar Agricultural College*

No background information on the Bokhtar Agricultural College was found in the review of literature.

#### Public, non-teaching institutions

##### *Tajik Academy of Agricultural Sciences (TAAS)*

This public, non-teaching institution was established in 1991 and focuses on research in several fields of agriculture, policy, and food security. Although no academic programs in agriculture are maintained in

this institution, it does serve as a vital resource to the Ministry of Agriculture for advisory services and consultation. TAAS maintains six national research institutes focused on: agriculture, horticulture, soil science, animal husbandry, veterinary science, and agricultural economics (ReSAKKS Asia, 2014). The Academy employs 1,114 individuals: 428 of these serving as their scientists. The institute serves as a research center for postgraduate studies, allowing students to complete their masters and doctoral theses (TAAS, 2013).

#### Private, teaching institutions

##### *Technological University of Tajikistan*

The Technological University of Tajikistan is a private, teaching based institution with a specific focus on food processing, textile production, ICT, and economics. It is supported and guided by the Ministries of Education and of the Power Engineering and Industry. There are two branches of the Technological University of Tajikistan, one in Kulab and one in Khujand. The university was founded in 1990 as the Higher Technological College and has since then changed its name first to Tajik Institute of Light and Food Industry and then to its current title of Technological University of Tajikistan. As of 2010, there were approximately 6,700 students enrolled and 170 full-time (plus 88 part time) academic instructors at the university (Nosirov, 2010).

#### Non-formal institutions and programs in AET

While Tajikistan has several ATE institutions associated with the government's education and agriculture ministries, there exist several non-formal institutions, both non-profit and private sector that are conducting AET programs. Many of these work in the area of providing agricultural extension and advisory services as a means of short-term and technical skills training and assistance. The Modernizing Extension and Advisory Services (MEAS) project, a USAID project focused on building capacity for pluralistic extension and advisory services, conducted a scoping visit to Tajikistan in fall 2011, and summarized findings on non-formal AET institutions in Swanson et al. (2011). The descriptions that follow are, unless otherwise noted, summaries drawn from the MEAS report.

##### *Non-profit: National Association of Dehkan Farms (NADF)*

Established by the Canadian International Development Agency (CIDA), NADF includes 109 Dehkan farms with 6,911 farm members. The organization supports two training centers for the farm leaders, one just 20 km south of Dushanbe and one 200 km north-east of Dushanbe. About 80% of courses are directly targeted to farmers and 20% are trainer preparation focused for farm leaders – both taught by hired faculty of the Agrarian University or researchers of the National Research Center. Course content includes: business plan development, horticulture crop production, livestock management, and strategic planning for *jamoats* (sub- districts). NADF also works aggressively in lobbying for dehkan farm independence in Tajikistan's legislation. According to NADF administration, the Government desires to improve the farms but is unwilling to invest in advisory services for the farmers (Swanson et al., 2011).

##### *Non-Profit: National Agricultural Training Center (NATC)*

The World Bank established NATC in 2002 as part of their Privatization Support Project. The program develops and offers agricultural extension courses in the field, ranging from the first 3-month course of "training the trainer" to recent and specialized GIS-GPS training for ICT technicians. NATC also trains NGO agriculturalists and provides them with training materials and modules for the farmers being served. NATC has 12 full time staff and hire consultants of specific agricultural fields for training courses who develop training and technical materials and documents (Swanson et al., 2011).

##### *Private, development firm: GIZ Germany*

Germany's contracted development agency, GIZ (Society for International Cooperation), is collaborating with Ministries of Agriculture and Ministries of Education in the Central Asian countries of Uzbekistan,

Kyrgyzstan, Tajikistan, Turkmenistan, and Kazakhstan to develop more efficient professional education and training for the agricultural and food processing industries. The objective of this project is to better connect the economic and ecological demands of the private sector with modern teaching methods of appropriate technologies for the industry. This ATE program focuses on capacity and competency development at educational institutions and is developing pilot degree courses, curriculum, training programs, and innovative teaching approaches to best meet labor needs of the region (GIZ, 2010).

#### *Non-Profit: UN International Food and Agricultural Development (IFAD) Beekeeping Program*

In 2010, an IFAD program provided 425 families were provided with bee hives and colonies. The facilities and supplies were split throughout various Tajik regions according to requests received from local governing bodies. Through an accompanying IFAD training program, 53 beekeepers were recertified in beekeeping with updated management procedures (IMF, 2011).

#### *Private, development bank: Asian Development Bank (ADB) supports TVET Programing*

Japan's Fund for Poverty Reduction and the Asian Development Bank have identified a need for investment in the Technical and Vocational Education and Training (TVET) programs in Tajikistan. The Japanese recently provided a \$700,000 grant to strengthen private sector participation in the TVET system. Aims of this project are to update methodology, infrastructure, and teaching quality. A Skills Training Fund is also being developed to give TVET access to more vulnerable groups (including women). Additionally, ADB is considering a \$20 million grant to further this project (ADB, 2014).

## Demand side for education

The demand side for education in Tajikistan comes primarily from the labor market and the goals of economic growth. In addition, there is demand from families and communities for education that can help keep young people from migrating by providing skills and training needed to find local employment (Baskakova, 2007). The current perception of the low quality of education in Tajikistan creates a barrier to increased demand for education. Other social realities that limit the demand for education include household poverty and low levels of parental education, regressive gender norms (as discussed above) that limit girls' enrollment in school, and the possibility for child labor rather than education (UNICEF, 2013). Demand for agricultural education is especially low from many families and communities that have experience difficulties over the past two decades in acquiring land and maintaining irrigation infrastructure. Perception of low returns on AET persist despite evidence a strong labor market demand for individuals trained in agricultural skills and occupations (EDB, 2013).

### *Labor market and employer needs*

The National Development Strategy of Tajikistan identifies a "three-part" labor market in the country: formal employment, informal employment, and labor migration (GOTJ, 2006). With faster population growth than economic development, the informal and migration sectors of the labor market likely contain more individuals than the formal employment sector, although lack of data about both migration and the informal sector make comparisons difficult. According to government statistics, as of 2007, over two-thirds of formal sector employment in Tajikistan was in the agricultural sector, with education being the next highest sector (at 8% of total employment) (Kuddosov, 2010). Assessments over the past ten years have identified the food and restaurant industry, as well as information and computer technology fields as potential growth areas for labor demand (UNDP, 2010; Ganzglass, 2004). Atamanov (2012) estimates that, with land reform and agrarian liberalization, agricultural employment is decreasing in rural areas and rural non-farm employment is increasing, reflecting an increased demand for skilled labor in construction, transport and education. However, the combined reality of a predominantly rural population and high levels of employment in agriculture mean that a focus on the agricultural labor market is key to any analysis of the overall demand for education.



The specific needs of the agricultural employment sector will be discussed below, but it is important to note that, in general, there is not a well-established system in Tajikistan for assessing the needs of the labor market and incorporating these demands into the educational system (GOTJ, 2012). The innovATE project will use the workforce development framework tested in other countries to assess demand in the agricultural labor market and support capacity development in the agricultural education sector in Tajikistan. This approach identifies occupational opportunities and skills demands in the agricultural sector, analyzes the appropriate level of education to acquire these skills, and finally connects these assessments to training and educational institutions and curriculum development (see Jones, 2013, for an overview).

### *Agricultural industry*

As overviewed in the agricultural economic sector section above, several agricultural value chains have been identified as key areas for economic development in Tajikistan. Currently, there is limited capacity in the agricultural industry for expanding fresh fruit and vegetable production, processing and export value chains. However, some investments in this industry are beginning. Opportunities therefore exist for skilled technicians in greenhouse production, cold chain management, food safety monitoring and regulation, food processing, and transportation. As agricultural diversification continues, there is also a demand for a reliable input supply chain, which includes everything from seed selection and production to the sale of agro-inputs and agricultural machinery. Skills needed for employment in these links in the value chain include both technical expertise, such as plant science and mechanics, and also include also 'soft' skills, like business management and ICT use (Boboyorov, 2012). Lerman (2012) identifies as well the need for private rural intermediaries in the agricultural sector, as agricultural production is increasingly intensified and scaled up. These occupations include machinery rental, wholesale and distribution of production, and the provision of agricultural advisory services.

At the farm level, there is an ongoing need for technical input (as has been extensively overviewed by Swanson et al., 2011), and there is consistent demand for trained extension agents from both public and private agricultural advisory services. Shtaltovna (2013) highlights the fact that many dekhan farms, even those that are family owned, are increasingly professionalized and oriented toward production agriculture. This implies that there will be an increase in the demand for pay-for-service advisory services. However, these farmers need a different type of extension input than that historically offered by the public extension and agricultural offices. There is therefore an emerging subsector in the agricultural industry of more flexible, specific and embedded agricultural advisory services (Swanson et al., 2011). This educational demand is currently not being met by the main higher education institutions, especially in terms of 'extension process' skills, which include community organizing, and the use of participatory techniques and other community-based assessment and learning approaches.

One focus of the scoping assessment will be to profile the current status of the agricultural production and related industries with particular attention paid to the needs for trained personnel. The assessment should examine both private and public sector entities, including value chain actors, micro/small/medium enterprises and agribusinesses, ministries of agriculture and education, research and extension institutions, farmer organizations, water user associations and NGOs. Projections on the future demand for trained personnel will be an important part of the assessment because there is a large demand for capital investment in processing, cold storage, and value chain development. The development of a trained work force to support the capital investment is vital for the future success of food sector investments.

### *Skills shortages and gaps*

As has been touched upon throughout this report, there are two major types of skills shortages and gaps that currently exist within the agricultural labor market. In terms of shortages, there is a lack of personnel trained in the types of agricultural production currently being pursued by increasing numbers of private dekhan farmers in Tajikistan. This agricultural model is focused more on horticultural products than on cotton, and is beginning to scale up into full value chains that include processing, marketing and export (FAO, 2012; IMF, 2011; USAID, Feed the Future Initiative, 2012). Farmers therefore need access to intermediaries and services that can support this agricultural production system, but there is currently a lack of trained personnel with business skills and technical training in horticultural production. There is also an increasing demand for agricultural advisory services from a range of types of farmers, and a lack of personnel with skills in extension processes like community organizing and adult education (Swanson et al., 2011).

In terms of gaps, there continues to be a mismatch between the highly specialized training received in higher education institutions and the demand for a broad range of hard and soft skills that are required to work in emerging agricultural value chains (Kazbekov and Qureshi, 2011). Faudel et al. (2006) describe the limitations of educational programs having an exact one-to-one correspondence with an occupation; specialization makes flexibility and innovation in the labor market difficult. There also exists a large gap between educational institutions and the agricultural employment sector, with little data and few feedback mechanisms for the demand side for education (the labor market) to influence the supply side for education (through curriculum and program development) (Bjarnason et al., 2012). The government of Tajikistan recognizes this gap and has consistently incorporated it into national development plans over the past decade (GOTJ, 2006; 2012).

## **Conclusion**

This background report has been prepared in advance of an innovATE team scoping visit to Tajikistan in fall 2014. In preparation for the scoping visit, documents and data that overview the current state of agricultural education and the agricultural economic sector are summarized here. In the final section, we highlight some examples of projects in the Central Asian region that could provide guidance for future work in building capacity in agricultural education in Tajikistan. We then draw from the agreed-upon Scope of Work and Terms of Reference between innovATE and the USAID/Tajikistan mission to highlight the next steps in the scoping process, and conclude with more general recommendations of ways forward for building capacity in agricultural education in Tajikistan.

### *Examples from the region*

Two key areas of emphasis for capacity building in agricultural education and the agricultural economic sector across the Central Asian region have been to build capacity of agricultural advisory and extension services, and to strengthen linkages between private enterprise, government agencies and educational institutions. Kyrgyzstan provides a useful case from which to learn for both of these areas of emphasis, as the country has consistently invested a higher proportion of domestic spending in developing educational institutions, including AET institutions (Bjarnason et al., 2012). One effect of this investment has been the development and staffing of a broad network of advisory service organizations and offices, including cooperative and privately funded services (FAO, 2012). The investment in the training of extension agents was motivated in part by demand from the private agro-input sector, which required a network of trainers and support services to encourage farmers to adopt new techniques and inputs (Kazbekov and Qureshi, 2011). Cormier (2010) argues that the model of market-oriented agriculture

(especially for horticultural products) that has emerged in Kyrgyzstan over the past ten years has largely been the result of relationships among farmers, international development agencies, and emerging private enterprise. However, the government of Tajikistan can learn from the successes here and be pro-active in supporting and strengthening these types of linkages by engaging private enterprise in curriculum and workforce training reforms.

A second example from the Central Asian region of capacity building in AET is the AgLinks and AgLinks Plus project. Though it covers several countries in the region, we focus here on AgLinks Uzbekistan, which was a strong farmer-to-farmer training and exchange program in conjunction with the University of California-Davis in the United States. The exchange program supports informal, technical training for farmers in specific techniques to improve the horticultural value chain (in this case, grape and tree fruit production). In addition, the AgLinks program brings together actors from across the value chain to discuss opportunities and gaps, and provides information that can support on-the-job training for new approaches to value chain development (USAID, 2012; DAI, 2010). The second phase of this program, AgLinks Plus, continues to identify 'choke points' between producers and buyers, and is focusing capacity building efforts on personnel and equipment that can strengthen these links in value chains (DAI, 2012a).

### *Next steps*

The following is excerpted from the innovATE team's Scope of Work for the scoping assessment, which will be conducted Oct. 10-25, 2014:

The innovATE team is expected to field a team of experienced agricultural education consultants in Tajikistan during the fall of 2014. The team will examine opportunities for improving the quality of AET in the target universities. The consultants will assess opportunities to improve degree programs in Tajikistan institutions of higher education that support the Tajik food and farming economy.

The work of the innovATE team will culminate in an in-depth evaluation of the public and private universities that provide AET in agricultural and related disciplines. The evaluation will meet the following objectives:

1. Perform a gap analysis of the agricultural education and training system in Tajikistan, specifically:
  - a. Identify the current supply of agriculture graduates from AET programs in pre-tertiary, tertiary and TVET institutions.
  - b. Identify the current and projected workforce and skill demand in Tajikistan's agricultural sector (food and farming systems).
2. Analyze the skills gap between current supply of AET students/graduates and skill demand in current/future workforce, especially in high value fruit and vegetable value chains map and define current stakeholders, including donor-funded programs focused on the AET-workforce development continuum.
3. Identify paths to leverage partnerships for AET capacity development (and so that efforts are not duplicated and muddled) through objective 2.
4. Identify and assess feasibility of scaling-up good/best AET practices for implementation in future AET capacity development.

During the scoping visit, the innovATE team will meet with relevant stakeholders in the agricultural education and economic development sectors, including:

- Meeting with the World Bank concerning their new program to improve the agricultural universities and extension in Tajikistan.
- Conducting field visits to Tajik Agrarian University, Bokhtar Agricultural College, Tajik Academy of Agricultural Sciences and Technological University of Tajikistan for interviews and focus groups with faculty, administrators and students.
- Meeting with stakeholders that serve farmers, producer groups, water user associations and NGOs.

Deliverables from the fall 2014 scoping trip will include a full country assessment of AET and the agricultural economic sector in Tajikistan, with recommendations and next steps for specific actions to build capacity in AET through curriculum reform and to increase agricultural economic activity by supporting the development of key agricultural value chains. This work will build upon past Feed the Future activities that have included proposed assessments agricultural education institutions (DAI, 2012b). The recommendations and next steps will focus on agricultural opportunities in Khatlon Province, as the focus of Feed the Future activities, and will highlight the cross-cutting theme of gender equity in agricultural education and employment. The innovATE team will then work with the USAID/Tajikistan mission to implement elements of the assessment recommendations, in concert with other donor efforts in the country.

### *Recommendations*

Based on the review of existing literature and current efforts to build capacity in agricultural education in Tajikistan, the upcoming innovATE scoping assessment will further explore the key leverage points that could be the focus of future efforts to strengthen education, employment and economic growth in the agricultural sector.

InnovATE's past experience working within agricultural education and training institutions has highlighted how curriculum development should be oriented toward providing both the hard and soft skills necessary to meet demands in the agricultural employment sector. Examples of hard skills include training in greenhouse vegetable production, in certification techniques to ensure that food safety standards are met, and in elements of supply chain management, including transportation and cold storage. Soft skills include those that cut across and underlay specific employment opportunities. These include leadership skills, communication techniques, financial management approaches, and the use of information technology. To further align curriculum development efforts with demand in the agricultural employment sector, linkages should be fostered and encouraged between private enterprise and agricultural education and training institutions, so that the courses being offered and skills being taught prepare students for employment opportunities.

The agricultural sector in Tajikistan has been historically important to the nation's economy, and remains a strong source of economic growth and employment. Aligning agricultural education and training to support current and future agricultural sector development will aid the transition toward a sustainable, market-oriented agricultural economic sector. Secondary benefits of emphasizing agricultural education and training include providing more in-country employment as a way to deter economic migration, and shifting perceptions of agriculture away from its historical secondary status and toward agriculture as an economic opportunity. Finally, building capacity in agricultural education and training will contribute to food security and economic stability in rural and under-developed regions of the country by providing relevant information and training throughout the educational pipeline.

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## Appendix A: Formal AET institutions

Expanded background review of formal ATE institutions, which may include: history, mission, vision, graduates, departments/colleges, academic programs, and other general information

### *Tajik Agrarian University*

- **History:** In 1931, the faculty of the State University of Central Asia established a Fruit and Vegetable Institute in the city of Khujand. Renamed the Tajik Agricultural Institute in 1934, the institute continually developed and re-focused its scientific and pedagogical potential over the years. In 1992, the Council of Ministers of Tajikistan reorganized the institute into the Tajik Agrarian University and later added the title of Shirinsho Shotemur to the University.
- **Graduates:** There are an estimated 35,000 graduates of the Tajik Agrarian Institution
- **Faculties (departments):** Agronomy, Agribusiness, Zoo (bio) engineering, Veterinary, Economics, Horticulture, Biotechnology, Mechanization, Hydro melioration
- **Fields of Study:** Agricultural, Technical, Technological, Financial, Environmental Philosophy, Economic
- **Expected Occupational Outcomes:** finance and credit to agriculture, accounting and auditing, economy of agricultural production, marketing, agribusiness management in agriculture, forestry, hydraulic engineering, agricultural chemistry and soil science, agronomy, gardening and viticulture, plant protection, sericulture, plant breeding and genetics of crops, animal science, veterinary science, land management, production technology and processing of agricultural products, agricultural mechanization, electrification and automation of agriculture, processing of agricultural products, farm organization, technology of storing and processing fruits and vegetables, agroecology, land reclamation, re-vegetation and land protection, integrated management and protection of water resources, beekeeping (Imex, 2014).

### *Bokhtar Agricultural College*

### *Tajik Academy of Agricultural Sciences*

- **Primary Activities:** crop and fruit tree variety development; animal breeding and development; collection, study, conservation of genetic resources; plant and animal disease prevention and treatment development; effective growing technology; improve soil fertility and its prevention of erosion and salinization; creation and improvement of agricultural technology; research in the field of agricultural economics, promotion and implementation of science; training of highly qualified scientific personnel
- **Noteworthy Achievements:** Genetic development of: 110 crop varieties, 36 produce varieties, black and white cattle and goats, high-yielding chicken crosses; development of soil fertility techniques, water management practices, and farm equipment for vineyards; more than 120 patents and copyright certificates processed; conducted more than 330 national, regional, and global conferences; published more than 260

### *Technological University of Tajikistan*

- **History:** The original name of the institution, upon its foundation in 1990, was Higher Technological College. In 1992, the name changed to the Tajik Institute of Food and Light

Industry to reflect industry needs. Finally, in 1993, the name was again changed to its current title of Technological University of Tajikistan.

- **Mission:** The school has primary objectives in preparing highly qualified experts in the fields of:  
Preparation of highly qualified experts under the spheres of:
  - Technology of Food Production
  - Technology of Textile Industry
  - Information and Communication Technologies
  - Economics
- **Faculties (departments):** Engineering and Technology, Technology and Design, Business Administration and Innovation Economy, Innovation and Computer Technology, Branch Systems and Information Technologies, Financial and Innovation Management, Management of Staff and Modern Technology (joint Tajik-Ukrainian), Correspondence Studies, Fundamental Preparation and Technical Expertise
- **Expected Occupational Outcomes:** Machines and devices of food manufactures, Production and organization of public catering, Technology of storage and processing of food vegetative raw materials, Technology of storage and processing of animal raw materials, Technology of thread, fabrics, knitted garments and nonwoven materials, Design and technology of garments, Design (on directions), Software of information technologies, Information systems and technologies (on directions), World Economy, Marketing, Management, Finance and credit, Economy and management at the enterprises, Management, Software of information technologies, Metrology, standardization and certification (on directions)