

Supplementary Document 16:
Detailed Financial and Economic Analysis

A. Introduction

1. The Horticulture Value Chain Infrastructure Project (HVCIP) is a follow-on project to the ongoing Horticulture Value Chain Development Project and the Horticulture Value Chain Development Project Additional Financing.¹ HVCIP will complement the financing provided under the Horticulture Value Chain Development Project and Additional Financing (HVCDP) to horticulture enterprises by the establishment of two agro-logistic centers (ALCs) in two key horticulture production regions of Uzbekistan, namely Andijan and Samarkand. The ALCs will provide a central location through which fruit and vegetable producers and agribusiness enterprises can access market trading areas, cold storage and processing facilities, and complementary services such as banking, certification, customs clearance. A focus of the ALCs will be the provision of services to exporters to enable them to realize the significant potential for Uzbek horticulture products in international markets.

B. Macroeconomic and Horticulture Sector Overview

2. The economy of Uzbekistan has grown consistently in recent years. Over the period 2011–2016 gross domestic product (GDP) grew at an average annual rate of 8%, though annual rates of growth fell from 8.2% in 2012 to 7.8% in 2016. GDP grew from \$46.2 billion in 2011 to \$63.4 billion in 2016.² Growth is expected to be slightly lower in 2017 and 2018 in view of protracted economic weakness in Uzbekistan's key trading partners, notably Russia, its major trading partner and source of remittances. GDP growth rates are expected to be 7.0% in 2017 and 7.3% in 2018.³ Inflation is forecast at 9.5% in 2017 and 10.0% in 2018. Inflationary pressures will come mainly from higher government spending and continued depreciation of the Uzbek sum (SUM) against the United States dollar (\$).

3. Uzbekistan has made significant progress in poverty reduction in recent years. According to national poverty line estimates, the proportion of the population living below the poverty line fell from 27.5% in 2001 to 12.8% in 2016.⁴ This exceeded the government's target, elaborated in the Welfare Improvement Strategy for 2012–2015, which aimed to reduce the national level of low-income people from 17.7% in 2010 to 13.7% by 2015. More recently, between 2011 and 2016, gross national income per capita (based on international dollar purchasing power parity) grew at an annual average rate of 7.4%, from \$4,650 to \$6,640.⁵ Improvements in household incomes resulted from rapid economic growth based on (i) the creation of new small businesses and employment, (ii) large government investments in education, health and infrastructure, (iii) increases in public sector salaries, and (iv) increased remittances. However, the elasticity of poverty reduction to GDP growth remains low, reflecting the historically low level of productivity of agriculture, regional differences in growth, and the rural-urban income gap. As of 2016, 63.5%

¹ ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan Republic of Uzbekistan: Horticulture Value Chain Development Project*. Manila; and ADB. 2018. *Report and Recommendation of the President to the Board of Directors: Proposed Loan for Additional Financing to the Republic of Uzbekistan for Horticulture Value Chain Development Project*. Manila.

² Based on GDP in current Uzbek sum (SUM) converted at the average annual exchange rate. Average annual growth in current SUM was 20.4%. Source: ADB. 2017. *Key Indicators for Asia and the Pacific 2017*. Manila.

³ ADB. 2017. *Asian Development Outlook 2017*. Manila.

⁴ On the basis of \$1.90 purchasing power parity criterion. Source: ADB. 2017. *Basic Statistics 2017*. Manila. <https://www.adb.org/sites/default/files/publication/298061/basic-statistics-2017.pdf>.

⁵ World Bank. 2017. <https://data.worldbank.org/country/uzbekistan>.

of the total population of 31.8 million live in rural areas,⁶ and 75% of people living below the poverty line reside in rural areas.⁷

4. Looking forward, the government aims to enable Uzbekistan to become an industrialized, high middle-income country by around 2050, based on a strategy of continuing the transition to a more market-oriented economy to ensure equitable distribution of growth between regions and to maintain infrastructure and social services.⁸ The country's policy goals and priorities are to: (i) increase the efficiency of infrastructure, especially of energy, transport, and irrigation, (ii) enhance the competitiveness of specific industries, such as agro-processing, petrochemicals, and textiles, (iii) diversify the economy and thereby reduce its reliance on commodity exports, and (iv) improve access to and the quality and outcomes of education, health and other social services.

5. GDP in agriculture has grown in line with aggregate GDP, though at a slightly lower rate. Over the period 2011-2016 it grew an average annual rate of 6.8%, ranging from 7.2% in 2012 to 6.0% in 2016. According to the ADO, agriculture is expected to grow by 6.8% in 2017 and 7.1% in 2018, reflecting higher production of fruit and vegetables from major horticulture and agro-processing development programs initiated in 2017, such as HVCDP. However, the expansion of and higher rate of growth in other sectors, largely as a result of significant government-financed investment programs, resulted in a decline in the contribution of the agriculture sector to GDP. In 2000, agriculture accounted for 34.4% of GDP. This had fallen to 29.5% by 2005 and 17.9% by 2016. A decline in the significance of agriculture was also recorded in respect of employment. In 2000 agriculture accounted for 34.4% of employment. This had fallen to 25.5% in 2009, but then started to increase slightly, reaching only 27.7% in 2016.⁹

6. With respect to the structure of agricultural production, there has been a significant shift in recent years (Table 1). Significant increases in area between 2000 and 2016 have been recorded in vegetables (59%) and fruit and berries (37%), while the area under grains increased by 5%. The area under industrial crops, predominantly cotton, fell by 12% over the period.

⁶ World Bank. 2017. <https://data.worldbank.org/country/uzbekistan>.

⁷ United Nations Development Program (UNDP). 2016. (<http://www.uz.undp.org/content/uzbekistan/en/home/countryinfo/>).

⁸ In 2011 the World Bank re-classified Uzbekistan from a low-income to a lower middle-income country.

⁹ ADB. 2017. *Key Indicators for Asia and the Pacific 2017*. Manila.

**Table 1: Nationwide Area under Main Crop Groups Selected Years
(‘000 ha)**

Crop Group	2000	2005	2010	2016
Grain	1,614.0	1,616.1	1,679.4	1,689.4
Industrial crops (including cotton)	1,512.6	1,518.4	1,417.0	1,333.9
Potato	429.0	290.3	320.4	333.5
Vegetables	129.9	137.7	173.0	206.0
Other crops (gourd, fodder)	92.8	85.0	118.6	143.9
Subtotal	3,778.3	3,647.5	3,708.4	3,706.7
Fruit and berries	204.0	208.2	235.3	279.6
Vineyards	120.0	120.7	127.9	131.2
Total	4,102.3	3,976.4	4,071.6	4,117.5

Source: The State Committee of the Republic of Uzbekistan on Statistics. 2017. *Key Indicators of Agricultural Sector*. Tashkent.

7. The shift in the structure of cropping is more marked with respect to production. The output of grains rose from 4.1 million tons in 2000 to 8.3 million tons in 2016, while the production of cotton remained largely unchanged at around 3.0 million tons over the same period. Significant increases were recorded for vegetables 2.6 million tons in 2000 to 11.3 million tons in 2016, potatoes 0.7 million tons to 3.0 million tons, and fruit 0.8 million tons in 2000 to 3.0 million tons in 2016. In addition to the increases in area sown, production increases resulted from large increases in crop yield (Table 2). With the exception of cotton, which recorded an increase in yield of 7.3% between 2000 and 2016, the yield of all crops increased by over 35.0%.

**Table 2: Crop Yields Selected Years
(tons per ha)**

Crop Group	2000	2010	2016	Increase 2000-2016 (%)
Grain and legumes	2.82	4.42	4.50	59.6
Cotton	2.18	2.54	2.34	7.3
Potato	12.93	19.49	22.51	74.1
Vegetables	18.38	25.25	27.11	47.5
Gourd	13.24	19.26	20.94	58.2
Fruit and berries	5.69	9.26	13.41	35.7
Grapes	6.31	9.08	14.19	124.9

Source: The State Committee of the Republic of Uzbekistan on Statistics. 2017. *Key Indicators of Agricultural Sector*. Tashkent.

8. The share of cotton and wheat, traditionally regarded as strategic crops, in GDP also declined. The share of cotton production in GDP declined from 3.6% in 2000 to 2.3% in 2013. Over the same period the contribution of grains to GDP fell from 3.4% to 2.4%. Meanwhile, the combined share of fruits and vegetables (including potatoes) increased from 5.2% to 10.6%. The structure of agricultural exports is also shifting. Total exports grew at an annual average rate (in current dollar terms) of 8.6% between 2000 and 2016. Over the same period cotton exports fell by an average annual rate of 2.2%, and fell from a peak of \$1.58 billion in 2010 to \$0.48 billion in 2017. This resulted in a fall in the share of cotton in total exports from 27.5% in 2000 to only 3.4% in 2017. By contrast, the share of food products in exports has risen, from 5.4% in 2000 to 6.3%

in 2017. For fruit and vegetables, exports grew from \$68.7 million in 2000 to around \$1.0 billion in 2017. As of 2017, therefore, the share of fruit and vegetables in the value of exports exceeded that of cotton.

9. A focus of the government's economic strategy is to restructure and modernize agriculture, a key feature of which is more intensive production and improved access to modern agricultural technology. Agricultural labor is increasingly scarce as people migrate to urban centers for jobs in the more lucrative industrial and service sectors. In response, the government aims to continue to widen access to credit to facilitate investment in improved technology at both production and post-harvest levels.

C. Project Rationale

10. In recent years the government has implemented a number of policies within the agriculture sector as a whole that have addressed key issues, such as farm restructuring and the introduction of private usufruct rights on former cooperative and state land. This and other privatization initiatives resulted in the formation of private farms and an increase in the number of households in agriculture which together are now responsible for much of the recent growth in agricultural output. This has been accompanied by diversification in cropping patterns away from traditional cotton and wheat crops to higher value fruit and vegetable crops. However, in spite of impressive increases in yields for certain crops, agriculture continues to be characterized by low productivity and remains labor intensive. Government policy in respect of the fruit and vegetable sector is to facilitate private-sector, market-driven development supported by improved access to finance and improved technologies, especially to facilitate greater value addition and realization of export potential. Specific focus was afforded to agro-processing as part of the broad economic policy and strategy defined in a Presidential Decree of February 2017.¹⁰ As part of a general strategy for modernization and intensive development of agriculture, the Decree targeted the implementation of investment projects for construction of new, and reconstruction and modernization of existing processing plants, equipped with modern high-tech equipment for deeper processing of agricultural products, production of semi-finished and finished food products, and the production of packaging.

11. At the institutional level, the government established Uzbek Food Holding (Uzbekozikovkatholding) as a 100% state-owned holding company for enterprises operating in the food industry.¹¹ A subsequent resolution¹² established a series of targets for food industry expansion and identified 180 projects for an amount of \$596.0 million for the processing of agricultural products and food production over the period 2016–2020. These projects include the construction of large logistic centers in strategic locations based on availability of raw materials and infrastructure, and the construction of cold storage facilities. To support the increase in horticulture exports, the government also established the state-owned Uzagroexport as a

¹⁰ Government of Uzbekistan. 2017. *Presidential Decree No. UP-4947*. Under this decree, actions on further development of Uzbekistan were adopted.

¹¹ Government of Uzbekistan. 2016. *President Resolution No. PP-2492*. Under this resolution, measures for further improvement of the republican food industry management were adopted.

¹² Government of Uzbekistan. 2016. *President Resolution No. PP-2505*. Under this resolution, measures to further develop the raw materials base, deepen the processing of fruit and vegetable and meat and dairy products, increase production and export of food products in 2016-2020 were adopted.

subsidiary of Uzbek Food Holding.¹³ Uzagroexport was initially given sole responsibility for the procurement, handling and shipment of fruit and vegetables for export. However, its monopoly was subsequently rescinded and private sector entities allowed to participate in fruit and vegetables exports. Uzbek Food Holding has a significant role in the promotion of the horticulture sector and, through its subsidiaries, the production, processing and export of horticulture produce. Its strategic plan for 2018 focuses on more efficient use of subsidiary and associated companies' production facilities, commissioning of new ones, modernization and technical re-equipment of existing companies, creation of new companies, solving problems of raw material and related supplies, and expanding the range of products marketed by domestically and overseas. With respect to fruit and vegetables, projected increases in production are fruit 6.3%, vegetables 5.9%, and grapes 6.0%. It is envisaged that at least 20.5% of agricultural production will be processed. In this regard, the volume of production of canned fruit and vegetables will grow by 114.2%, ketchups and sauces by 119.6%, fruit juices by 115.4%, and dried fruit by 112.3%.

12. Such positive developments in government policy in the sector have led to the emergence of a network of enterprises engaged in activities both upstream and downstream of production. This includes input supply enterprises engaged in the supply (including the importation) of seeds, fertilizers and agrochemicals more appropriate to fruit and vegetable production whereas traditional, largely state-controlled input supply remains focused on supporting cotton and wheat production. The introduction of a large number of new private farmers provided a significant demand impetus to the development of this network of private sector input suppliers. The supply of other services has yet to develop as effectively. Access to appropriate farm machinery, either farmer-owned or through contract services, is limited by functional obsolescence of the existing farm machinery fleet, which remains geared to serving cotton and wheat production. There is a need for improved access to machinery appropriate to fruit and vegetable production. On- and off-farm storage and transport infrastructure is rudimentary and inappropriate for the handling of perishable fruit and vegetable crops. This results in significant post-harvest losses, ranging from 25% to 30%, for more perishable crops in transit from farm to consumer. The exact scale of post-harvest losses is difficult to estimate, but analysis of Andijan and Samarkand Regions suggests losses of 21% in Andijan and 29% in Samarkand.

13. In the processing subsector, there is a high level of demand for Uzbek products in international markets. However, processors face problems in obtaining (i) sufficient quantities of raw material, (ii) processing-specific product varieties (that reduce processing costs and/or wastage), and (iii) technology that enables them to both maintain product quality to standards required by more lucrative European markets (and increasingly sophisticated markets of the Commonwealth of Independent States [CIS]), and add greater value by processing to finished rather than semi-finished product.

14. The project will support the most recent government strategy announcement for the horticulture sector,¹⁴ which identifies a number of constraints that need to be addressed to enable horticulture producers, processors and traders to improve product quality and access to domestic and international markets. The Resolution proposes the establishment of horticulture clusters where production and post-harvest services can be consolidated to improve efficiency and earn

¹³ Government of Uzbekistan. 2016. *President Resolution No. PP-2520*. Under this resolution, measures for enhancement of purchasing system and use of fruit and vegetable products, potatoes and melon cultures were adopted.

¹⁴ Government of Uzbekistan. 2018. *President Resolution No. PP-5388*. Under this resolution, additional measures to expedite development of horticulture in the republic of Uzbekistan were adopted.

economies of scale. The reorganization of marketing systems and the introduction of logistics centers is given specific focus.

D. Demand Analysis and Comparative Advantage

15. Horticulture production has grown significantly over the last decade. In 2005, production was estimated at 6.6 million tons. By 2017, production had reached 21.4 million tons, representing an average annual growth rate of 10.3%. This has had a marked impact upon average Uzbek food consumption patterns. In the early 2000s, per capita consumption of fruit in Uzbekistan was below that of the average for CIS countries and well below the average for developed countries. According to FAOSTAT data, in 2003, per capita fruit consumption was 30.3 kg per year in Uzbekistan compared with averages of 40.9 kg in the CIS and 87.0 kg in developed countries. The situation with respect to vegetable consumption was better, though at 116.1 kg per capita in 2003, it was below that of both Kazakhstan (131.0 kg) and Kyrgyz Republic (132.6 kg). The growth in supply has resulted in an increase in consumption of fruit and vegetables. Between 2000 and 2016, per capita consumption of vegetables and melons more than doubled from 128 kg per year to 277 kg per year, and per capita consumption of fruit increased by 3.5 times from 42 to 149 kg per year. As a result, the share of fruit and vegetables in the average Uzbek daily energy supply has also increased. From the nutritional standpoint, Uzbekistan performs well in respect of fruit and vegetables consumption. Variations by region and by income group are likely to exist but data are not available to estimate the extent of such variations. Demand in Uzbekistan will therefore derive partially from population growth, which averaged 1.5% per year between 2000 and 2016, but principally from changing patterns of demand as household incomes rise and consumers demand higher levels of fruit and vegetable quality and safety, and a higher proportion of processed products. According to Ministry of Agriculture (MOA) data, in 2015, about 69.0% of fruit is consumed fresh, 20.0% processed, and 11.0% exported, while 81.0% of vegetables is consumed fresh, 11.3% processed, 4.3% used for seeds, and 3.4% exported.

16. While there is likely to be a shift in the pattern rather than a significant increase in the volume of domestic demand, the major source of demand is expected to be exports. Growth in the volume, diversity and value of exports was considerable between 2005 and 2015. According to MOA data, the volume of exports increased by 1.8 times and the value 18-fold over the period. In 2016, Uzbekistan exported 65 types of fruit and vegetable products to 43 countries amounting to around 1.0 million tons, an increase of 40% on 2015.¹⁵ Of this, vegetables accounted for 242,100 tons, fruit for 229,600 tons and grapes for 96,200 tons. According to MOA estimates, exports are forecast to rise significantly by 2020 (Table 3).

¹⁵ Source: Uzagroexport ([www. http://uzagroexport.uz/2017/01/05/](http://uzagroexport.uz/2017/01/05/)).

Table 3: Forecast Exports of Horticulture Products (2020)

Item	Volume ('000 ton)		Value (\$ million)		Average Annual Growth Rate (%) ^a
	2015	2020	2015	2020	
Vegetables	286.6	1,212.3	478.7	2,024.6	33.4
Melons	7.7	267.4	5.1	178.0	103.3
Fruit	108.7	383.0	359.0	1,264.9	28.6
Grapes	186.9	326.3	350.0	611.1	11.8
Total	589.9	2,189.1	1,192.8	4,078.6	30.0

^a Average annual growth rates are the same for volume and value, subsuming a constant value per ton in US dollar terms over the period.

Source: Ministry of Agriculture.

17. The average annual growth rates indicated in Table 3 appear ambitious, especially for melons, and actual growth may be expected to be rather lower. However, the average annual rate of growth of exports from 2000 to 2016 was 21%, increasing from \$68.7 million in 2000 to \$1.45 billion in 2016. While this growth was from a low base, it was achieved in spite of government agriculture sector policy that focused on cotton and wheat and effectively constrained horticulture access to land, inputs, machinery, finance, etc. Now that government is actively supporting horticulture development, for instance through export promotion via Uzagroexport and provision of finance from international financial institutions including ADB through HVCDP, increases in exports of this level may be achievable. It is, nonetheless, indicative of the significance attached to export growth by the government. It is not specified, but much of this growth in exports is expected to be absorbed by Uzbekistan's traditional CIS markets. However, there is also scope for Uzbek horticulture exports in European markets, where fruit and vegetables consumption is relatively low based on recommended nutritional requirements. In only four countries of the World Health Organization (WHO) European Region did fruit and vegetables consumption exceed the WHO recommended level of 400 grams (g) per capita per day in 2011.¹⁶ The mean intake across the region was 386 g per capita per day, comprising 166 g of fruit and 220 g of vegetables. The situation is similar in the 28 countries of the European Union, where average fruit and vegetables consumption in 2013 was 342 g per capita per day, around 85% of the minimum recommended WHO intake.¹⁷ However, accessing European, especially European Union, markets will require improvement in horticulture quality and safety standards and certification systems. In this context, Uzbekistan must improve its performance compared with its major competitors' (China, Iran, Poland, and Turkey) in areas of price, product variety, design, and packaging. This reflects importers' and consumers' preference for (i) consistent and timely supply, (ii) guaranteed quality, (iii) product variety (width and depth of product range), (iv) visual appearance, and (v) price competitiveness (though increasingly, as markets become more sophisticated, price is relatively less important). These factors form the basis of market loyalty between producers/exporters and importers/consumers in destination markets.

18. Much of the projected increase in exports is for fresh produce, though there is also significant scope for exports of processed produce. In this context, government forecasts foresee the construction or modernization of over 100 processing plants for finished and semi-finished product, with a combined cost of \$461 million by 2020. Meeting this projected demand will require significant investment in the processing subsector. As well as the demand for fruit and vegetable processing facilities, there is an indirect demand for investment in the manufacture of equipment

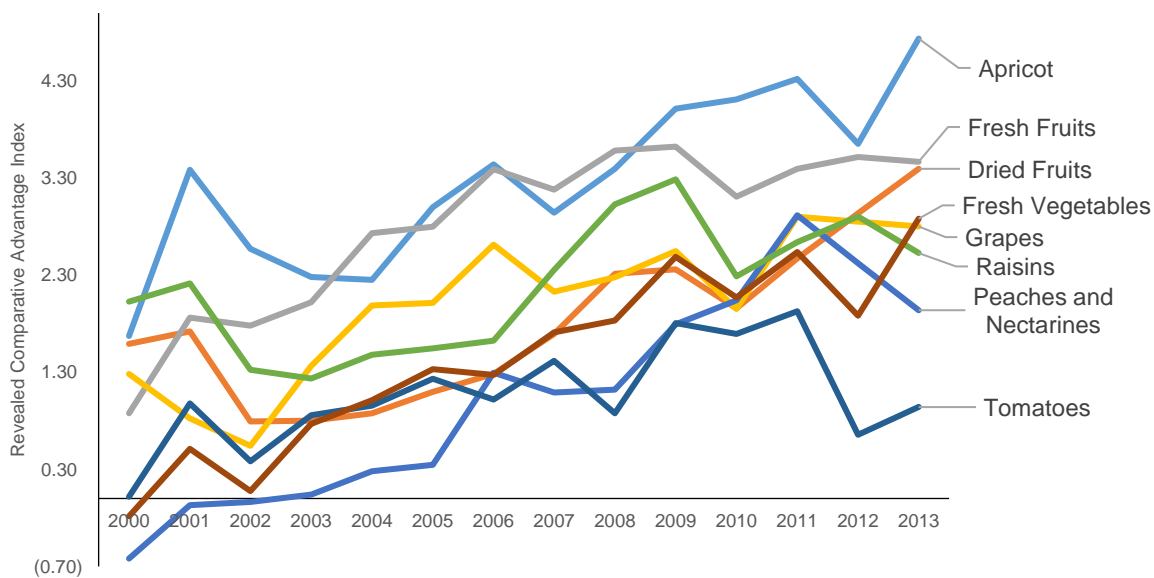
¹⁶ European Food Information Council (EUFIC). 2012. *Fruit and vegetable consumption in Europe – do Europeans get enough?* Brussels. <http://www.eufic.org/article/en/expid/Fruit-vegetable-consumption-Europe/>.

¹⁷ European Fresh Produce Association. 2015. *Freshfel Consumption Monitor*. Brussels. http://www.freshfel.org/asp/what_we_do/consumption_monitor.asp.

to process, label, and package products. There is high demand for packaging materials, such as cardboard, paper, glass, aluminum foil, and shrink wrap, but these materials are not produced in Uzbekistan. Small-scale processing equipment is in demand and is more affordable for small businesses. Cold storage warehouse equipment is also in high demand. Uzbekistan's food processing industry needs newer technology and equipment related to cooling, processing, packaging and storage to improve the quality and longevity of fruit and vegetables. Integrated chains of production need to be introduced to maintain the cold chain and utilize new technologies and best practices throughout production, transportation, processing and storage of sensitive categories of fruit and vegetables to improve quality, safety and efficacy.

19. **Comparative advantage.** Since independence in 1991, Uzbekistan's horticultural exports have largely been confined to Russia and Kazakhstan. Estimates of revealed comparative advantage (RCA) indices for Uzbekistan's main horticultural exports, however, suggest that the country has a comparative advantage with respect to the rest of the world and the potential to penetrate additional markets for its horticultural produce. From 2000 to 2013, Uzbekistan's RCA indices for all exports have generally increased, especially those for apricot, dried fruits, grapes, and fresh vegetables (Figure 1).¹⁸ Significant improvements in RCA occurred after 2002, when there were considerable spikes in RCA for grapes, tomatoes, and fresh vegetables. Furthermore, exports of peaches and nectarines obtained comparative advantage during the same period.

Figure 1: Trends in Uzbekistan's Revealed Comparative Advantage Indices with Respect to the Rest of the World for Selected Horticultural Products, 2000 to 2013



Source: FAOSTAT.

20. On a regional level, Uzbekistan also has comparative advantage in producing apricots, dried and fresh fruits, grapes, and fresh vegetables with respect to other regions of the world (Table 4). However, the country does not have comparative advantage in exporting raisins and tomatoes with respect to other exporters in Western Asia. This is also the case for Central America in terms of tomato production and Southern Europe in terms of the production of peaches and

¹⁸ Time series data are not available beyond 2013.

nectarines. Overall, the RCA analysis suggests that Uzbekistan is more specialized in producing horticultural products than producers from the rest of the world, indicating the potential for Uzbekistan to expand its export market.

Table 4: Revealed Comparative Advantage of Uzbekistan's Major Horticultural Exports by Region (average 2000 to 2013)

Region	Major Horticultural Exports															
	Apricot		Dried Fruit		Fresh Fruit		Grapes		Peach and Nectarine		Raisins		Tomato		Fresh Vegetables	
	L	A	L	A	L	A	L	A	L	A	L	A	L	A	L	A
Africa	3.90	49.19	3.02	20.43	2.79	16.33	1.09	2.98	2.17	8.75	2.25	9.49	1.10	3.02	0.65	1.92
Northern America	5.05	156.74	2.25	9.53	4.26	70.53	8.86	71	2.10	8.19	1.94	6.95	1.64	5.14	2.34	10.42
Central America	11.72	123,467.78	3.85	46.97	4.18	65.61	1.88	6.55	5.85	347.37	5.09	163.08	-0.82	0.44	0.27	1.31
South America	6.37	585.92	2.83	17.02	4.08	59.01	1.12	3.06	2.16	8.66	2.32	10.19	6.71	820.90	5.40	221.13
Eastern Asia	7.47	1,750.83	1.46	4.32	2.13	8.39	2.42	11.22	2.99	19.81	3.08	21.81	3.20	24.62	1.42	4.15
Southern Asia	4.70	110.29	1.61	5.00	2.69	14.68	0.93	2.54	4.42	83.12	0.78	2.19	3.23	25.37	1.35	3.85
South-Eastern Asia	10.25	28,146.34	1.37	3.94	1.98	7.21	1.76	5.79	8.36	4269.35	5.87	355.92	4.67	107.21	2.61	13.59
Western Asia	2.23	9.32	2.04	7.67	1.77	5.85	0.54	1.72	1.38	3.98	0.12	0.89	-0.16	0.85	0.87	2.38
Northern Europe	6.26	522.08	2.99	19.90	4.89	133.61	0.81	2.26	3.61	37.07	4.25	70.30	3.50	33.21	3.34	28.26
Southern Europe	2.25	9.48	1.77	5.86	2.90	18.11	1.40	4.07	-0.48	0.62	2.97	19.58	0.28	1.32	1.08	2.95
Western Europe	3.26	26.17	2.41	11.19	3.63	37.65	0.09	1.09	2.44	11.52	3.94	51.41	1.02	2.78	1.99	7.30
Oceania	4.58	97.61	4.61	100.76	5.35	210.17	0.99	2.69	3.26	25.99	4.47	87.13	4.46	86.78	3.70	40.48
World	3.60	36.54	2.13	8.40	3.06	21.39	0.70	2.01	1.56	4.74	2.38	10.77	1.18	3.27	1.80	6.05

A = Actual. If RCA > 1 (< 1), then country j has comparative advantage (disadvantage) in producing commodity i, over the reference region or the rest of the world.

L = Logarithmic. If RCA > 0 (< 0), then country j has comparative advantage (disadvantage) in producing commodity i, over the reference region or the rest of the world.

Equation for Revealed Comparative Advantage Index:

$$RCA = \ln \left\{ \frac{[x_{ij}/(\sum_{i=1}^n x_{ij})]}{[(\sum_{j=1}^m x_{ij})/(\sum_{j=1}^m \sum_{i=1}^n x_{ij})]} \right\}$$

where: Xij = value of export (in \$) of commodity i by country j; i = 1, n commodities; j = 1, m countries; If RCA > 0 (< 0), then country j has comparative advantage (disadvantage) in producing commodity i, over the reference region or the rest of the world.

Source: FAOSTAT.

21. In the case of grape exports, in 2013, the top three importers of grapes were Germany (\$690 million), China (\$515 million), and Canada (\$440 million). These countries are coincidentally Uzbekistan's traditional trading partners for raisins. However, Germany largely imports grapes from the Netherlands and Italy, while China and Canada generally import grapes from the Americas, mainly Chile, USA, and Peru. The RCA analysis indicates that Uzbekistan has the potential to penetrate the markets for grapes in Germany, China, and Canada since it has comparative advantage in the export of grapes with respect to other exporters in Europe and the Americas. Entering these markets depends upon several other factors relating to international trade, including logistical, political, and environmental considerations.

E. Methodology and Assumptions

1. Introduction

22. The benefits of HVCIP have been assessed on two levels. First, a financial analysis of each ALC has been undertaken to determine their financial viability as standalone investments to be financed by the proceeds of the ADB loan for HVCIP. Second, an economic analysis has been undertaken of the project as a whole. This includes an assessment of the economic viability of the ALCs and indirect benefits that will accrue from the establishment of cold storage and processing facilities at the ALCs. The latter comprise (i) increased domestic sales and exports of fresh and processed fruit and vegetables, and (ii) a reduction in post-harvest losses. They are not included in the quantitative analysis based on the economic models.

2. Financial Analysis

23. The ALCs will provide a range of services related to post-harvest trading and processing of fruit and vegetables. These principally comprise rental of trading areas (based on floor area in square meters [m²]) for wholesalers and small farmers, the rental of cold storage facilities (based on storage capacity in cubic meters [m³]), and primary processing (washing and sorting) facilities based on the volume of throughput (tons). In addition, the ALCs will offer areas for rent in the ALC administration building for services such as complementary services such as banking, product certification, customs clearance, etc. They will also levy a nominal charge on access to the ALC for certain types of vehicle. The type and volume of gross area/facility capacity available have been based on the analysis of demand within the area of influence of each ALC. Net rentable areas, the capacity of cold storage facilities, and the number of processing lines required are then estimated from the gross building area/volume constructed. Estimates of both gross and net areas/capacities are based principally on European experience in the construction and operation of ALCs, adjusted to reflect operating conditions specific to Uzbekistan.

24. It is expected that HVCIP will commence in 2018 for a period of five years. Construction of the ALCs will not commence until 2020, allowing time for establishment of the ALC management entity, contracting, etc. Construction is expected to take three years with ALC operation starting in 2023. In order to fully account for the ADB loan to construct the ALCs and finance project overhead costs (project management, consulting services, capacity building, environmental management and land acquisition and resettlement), total project costs including physical contingencies (over the five-year project period) have been used as the basis for investment cost estimates in the financial analysis.¹⁹ Physical contingencies have been added to

¹⁹ Since the contribution of the government to the HVCIP will be in the form of the exemption of duties and taxes on the construction of the ALCs and project management, etc, costs used in the analysis are net of such duties and taxes.

base cost estimates at the rates in the range of 2.5%-15.0% depending on nature of expenditures to account potential increases in the scale of investments in infrastructure and buildings. Where investment relates to a fixed number of units or investment cost is estimated as a lump sum, no physical contingencies have been added. The cost of replacement of equipment whose economic life is less than 20 years has been built into the cash flow. Infrastructure and buildings are considered to have a life of more than 20 years and no replacement cost has been included.

25. Unit costs and prices in dollars have been estimated on the basis of market rates in Uzbek sum prevailing in March 2018 (at the time of HVCIP design) for comparable investment and operating and staff costs and revenues in Andijan and Samarkand, or other areas of Uzbekistan where local estimates were not available. Conversion between dollars and Uzbek sum has been made using the Central Bank of Uzbekistan official exchange rate of \$1 – SUM8,140 as of 31 March 2018.

26. Financial cash flows comprising revenues, investment and operating costs and staff costs denominated in SUM have been estimated, starting from the commencement of HVCIP in 2019 and for a period of 20 years of ALC operation to derive an annual net cash flow. Investment costs have been phased in accordance with expected phasing of ALC groundworks and infrastructure and the construction of buildings and other facilities. Replacements have been built into the cash flow in accordance with the estimated economic life of the assets concerned. This is 20 years for infrastructure and buildings, seven years for plant and equipment, and five years for administration/office equipment. The costs of project overheads have been phased according to estimated annual requirements. ALC revenues have been phased according to the estimated level of capacity utilization for each type of revenue stream (rental areas, cold storage, processing facilities, etc.). Since one of the key functions of the ALCs is to smooth the current seasonality in production, it is assumed that all facilities will be operated year-round and, given the projected level of demand, at 100% capacity following the year in which full capacity utilization is achieved.

27. A net cash flow based on ALC revenues and costs and the allocation of project overheads has been estimated to determine ALC viability. Where project overhead costs are not specific to a particular ALC, they have been allocated on the basis of the relative proportion of each ALC in total ALC construction costs (43.2% for Andijan and 56.8% for Samarkand). Environmental management and land acquisition and resettlement costs site specific and have been allocated to each ALC accordingly.

28. With respect to financing it is assumed that each ALC will receive loan funding based on its cost of construction and its share in project overhead costs and that each ALC will be liable for the entire loan debt service (interest payments and principal repayment) ensuring full cost recovery for the government in respect of repayment of the loan to ADB. The terms of the ADB loan assumed in the analysis are based on its ordinary capital resources (concessional loan) lending with a term of 25 years, a grace period of 5 years and an interest rate of 2.0% per year. Since the project has revenue generating capacity, the analysis assumed that the Ministry of Finance would provide funds to the ALC management entity and the ALC management entity would “pay” at a nominal interest rate of 5.5%. In reality, as this is a public infrastructure project the Ministry of Finance passes on the loan proceeds with the same terms and conditions as those of the loan it receives from ADB. In this context, the viability of the ALCs would be further improved. However, the financial analysis assumes the more conservative rate of 5.5% as the cost to the ALC management entity. Annual repayments by the ALC management entity are based on the payments equivalent to interest during the grace period and thereafter to constant

annual payments of principal and interest. The ALCs will be subject to a tax of 14% of net income/profit.²⁰

29. Sensitivity analysis based on switching values has been undertaken for each ALC. Switching values for revenues, investment costs and operating and staff costs have been calculated on the financial internal rate of return (FIRR) after allocation of project overhead costs to determine the intrinsic susceptibility of each ALC to adverse movements in revenues and costs, either input/output levels or prices. Switching values indicate the adverse percentage change in revenues and costs that would result in the FIRR falling to the assumed cost of funds to the ALC management entity of 5.5%, the lending rate at the participating financial institutions of Horticulture Value Chain Development Project (Loan 3471-UZB). The nominal rate of 5.5% is used to provide a more conservative estimate of the financial viability and the robustness of the financial cash flow of each ALC than the estimated weighted average cost of capital of 3.7%.²¹

3. Economic Analysis

a. Without Project Scenario

30. Without investments in agribusiness and efficiency improvements, the horticulture sector is unlikely to realize its full potential to contribute to national economic growth and employment generation and higher household incomes. Without continued investment in improved post-harvest handling, storage and transport technologies, losses will continue to be high, product quality will continue to be low, and marketing opportunities will remain limited. In this situation, Uzbek products will both lose market share in domestic markets as consumer incomes rise and they become more discerning and continue to lose market share in international markets to emerging competitors from the Central Asian region. This will also affect processing enterprises which will continue to face a lack of raw material and to have to accept raw material inappropriate for processing purposes. Though, as noted, the government has prepared a program of investments in the horticulture sector, the exact nature and scale and, therefore, benefits of those investments are difficult to determine. It has been assumed for the economic analysis of HVCIP that the future without project scenario will reflect the current situation in the sector and that all project benefits represent net incremental benefits.

b. Conversion Factors

31. Economic analysis has been conducted in accordance with the domestic price numeraire,²² in which tradable inputs and outputs have been converted by the application of conversion factors, and nontraded inputs and outputs are valued at their domestic prices. The standard conversion factor (SCF) is estimated to be 0.60 (Table 5). Where appropriate, the shadow exchange rate factor (SERF) of 1.66 has been applied in estimating economic prices.²³

²⁰ This is the assumed rate of tax that will be applicable to ALCs' net income, based on the draft revisions to the Tax Code published at the end of March 2018.

²¹ Based on financing plan, a nominal interest rate of 5.5%, tax of 14%, and inflation of 1.5% per year on foreign currency. The resulting weighted average cost of capital is 3.7%. The WACC estimation is included in the MS excel financial model.

²² Using the domestic currency at the domestic price level. Input and output prices have been estimated in Uzbek sum and converted to US dollars in cash flows for illustrative purposes.

²³ The SERF is the inverse of the SCF.

Given that labor employed in the ALCs will be skilled and semi-skilled, of which there is a scarcity in Andijan and Samarkand, a shadow wage rate factor of 1.0 has been assumed in the analysis.

Table 5: Derivation of the Standard Conversion Factor

Item	Value (\$ million)
Total Imports (M) 2017 ^a	13,008.3
Total Exports (X) 2017 ^a	13,953.0
Import Duty (70%) ^b	9,105.8
Sales Tax on Imports (20%) ^b	2,601.7
Subsidy on Imports (0%)	0.0
Net Value of Taxes on Imports (Tm)	11,707.5
Export Duty (0%) ^b	0.0
Export Rebates (43%) ^c	5,999.8
Net Value of Taxes on Exports (Tx)	5,999.8
Exports + Imports	26,961.3
Imports + Tm	24,715.8
Exports - Tx	19,952.8
Standard Conversion Factor (SCF) (M+X / [M+Tm]+[X-Tx])	0.6036
Shadow Exchange Rate Factor (1/SCF)	1.6568

^a State Committee of the Republic of Uzbekistan on Statistics. 2018. Tashkent.

^b Price Waterhouse Coopers. 2014. Guide to Doing Business and Investing in Uzbekistan.

^c United States Department of Agriculture. 2012. A Report from the Economic Research Service: Economic Policy and Cotton in Uzbekistan. (CWS-12h-01).

c. Project Benefits

32. Economic benefits derive from multiple sources. Direct, long-term benefits accrue from the establishment and operation of the ALCs, the analysis of which is based on the conversion of the financial analysis of the ALCs into economic analysis. As the ALCs provide rental services to local farmers, traders, processors, etc., the outputs of the ALCs are nontraded. In accordance with the domestic price numeraire, the financial prices of these services are, therefore, considered to represent their economic prices.

33. Indirect benefits are both short and long term. Short-term indirect benefits include the increase in economic activity that will be generated during the construction of each ALC. Long-term benefits include (i) the reduction in post-harvest losses, (ii) the increase in exports of fruit and vegetable products, (iii) efficiencies gained in the fruit and vegetable value chain, which include reduced product handling and associated improved product quality, (iv) more transparent price identification and formation and stabilization of fruit and vegetable prices throughout the year, and (v) social and environmental benefits of the reduction in roadside trading from trucks. The exact scale of these benefits is not readily quantifiable and will depend upon the mix and volume of fruit and vegetables handled by each ALC. These benefits can be quantified following commencement of ALC operation in 2023. They have not been included in the economic analysis of each ALC.

d. Project Costs

34. The majority of ALC investment and all operating and staff costs will be domestic,²⁴ for which financial costs are assumed to reflect their economic costs. Certain elements of ALC investment costs (imported plant and machinery, etc.) and project overhead costs may be considered as traded. For such costs, economic prices have been estimated by breaking down the cost into foreign and local currency components and applying the SERF to the foreign currency component and adding the result to the local currency component to obtain the final economic cost.

e. Economic Cash Flow

35. In deriving the economic cash flow of each ALC from the estimates of economic costs and benefits, all transfer payments (taxes and loan interest) have been removed as they do not represent real economic costs. From the resulting economic cash flow an economic internal rate of return (EIRR) has been estimated. This has been subjected to sensitivity analysis using switching values. In this context, the EIRR has been assessed against the ADB cut-off rate of economic viability of 9%.

F. Financial Analysis of Andijan Agro-Logistic Center

1. Overview

36. **Production.** Andijan produces a large variety of fruit and vegetables year-round.²⁵ The region has abundant water, varied agro-climatic conditions and surplus agricultural labor, which allows for two crops per year in most places with different ripening periods throughout the year. The favorable agro-climatic conditions enable farmers to achieve high levels of productivity without the use of chemical fertilizers and agro-chemicals for pest and disease control. This gives farmers in the Andijan area a comparative advantage in the production of organic high-quality fruit, and vegetables for domestic and high-value export markets. The areas under various fruit and vegetables crops in 2015 and projected levels in 2020 are in Table 6. Production is expected to increase by around 30% based on an increase in the area cultivated alone, without any projected increase in crop yields.

²⁴ Certain ALC operating costs may contain indirect foreign exchange costs. As they are not readily quantifiable, they have not been considered in the analysis. This may overstate the economic viability of each ALC but the extent of overestimation is considered to be minimal in terms of overall viability.

²⁵ For detailed analysis, refer to the Andijan Agro-Logistic Center Detailed Feasibility Report, April 2018 (available on request).

Table 6: Area and Production of Selected Fruit and Vegetables in Andijan 2015 and 2020

Crop	2015		2020	
	Area (ha)	Production (ton)	Area (ha)	Production (ton)
Fruit	32,700	634,400	34,300	664,800
Vegetables	19,400	1,596,200	25,800	2,121,000
Potato	7,000	316,800	9,800	442,800
Grape	4,400	76,700	5,100	88,600
Melon	2,200	117,900	4,800	258,300
Total	65,700	2,742,000	79,800	3,575,500

Source: Andijan Agro-logistic Center Detailed Feasibility Report, April 2018.

37. **Post-harvest losses.** Limitations in the availability of effective value-chain infrastructure results in significant post-harvest losses of fruit and vegetables and other perishable products. An estimate of the level of losses is in Table 7. It is estimated that around 807,300 tons of produce are lost post-harvest. This equates to 29% of total production in 2015 (Table 6). Based on an average value of \$600 per ton, the value of these losses is \$484.372 million. Improved access to cold storage and processing facilities would reduce these levels of losses and result in significant value addition.

Table 7: Estimated Post-harvest Losses Andijan Region

Crop	Post-harvest Losses (ton)	Value (\$ million)
Fruit and grapes	47,270	28.362
Vegetables and melons	672,123	403.274
Potatoes	87,893	52.736
Total	807,286	484.372

Note: Value estimated on the basis of an average value of \$600 per ton.

Source: Andijan Agro-logistic Center Detailed Feasibility Report, April 2018.

38. **Value chain.** Analysis of the horticulture value chain suggests that there is significant scope for reducing costs related to product loss and transportation, improving linkages between producers, traders and exporters, and realizing the potential to expand exports. The value chain around Andijan has several links. Traditionally, a large portion of horticulture production originated on *dehkan* farms, which gave rise to an extensive informal marketing chain, well suited to serving local markets from dispersed sources. More recently, an increased share of production originates on larger private farms that focus exclusively on commercial markets. As a result, new marketing channels are emerging that coexist with traditional markets, which together serve *dehkan* and private farms, local markets, processors, and export markets. There is currently a low level of professionalism and efficiency in the fruit and vegetable value chain, epitomized by the existing wholesale market at Jahon Bazar, located in Andijan City. Jahon Bazar and three other markets have cold storage facilities, though they are limited in scale, with the total capacity equal to around 920 tons. There are around 20 other markets in Andijan Region, which operate as truck-sale areas for wholesale activities on public roads. This also gives rise to inefficiencies and food safety and hygiene issues in product handling, storage and transportation.

39. It is proposed to build a new ALC comprising wholesale market, post-harvest and cold storage facilities, an export platform, and related services. This cannot be accomplished by remodeling Jahon Bazar or any of the other markets that currently have cold storage facilities, given the physical capacity and obsolescence of the markets' infrastructure, commercial

limitations, and serious health risks. The Andijan ALC will provide infrastructure where commercial exchanges can be carried out between producers, wholesalers, distributors, retailers, and exporters. This trading platform is integrated with post-harvest processing, cold storage, customs, and related services (finance, certification, etc.). The ALC will be located close to Andijan City and will service fruit and vegetable production areas in five surrounding districts and Andijan City itself, which together currently contribute 51% of total production in Andijan Region (Table 8). Given its location, the ALC could also serve areas in neighboring Fergana and Namangan Regions.

Table 8: Production of Selected Crops in Districts Served by Andijan Agro-Logistic Center
(tons)

District	Potato	Vegetable	Melon	Fruit	Grape	Total	%
Andijan	17,123	213,815	10,330	72,521	14,241	328,030	10.8
Asaka	35,587	265,998	17,332	73,077	17,317	409,311	13.5
Jalakuduk	40,864	149,254	8,333	72,939	6,596	277,986	9.2
Paxtabad	31,924	128,029	5,446	67,820	3,060	236,279	7.8
Shaxrixon	29,092	144,775	10,058	51,518	5,038	240,481	7.9
Andijan City	5,508	33,404	120	12,663	816	52,511	1.7
Total (5 Districts)	160,098	935,275	51,619	350,538	47,068	1,544,598	50.9
Total (Region)	349,175	1,790,855	127,651	681,389	82,834	3,031,904	

Source: Andijan Agro-logistic Center Detailed Feasibility Report, April 2018.

40. Based on projected production volumes for 2020 (Table 6), the throughput of product that would be captured by Andijan ALC for post-harvest services and cold storage is estimated in Table 9. The design of the ALC facilitates an expansion in throughput in both post-harvest services and cold storage.

Table 9: Estimated Volume of Production of Selected Crops Captured by Andijan Agro-logistic Center for Post-harvest Services and Cold Storage 2020
(tons)

Crop	Production	Self-consumption (60%)	Marketable	Post-harvest Services (Domestic Market)	Post-harvest Services (Export Market)	Total Post-harvest Services	Cold Storage
Fruit	664,800	398,880	265,920	34,066	115,496	149,562	179,474
Vegetables	2,121,000	1,272,600	848,400	85,695	335,327	421,022	505,227
Potato	442,800	265,680	177,120	17,108	68,431	85,539	102,647
Grape	88,600	53,160	35,440				
Melon	258,300	154,980	103,320	6,373	25,494	31,867	38,240
Total	3,575,500	2,145,300	1,430,200	143,242	544,748	687,990	825,588

Source: Andijan Agro-Logistic Center Detailed Feasibility Report, April 2018.

2. Revenue

41. Andijan ALC has multiple sources of revenue, comprising income from the rental of (i) market trading areas to wholesalers and small farmers, (ii) post-harvest processing facilities for a range of fruit and vegetable products, (iii) cold storage and frozen storage rented on a daily and monthly basis, and (iv) floor space in the ALC administration building. Commencing in 2023 when the ALC becomes operational, revenues increase over time in accordance with the phasing of capacity utilization, which varies by type of facility. In the first year, the wholesale and small farmers' market areas, cold and frozen storage facilities, and administration building areas are estimated to reach 75% of capacity. Thereafter, the rental of these areas increases to full capacity (100%) by the sixth year (2028). Rental of processing facilities is projected to commence at a lower level of 50% of capacity in the first year but also rise to full capacity by 2028. Total annual revenue amounts to SUM219,397.3 million (\$26.953million) at full capacity (Table 10). The key sources of revenue are rental of post-harvest processing facilities for fruit and vegetable, which accounts for 51% of total revenue, and rental of cold storage facilities, which accounts for 43% of total revenue.

Table 10: Andijan Agro-Logistic Center Projected Annual Revenue at Full Capacity

Source of Revenue	Unit	Quantity	Unit Price (SUM)	Total Revenue (SUM million)	Unit Price (\$)	Total Revenue (\$ '000)
Wholesale market area (12,000 m2 per month)	m2	101,112	24,420	2,469.2	3.00	303.3
Small farmers' area (12,000 m2 per day)	m2	2,637,338	1,628	4,293.6	0.20	527.5
Post-harvest processing - export (small fruit)	ton	50,000	407,000	20,350.0	50.00	2,500.0
Post-harvest processing - export (tubers)	ton	100,000	146,520	14,652.0	18.00	1,800.0
Post-harvest processing - export (tomato and similar)	ton	300,000	203,500	61,050.0	25.00	7,500.0
Post-harvest processing - export (carrot, pepper, etc.)	ton	150,000	97,680	14,652.0	12.00	1,800.0
Post-harvest processing - domestic	ton	63,780	24,420	1,557.5	3.00	191.3
Cold storage (daily) - 40,500 m3 per day	m3	14,782,500	5,698	84,230.7	0.70	10,347.8
Cold storage (monthly) - 13,500 m3 per month	m3	162,000	32,560	5,274.7	4.00	648.0
Freezer storage (daily) - 1,500 m3 per day	m3	547,500	6,838	3,743.6	0.84	459.9
Freezer storage (monthly) - 4,500 m3 per month	m3	54,000	40,700	2,197.8	5.00	270.0
Market (1st Floor) rental areas - 2,160 m2 per month	m2	19,440	56,980	1,107.7	7.00	136.1
Customs office rental - 1,000 m2 per month	m2	12,000	56,980	683.8	7.00	84.0
Administration area rental - 1,000 m2 per month	m2	12,000	56,980	683.8	7.00	84.0
Other areas rental - 142,133 m2 per month	m2	869,988	2,035	1,770.4	0.25	217.5
Subtotal (Rentable Areas)				218,716.7		26,869.4
Other revenue				680.6		83.6
Total				219,397.3		26,953.0

m2 = square meter, m3 = cubic meter.

Notes:

Unit price is based on the end-March 2018 unit price.

Total revenue is the revenue earned when the ALC is operating at full capacity.

Small farmers' area is based on a total area of 12,000 m² and 2,000 individual stalls of 6 m² rented for 313 days per year.

Figures may not sum due to rounding.

Source: Asian Development Bank.

3. Costs

a. Investment cost

42. The total cost of establishing the Andijan ALC is estimated at SUM630,058.8 million (\$77.4 million) including physical contingencies (net of taxes and duties). A detailed breakdown of investment costs is in Table 11.

Table 11: Andijan Agro-logistic Center Estimated Investment Cost

Item	Unit	Quantity	Unit Cost (SUM)	Total Cost (SUM million)	Unit Cost (\$)	Total Cost (\$ '000)
Groundwork and Infrastructure						
ALC Entrance	m2	335	7,203,900	2,534.0	885.00	311.3
Land Levelling, Roads, Parking, etc	m2	121,204	1,066,340	135,706.9	131.00	16,671.6
Electricity Distribution Network	m2	1,000	5,616,600	5,897.4	690.00	724.5
Water Supply	m2	2,900	2,319,900	7,064.1	285.00	867.8
Waste Water Treatment Plant	m2	3,500	3,695,560	13,581.2	454.00	1,668.5
Solid Waste Management System	m2	1,315	1,872,200	2,585.0	230.00	317.6
Railway Line	m2	1,100	1,684,980	1,946.2	207.00	239.1
Highway Access	m2	1,600	1,107,040	1,859.8	136.00	228.5
Subtotal				171,174.6		21,028.8
Buildings						
Fruit and Vegetable Storage/Sale - Wholesalers	m2	12,505	4,949,120	63,436.0	608.00	7,793.1
Fruit and Vegetable Storage/Sale - Small Farmers	m2	12,505	4,949,120	63,436.0	608.00	7,793.1
Post-harvest Processing Building (Exports)	m2	14,544	5,413,100	80,696.3	665.00	9,913.6
Post-harvest Processing Building (Domestic)	m2	5,905	4,436,300	26,851.3	545.00	3,298.7
Cold Storage	m2	18,010	6,512,000	120,213.1	800.00	14,768.2
Containers Area	m2	54,185	431,420	23,960.9	53.00	2,943.6
Administration	m2	8,640	2,442,000	21,626.4	300.00	2,656.8
Subtotal				400,219.9		49,167.1
Plant and Equipment						
Processing Lines (Washing/Sorting)	No	12	3,127,388,000	37,528.7	384,200	4,610.4
Pallet Trucks (Electric)	No	26	77,142,780	2,005.7	9,477	246.4
Forklift Trucks	No	4	278,388,000	1,113.6	34,200	136.8
Cold Storage Forklift Trucks	No	8	350,956,100	2,807.6	43,115	344.9
Wheelbarrows	No	332	3,117,620	1,035.0	383.00	127.2
Road Sweeper	No	12	366,300,000	4,505.5	45,000	553.5
Scrub Driver	No	12	77,330,000	951.2	9,500	116.9
Skid Steer	No	11	325,600,000	3,671.1	40,000	451.0
Refuse Bins (1,100 liter)	No	100	5,291,000	542.3	650.00	66.6
Vehicle Access Control	No	1	679,844,660	679.8	83,519	83.5
Video Surveillance System	No	1	2,133,127,700	2,133.1	262,055	262.1
Office Equipment and Fittings	sum			1,690.6		207.7
Subtotal				58,664.3		7,206.9
Total				630,058.8		77,402.8

m2 = square meter.

Notes:

Unit costs are based on end-March 2018 prices.

Total costs include physical contingencies.

Figures may not sum due to rounding.

Source: Asian Development Bank.

b. Operating and staff costs

43. Operating costs of the Andijan ALC comprise utilities (electricity and water), pallets and boxes for fruit and vegetables storage and transport, public relations, office administration, waste management and cleaning, and ALC maintenance. A breakdown of operating costs by type, unit cost and total cost is in Table 12.

Table 12: Andijan Agro-Logistic Center Estimated Annual Operating Cost

Item	Unit	Quantity	Unit Cost (SUM)	Total Cost (SUM million)	Unit Cost (\$)	Total Cost (\$ '000)
Electricity (1,730.0 kWh/hour, 10 hours/day, 26 days/month)	kWh	5,397,600	130.2	703.0	0.016	86.4
Water (515 m3/day, 365 days per year)	m3	187,975	781.4	146.9	0.096	18.0
Hygienic Pallets	No	600	651,200.0	390.7	80.00	48.0
Boxes (85 liter)	No	4,000	130,240.0	521.0	16.00	64.0
Boxes (54 liter)	No	6,500	97,680.0	634.9	12.00	78.0
Boxes (33 liter)	No	8,500	73,260.0	622.7	9.00	76.5
Boxes (28 liter)	No	12,000	65,120.0	781.4	8.00	96.0
Plastic boxes (Local market)	No	20,000	5,616.6	112.3	0.69	13.8
Public relations and advertising	sum			244.2		30.0
Insurance	sum			897.5		110.3
Communications	sum			284.9		35.0
Waste treatment	ton	13,276	35,246.2	467.9	4.33	57.5
Cleaning (based on surface area)	m2	203,558	2,197.8	447.4	0.27	55.0
Cleaning consumables and uniforms	sum			611.7		75.2
Surveillance and security	sum			70.3		8.6
Maintenance (1% of investment cost at full development)	sum			6,300.6		774.0
Total				13,237.4		1,626.2

kWh = kilowatt hour, m3 = cubic meter.

Notes:

Unit cost is based on the end-March 2018 price.

Quantity and total cost refer to annual operating costs when the ALC is operating at full capacity.

Figures may not sum due to rounding.

Source: Asian Development Bank.

44. The total staff proposed for the Andijan ALC is around 1,160, the majority of which is staff engaged in post-harvest processing. In addition to employee salaries, there are incidental costs related to ALC staff, including employee life insurance, other social costs, staff training, and expenses related to members of the ALC management entity board attending meetings. Details of staff costs broken down by employee grade and by type in Table 13. The full complement of staff will be engaged from 2023 onwards when the ALC commences operations. Prior to that, in 2022, key management staff will be engaged for up to six months to prepare for the commencement of ALC operations, and to undergo capacity building, etc.

Table 13: Andijan Agro-Logistic Center Estimated Annual Staff Cost

Staff Grade and Item	Unit	Number	Unit Cost (SUM)	Total Cost		
				(SUM million)	(Unit Cost \$) Total Cost (\$ '000)	
Managing Director	year	1	297,630,960	297.6	36,564.0	36.6
Operations Director	year	1	217,411,260	217.4	26,709.0	26.7
Technical Director	year	1	217,411,260	217.4	26,709.0	26.7
Administration Director	year	1	217,411,260	217.4	26,709.0	26.7
Financial Director	year	1	176,751,960	176.8	21,714.0	21.7
Business Units Director	year	1	176,751,960	176.8	21,714.0	21.7
Legal and Human Resources Director	year	1	176,751,960	176.8	21,714.0	21.7
Sales and Marketing Director	year	1	176,751,960	176.8	21,714.0	21.7
Engineering/Services Managers	year	2	176,751,960	353.5	21,714.0	43.4
Department Managers/Heads	year	28	83,516,400	2,338.5	10,260.0	287.3
Subject specialists	year	60	31,176,200	1,870.6	3,830.0	229.8
Miscellaneous staff	year	220	18,477,800	4,065.1	2,270.0	499.4
Post-harvest staff	year	840	12,323,960	10,352.1	1,514.0	1,271.8
Life insurance (5.0%) of staff salary costs	sum			1,031.8		126.8
Staff training	sum			488.4		60.0
Other social costs	sum			40.7		5.0
Board member expenses (10 members)	meeting	40	4,070,000	162.8	500.0	20.0
Total				22,360.4		2,747.0

Notes:

Unit cost is based on the end-March 2018 employee salary and item cost.

Total cost refers to annual staff costs when the ALC is operating at full capacity.

Figures may not sum due to rounding.

Source: Asian Development Bank.

4. Financial Analysis

45. Based on a 20-year cash flow of revenue and costs, the FIRR of the Andijan ALC is 18.4%. Sensitivity analysis, based on switching values, indicates that the investment is highly robust with respect to adverse movements in revenue and costs, resulting from the high FIRR relative to the nominal cost of funds of 5.5% to establish the ALC. A fall in revenue of 49.6% would be necessary for the FIRR to fall to the level of the assumed cost of funds. Similarly, investment costs could rise by 157.1% and operating and staff costs by 290.3% before the FIRR fell to the assumed cost of funds. Summary annual revenue, costs and financial indicators are in Table 14. The Andijan detailed financial cash flow is in Table A1 in the appendix.

Table 14: Andijan Agro-Logistic Center Summary Financial Cash Flow and Indicators

Unit: SUM million

Year	Revenue	Cost					Net Cash Flow
		Investment Cost	Over-head Cost	Operating Cost	Staff Cost	Total Cost	
2019	0.0	0.0	10,463.8	0.0	0.0	10,463.8	(10,463.8)
2020	0.0	131,711.1	8,354.3	0.0	0.0	140,065.4	(140,065.4)
2021	0.0	274,371.7	8,130.4	0.0	0.0	282,502.0	(282,502.0)
2022	0.0	223,976.1	4,084.4	0.0	1,283.7	229,344.1	(229,344.1)
2023	136,515.3	0.0	1,564.1	9,922.3	21,872.0	33,358.4	103,156.9
2024	153,091.7	0.0	0.0	8,198.6	22,360.4	30,559.0	122,532.7
2025	169,668.1	0.0	0.0	9,173.0	22,360.4	31,533.3	138,134.8
2026	186,244.5	0.0	0.0	10,100.5	22,360.4	32,460.9	153,783.6
2027	202,820.9	1,246.2	0.0	10,981.2	22,360.4	34,587.8	168,233.1
2028	219,397.3	0.0	0.0	11,815.2	22,360.4	34,175.5	185,221.7
2029	219,397.3	0.0	0.0	12,211.3	22,360.4	34,571.6	184,825.6
2030	219,397.3	19,889.5	0.0	12,607.4	22,360.4	54,857.2	164,540.0
2031	219,397.3	0.0	0.0	13,237.4	22,360.4	35,597.8	183,799.5
2032	219,397.3	1,246.2	0.0	13,237.4	22,360.4	36,844.0	182,553.3
2033	219,397.3	0.0	0.0	13,237.4	22,360.4	35,597.8	183,799.5
2034	219,397.3	0.0	0.0	13,237.4	22,360.4	35,597.8	183,799.5
2035	219,397.3	0.0	0.0	13,237.4	22,360.4	35,597.8	183,799.5
2036	219,397.3	0.0	0.0	13,237.4	22,360.4	35,597.8	183,799.5
2037	219,397.3	1,246.2	0.0	13,237.4	22,360.4	36,844.0	182,553.3
2038	219,397.3	19,889.5	0.0	13,237.4	22,360.4	55,487.3	163,910.0
2039	219,397.3	0.0	0.0	13,237.4	22,360.4	35,597.8	183,799.5
ENPV @5.5%	1,746,604.9	551,879.4	28,841.9	101,937.5	196,765.2	879,424.0	867,180.8
FIRR	18.4%						
Switching Value	49.6%	157.1%		290.3%			

FIRR = financial internal rate of return, ENPV = financial net present value.

Source: Asian Development Bank.

5. Economic Analysis

46. The economic analysis of the Andijan ALC results in an EIRR of 16.6%, well above the ADB economic cut-off rate of 9%, indicating that the ALC is economically viable. Sensitivity analysis also indicates that the economic cash flow is highly robust with respect to adverse changes in benefit and cost streams. Switching values are estimated at 33.5% for benefits, 71.8% for investment costs, and 190.8% for combined operating and staff costs. Summary economic benefits and costs and economic indicators are in Table 15. The Andijan detailed economic cash flow is in Table A2 in the appendix.

Table 15: Andijan Agro-Logistic Center Summary Economic Cash Flow and Indicators

Unit: SUM million

Year	Revenue	Cost					Net Cash Flow
		Investment Cost	Overhead Cost	Operating Cost	Staff Cost	Total Cost	
2019	0.0	0.0	10,463.8	0.0	0.0	10,463.8	(10,463.8)
2020	0.0	144,772.6	8,354.3	0.0	0.0	153,126.9	(153,126.9)
2021	0.0	298,774.8	8,130.4	0.0	0.0	306,905.2	(306,905.2)
2022	0.0	258,856.1	4,084.4	0.0	1,283.7	264,224.2	(264,224.2)
2023	136,515.3	0.0	1,564.1	10,067.0	21,872.0	33,503.1	103,012.2
2024	153,091.7	0.0	0.0	8,415.7	22,360.4	30,776.0	122,315.6
2025	169,668.1	0.0	0.0	9,462.3	22,360.4	31,822.7	137,845.4
2026	186,244.5	0.0	0.0	10,462.2	22,360.4	32,822.6	153,421.9
2027	202,820.9	1,686.9	0.0	11,415.3	22,360.4	35,462.5	167,358.3
2028	219,397.3	0.0	0.0	12,321.6	22,360.4	34,682.0	184,715.3
2029	219,397.3	0.0	0.0	12,790.0	22,360.4	35,150.4	184,246.9
2030	219,397.3	26,923.8	0.0	13,258.5	22,360.4	62,542.6	156,854.6
2031	219,397.3	0.0	0.0	13,960.9	22,360.4	36,321.3	183,076.0
2032	219,397.3	1,686.9	0.0	13,960.9	22,360.4	38,008.1	181,389.1
2033	219,397.3	0.0	0.0	13,960.9	22,360.4	36,321.3	183,076.0
2034	219,397.3	0.0	0.0	13,960.9	22,360.4	36,321.3	183,076.0
2035	219,397.3	0.0	0.0	13,960.9	22,360.4	36,321.3	183,076.0
2036	219,397.3	0.0	0.0	13,960.9	22,360.4	36,321.3	183,076.0
2037	219,397.3	1,686.9	0.0	13,960.9	22,360.4	38,008.1	181,389.1
2038	219,397.3	26,923.8	0.0	13,960.9	22,360.4	63,245.0	156,152.2
2039	219,397.3	0.0	0.0	13,960.9	22,360.4	36,321.3	183,076.0
ENPV@9.0%	1,183,029.7	551,927.3	26,819.6	71,876.6	135,928.7	786,552.4	396,477.3
EIRR	16.6%						
Switching Value	33.5%	71.8%		190.8%			

EIRR = economic internal rate of return, ENPV = economic net present value.

Source: Asian Development Bank.

G. Financial Analysis of Samarkand Agro-Logistic Center

1. Overview

47. **Production.** Samarkand produces a large variety of fruit and vegetables year-round.²⁶ The region has abundant water, varied agro-climatic conditions and surplus agricultural labor, which allows for two or three crops per year (depending on location) with different ripening periods throughout the year. The favorable agro-climatic conditions enable farmers to achieve high levels of productivity without the use of chemical fertilizers and agro-chemicals for pest and disease control. This gives farmers in the Samarkand area a comparative advantage in the production of organic high-quality fruit, and vegetables for domestic and high-value export markets. The areas under various fruit and vegetables crops in 2015 and projected levels in 2020 are in Table 16.

²⁶ For detailed analysis, refer to the Samarkand Agro-logistic Center Detailed Feasibility Report, April 2018. (available on request).

Production is expected to increase by around 28% based on an increase in the area cultivated alone, without any projected increase in crop yields.

Table 16: Area and Production of Selected Fruit and Vegetables in Samarkand in 2015 and 2020

Crop	2015		2020	
	Area (ha)	Production (ton)	Area (ha)	Production (ton)
Fruit	37,300	413,300	39,300	435,300
Vegetables	29,900	1,767,900	38,200	2,257,600
Potato	13,000	619,000	17,200	820,600
Grape	39,000	607,100	39,700	618,300
Melon	3,000	123,400	9,300	381,700
Total	122,200	3,530,700	143,700	4,513,500

Source: Samarkand Agro-Logistic Center Detailed Feasibility Report, April 2018.

48. **Post-harvest losses.** Limitations in the availability of effective value-chain infrastructure results in significant post-harvest losses of fruit and vegetables and other perishable products. An estimate of the level of losses is in Table 17. It is estimated that around 755,000 tons of produce are lost post-harvest. This equates to 21% of total production in 2015 (Table 16). Based on an average value of \$600 per ton, the value of these losses is \$452.886 million. Improved access cold storage and processing facilities would reduce these levels of losses and result in significant value addition.

Table 17: Estimated Post-harvest Losses Samarkand Region

Crop	Post-harvest Losses (ton)	Value (\$ million)
Fruit and grapes	151,474	90.884
Vegetables and melons	326,518	195.911
Potatoes	276,818	166.091
Total	754,810	452.886

Note: Value estimated on the basis of an average value of \$600 per ton.

Source: Samarkand Agro-Logistic Center Detailed Feasibility Report, April 2018.

49. **Value chain.** Analysis of the horticulture value chain suggests that there is significant scope for reducing costs related to product loss and transportation, improving linkages between producers, traders and exporters, and realizing the potential to expand exports. The value chain around Samarkand has several links. Traditionally, a large portion of horticulture production originated on *dehkan* farms, which gave rise to an extensive informal marketing chain, well suited to serving local markets from dispersed sources. More recently, an increased share of production originates on larger private farms that focus exclusively on commercial markets. As a result, new marketing channels are emerging that coexist with traditional markets, which together serve *dehkan* and private farms, local markets, processors, and export markets. There is currently a low level of professionalism and efficiency in the fruit and vegetable value chain, epitomized by the existing wholesale market at Yangi Bazar, which in practice is a truck-sale area for wholesale activities on public roads. This also gives rise to inefficiencies and food safety and hygiene issues in product handling, storage and transportation.

50. It is proposed to build a new ALC comprising wholesale market, post-harvest and cold storage facilities, an export platform, and related services. This cannot be accomplished by remodeling Yangi Bazar given the physical capacity and obsolescence of its infrastructure, its commercial limitations, and serious health risks. The ALC will provide infrastructure where commercial exchanges can be carried out between producers, wholesalers, distributors, retailers,

and exporters. This trading platform is integrated with post-harvest processing, cold storage, customs, and related services (finance, certification, etc.). The Samarkand ALC is designed to handle production from five districts, which together currently contribute 60% of total production in Samarkand region (Table 18).

Table 18: Production of Selected Crops in Districts Served by Samarkand Agro-Logistic Center
(tons)

District	Potato	Vegetable	Melon	Fruit	Grape	Total	%
Bulungur	99,406	353,400	8,400	64,460	94,866	620,532	17.1
Jomboy	72,162	220,414	31,258	40,400	8,703	372,936	10.3
Samarkand	45,200	210,588	4,200	44,750	52,656	357,394	9.9
Taylok	112,142	203,509	7,800	36,000	78,845	438,296	12.1
Urgut	105,073	167,091		16,199	97,137	385,501	10.6
Total (5 Districts)	433,983	1,155,002	51,658	201,809	332,207	2,174,659	60.0
Total (Region)	667,420	1,822,700	139,091	431,100	562,579	3,622,891	

Source: Samarkand Agro-logistic Center Detailed Feasibility Report, April 2018.

51. Based on projected production volumes for 2020 (Table 16), the throughput of product that would be captured by Samarkand ALC for post-harvest services and cold storage is estimated in Table 19. The design of the ALC facilitates an expansion in throughput in both post-harvest services and cold storage.

Table 19: Estimated Volume of Production of Selected Crops Captured by Samarkand Agro-Logistic Center for Post-harvest Services and Cold Storage 2020
(tons)

Crop	Production	Self-consumption (60%)	Marketable	Post-harvest Services (Domestic Market)	Post-harvest Services (Export Market)	Total Post-harvest Services	Cold Storage
Fruit	435,300	261,180	174,120	20,665	77,866	98,531	126,264
Vegetables	2,257,600	1,354,560	903,040	88,397	353,589	441,986	565,742
Potato	820,600	492,360	328,240		123,841	123,841	154,802
Grape	618,300	370,980	247,320		121,417	121,417	151,771
Melon	381,700	229,020	152,680	6,170	24,680	30,850	39,488
Total	4,513,500	2,708,100	1,805,400	115,232	701,393	816,626	1,038,067

Source: Samarkand Agro-Logistic Center Detailed Feasibility Report, April 2018.

2. Revenue

52. Samarkand ALC has multiple sources of revenue, comprising income from the rental of (i) market trading areas to wholesalers and small farmers, (ii) post-harvest processing facilities for a range of fruit and vegetable products, (iii) cold storage and frozen storage rented on a daily and monthly basis, and (iv) floor space in the ALC administration building. Commencing in 2023 when

the ALC becomes operational, revenues increase over time in accordance with the phasing of capacity utilization, which varies by type of facility. In the first year, the wholesale and small farmers' market areas, cold and frozen storage facilities, and administration building areas are estimated to reach 75% of capacity. Thereafter, the rental of these areas increases to full capacity (100%) by the sixth year (2028). Rental of processing facilities is projected to commence at a lower level of 50% of capacity in the first year but also rise to full capacity by 2028. Total annual revenue amounts to SUM295.665.3 million (\$36.323 million) at full capacity (Table 20). The key sources of revenue are rental of post-harvest processing facilities for fruit and vegetable exports, which together account for 62% of total revenue, and daily rental of cold storage facilities, which accounts for 32% of total revenue.

Table 20: Samarkand Agro-Logistic Center Projected Annual Revenue at Full Capacity

Source of Revenue	Unit	Quantity	Unit Price (SUM)	Total Revenue (SUM million)	Unit Price (\$)	Total Revenue (\$ '000)
Wholesale market area (12,000 m2 per month)	m2	144,000	24,420	3,516.5	3.00	432.0
Small farmers' area (12,000 m2 per day)	m2	3,756,000	1,628	6,114.8	0.20	751.2
Post-harvest processing - export (small fruit)	Ton	150,000	407,000	61,050.0	50.00	7,500.0
Post-harvest processing - export (tubers)	Ton	100,000	146,520	14,652.0	18.00	1,800.0
Post-harvest processing - export (tomato and similar)	Ton	350,000	203,500	71,225.0	25.00	8,750.0
Post-harvest processing - export (carrot, pepper, etc)	Ton	150,000	97,680	14,652.0	12.00	1,800.0
Post-harvest processing - export (cabbage, lettuce, etc)	Ton	100,000	203,500	20,350.0	25.00	2,500.0
Post-harvest processing – domestic	Ton	63,780	24,420	1,557.5	3.00	191.3
Cold storage (daily) - 40,500 m3 per day	m3	14,782,500	5,698	84,230.7	0.70	10,347.8
Cold storage (monthly) - 13,500 m3 per month	m3	162,000	32,560	5,274.7	4.00	648.0
Freezer storage (daily) - 1,500 m3 per day	m3	547,500	6,838	3,743.6	0.84	459.9
Freezer storage (monthly) - 4,500 m3 per month	m3	54,000	40,700	2,197.8	5.00	270.0
Market (1st Floor) rental areas - 2,160 m2 per month	m2	25,920	56,980	1,476.9	7.00	181.4
Customs office rental - 1,000 m2 per month	m2	12,000	56,980	683.8	7.00	84.0
Administration area rental - 1,000 m2 per month	m2	12,000	56,980	683.8	7.00	84.0
Other areas rental - 142,133 m2 per month	m2	1,705,596	2,035	3,470.9	0.25	426.4
Subtotal (Rentable Areas)				294,879.9		36,226.0
Other revenue				785.4		96.5
Total				295,665.3		36,322.5

m2 = square meter, m3 = cubic meter.

Notes:

Unit price is based on the end-March 2018 unit price.

Total revenue is the revenue earned when the ALC is operating at full capacity.

Small farmers' area is based on a total area of 12,000 m2 and 2,000 individual stalls of 6 m2 rented for 313 days per year.

Figures may not sum due to rounding.

Source: Asian Development Bank.

3. Costs

a. Investment cost

53. The total cost of establishing the Samarkand ALC is estimated at SUM834,106.4 million (\$102.5 million) including physical contingencies (net of taxes and duties). A detailed breakdown of investment costs is in Table 21.

Table 21: Samarkand Agro-Logistic Center Estimated Investment Cost

Item	Unit	Quantity	Unit Cost (SUM)	Total Cost (SUM million)	Unit Cost (\$)	Total Cost (\$ '000)
Groundwork and Infrastructure						
ALC Entrance	m2	335	7,203,900	2,534.0	885.00	311.3
Land Levelling, Roads, Parking, etc	m2	243,384	1,058,200	270,426.4	130.00	33,221.9
Electricity Distribution Network	m2	1,000	5,616,600	5,897.4	690.00	724.5
Water Supply	m2	2,900	2,319,900	7,064.1	285.00	867.8
Waste Water Treatment Plant	m2	3,500	3,695,560	13,581.2	454.00	1,668.5
Solid Waste Management System	m2	1,315	1,872,200	2,585.0	230.00	317.6
Railway Line	m2	1,875	1,684,980	3,317.3	207.00	407.5
Highway Access	m2	8,700	1,107,040	10,112.8	136.00	1,242.4
Subtotal				315,518.2		38,761.5
Buildings						
Fruit and Vegetable Storage/Sale – Wholesalers	m2	17,810	4,664,220	85,146.5	573.00	10,460.3
Fruit and Vegetable Storage/Sale - Small Farmers	m2	17,810	4,664,220	85,146.5	573.00	10,460.3
Post-harvest Processing Building (Exports)	m2	14,544	5,242,160	78,148.0	644.00	9,600.5
Post-harvest Processing Building (Domestic)	m2	5,905	4,070,000	24,634.2	500.00	3,026.3
Cold Storage	m2	18,010	6,202,680	114,503.0	762.00	14,066.7
Containers Area	m2	79,335	431,420	35,082.4	53.00	4,309.9
Administration	m2	8,640	2,442,000	21,626.4	300.00	2,656.8
Subtotal				444,287.0		54,580.7
Plant and Equipment						
Processing Lines (Washing/Sorting)	No	17	3,127,388,000	53,165.6	384,200.00	6,531.4
Pallet Trucks (Electric)	No	26	77,142,780	2,005.7	9,477.00	246.4
Forklift Trucks	No	4	278,388,000	1,113.6	34,200.00	136.8
Cold Storage Forklift Trucks	No	8	350,956,100	2,807.6	43,115.00	344.9
Wheelbarrows	No	332	3,117,620	1,035.0	383.00	127.2
Road Sweeper	No	12	366,300,000	4,505.5	45,000.00	553.5
Scrub Driver	No	12	77,330,000	951.2	9,500.00	116.9
Skid Steer	No	11	325,600,000	3,671.1	40,000.00	451.0
Refuse Bins (1,100 liter)	No	100	5,291,000	542.3	650.00	66.6
Vehicle Access Control	No	1	679,844,660	679.8	83,519.00	83.5
Video Surveillance System	No	1	2,133,127,700	2,133.1	262,055.00	262.1
Office Equipment and Fittings	Sum	1		1,690.6		207.7
Subtotal				74,301.2		9,127.9
Total				834,106.4		102,470.1

m2 = square meter.

Note:

Unit costs are based on end-March 2018 prices.

Total costs include physical contingencies.

Figures may not sum due to rounding.

Source: Asian Development Bank.

b. Operating and staff costs

54. Operating costs of the Samarkand ALC comprise utilities (electricity and water), pallets and boxes for fruit and vegetables storage and transport, public relations, office administration, waste management and cleaning, and ALC maintenance. A breakdown of operating costs by type, unit cost and total cost is in Table 22.

Table 22: Samarkand Agro-Logistic Center Estimated Annual Operating Cost

Item	Unit	Quantity	Unit Cost (SUM)	Total Cost (SUM million)	Unit Cost (\$)	Total Cost (\$ '000)
Electricity (2,366 kWh/hour, 10 hours/day, 26 days/month)	kWh	7,381,920	130.2	961.4	0.016	118.1
Water (779 m3/day, 365 days per year)	m3	284,335	781.4	222.2	0.096	27.3
Hygienic Pallets	No	600	651,200.0	390.7	80.00	48.0
Boxes (85 liter)	No	4,000	130,240.0	521.0	16.00	64.0
Boxes (54 liter)	No	6,500	97,680.0	634.9	12.00	78.0
Boxes (33 liter)	No	8,500	73,260.0	622.7	9.00	76.5
Boxes (28 liter)	No	12,000	65,120.0	781.4	8.00	96.0
Plastic boxes (Local market)	No	20,000	5,616.6	112.3	0.69	13.8
Public relations and advertising	Sum			244.2		30.0
Insurance	Sum			1,202.0		147.7
Communications	Sum			284.9		35.0
Waste treatment (declining % of total processing tons)	Ton	18,276	35,246.2	644.1	4.33	79.1
Cleaning (based on surface area)	m2	353,965	2,197.8	777.9	0.27	95.6
Cleaning consumables and uniforms	Sum			248.7		30.6
Surveillance and security	Sum			111.6		13.7
Maintenance (1% of investment cost at full development)	Sum			8,341.1		1,024.7
Total				16,101.2		1,978.0

kWh = kilowatt hour, m3 = cubic meter.

Notes:

Unit cost is based on the end-March 2018 price.

Quantity and total cost refer to annual operating costs when the ALC is operating at full capacity.

Figures may not sum due to rounding.

Source: Asian Development Bank.

55. The total staff proposed for the Samarkand ALC is around 1,500, the majority of which is staff engaged in post-harvest processing. In addition to employee salaries, there are incidental costs related to ALC staff, including employee life insurance, other social costs, staff training, and expenses related to members of the ALC management entity board attending meetings. Details of staff costs broken down by employee grade and by type in Table 23. The full complement of staff will be engaged from 2023 onwards when the ALC commences operations. Prior to that, in 2022, key management staff will be engaged for up to six months to prepare for the commencement of ALC operations, and to undergo capacity building, etc.

Table 23: Samarkand Agro-Logistic Center Estimated Annual Staff Cost

Staff Grade and Item	Unit	Number	Unit Cost (SUM)	Total Cost (SUM million)	Unit Cost (\$)	Total Cost (\$ '000)
Managing Director	Year	1	297,630,960	297.6	36,564.0	36.6
Operations Director	Year	1	217,411,260	217.4	26,709.0	26.7
Technical Director	Year	1	217,411,260	217.4	26,709.0	26.7
Administration Director	Year	1	217,411,260	217.4	26,709.0	26.7
Financial Director	Year	1	176,751,960	176.8	21,714.0	21.7
Business Units Director	Year	1	176,751,960	176.8	21,714.0	21.7
Legal and Human Resources Director	Year	1	176,751,960	176.8	21,714.0	21.7
Sales and Marketing Director	Year	1	176,751,960	176.8	21,714.0	21.7
Engineering/Services Managers	Year	2	176,751,960	353.5	21,714.0	43.4
Department Managers/Heads	Year	28	83,516,400	2,338.5	10,260.0	287.3
Subject specialists	Year	60	31,176,200	1,870.6	3,830.0	229.8
Miscellaneous staff	Year	220	18,477,800	4,065.1	2,270.0	499.4
Post-harvest staff	Year	1,190	12,323,960	14,665.5	1,514.0	1,801.7
Life insurance (5.0%) of staff salary costs	Sum			1,247.5		153.3
Staff training	Sum			488.4		60.0
Other social costs	Sum			40.7		5.0
Board member expenses (10 members)	meeting	40	4,070,000	162.8	500.0	20.0
Total				26,889.4		3,303.4

Note:

Unit cost is based on the end-March 2018 employee salary.

Total cost refers to annual staff costs when the ALC is operating at full capacity.

Figures may not sum due to rounding.

Source: Asian Development Bank.

4. Financial Analysis

56. Based on a 20-year cash flow of revenue and costs, the FIRR of the Samarkand ALC is 18.5%. Sensitivity analysis, based on switching values, indicates that the investment is highly robust with respect to adverse movements in revenue and costs, resulting from the high FIRR relative to the cost of funds of 5.5% to establish the ALC. A fall in revenue of 51.7% would be necessary for the FIRR to fall to cost of funds. Similarly, investment costs could rise by 166.1% and operating and staff costs by 336.5% before the FIRR fell to the cost of funds. Summary annual revenue, costs and financial indicators are in Table 24. The Samarkand detailed financial cash flow is in Table A3 in the appendix.

Table 24: Samarkand Agro-Logistic Center Summary Financial Cash Flow and Indicators

Unit: SUM million

Year	Revenue	Cost					Net Cash Flow
		Investment Cost	Overhead Cost	Operating Cost	Staff Cost	Total Cost	
2019	0.0	0.0	16,197.3	0.0	0.0	16,197.3	(16,197.3)
2020	0.0	215,253.5	10,966.7	0.0	0.0	226,220.2	(226,220.2)
2021	0.0	351,222.8	10,672.5	0.0	0.0	361,895.3	(361,895.3)
2022	0.0	267,630.2	5,357.9	0.0	1,283.7	274,271.8	(274,271.8)
2023	175,483.9	0.0	2,047.5	11,207.9	26,401.0	39,656.4	135,827.5
2024	199,520.2	0.0	0.0	9,747.9	26,889.4	36,637.4	162,882.9
2025	223,556.5	0.0	0.0	10,968.3	26,889.4	37,857.7	185,698.7
2026	247,592.8	0.0	0.0	12,124.3	26,889.4	39,013.7	208,579.0
2027	271,629.0	1,246.2	0.0	13,215.9	26,889.4	41,351.4	230,277.6
2028	295,665.3	0.0	0.0	14,243.0	26,889.4	41,132.4	254,532.9
2029	295,665.3	0.0	0.0	14,755.0	26,889.4	41,644.5	254,020.8
2030	295,665.3	19,889.5	0.0	15,267.1	26,889.4	62,046.0	233,619.3
2031	295,665.3	0.0	0.0	16,101.2	26,889.4	42,990.6	252,674.7
2032	295,665.3	1,246.2	0.0	16,101.2	26,889.4	44,236.8	251,428.5
2033	295,665.3	0.0	0.0	16,101.2	26,889.4	42,990.6	252,674.7
2034	295,665.3	0.0	0.0	16,101.2	26,889.4	42,990.6	252,674.7
2035	295,665.3	0.0	0.0	16,101.2	26,889.4	42,990.6	252,674.7
2036	295,665.3	0.0	0.0	16,101.2	26,889.4	42,990.6	252,674.7
2037	295,665.3	1,246.2	0.0	16,101.2	26,889.4	44,236.8	251,428.5
2038	295,665.3	19,889.5	0.0	16,101.2	26,889.4	62,880.1	232,785.2
2039	295,665.3	0.0	0.0	16,101.2	26,889.4	42,990.6	252,674.7
FNPV@5.5%	2,335,589.0	727,624.0	40,186.4	122,681.7	236,485.4	1,126,977.6	1,208,611.5
FIRR	18.5%						
Switching Value	51.7%	166.1%		336.5%			

FIRR = financial internal rate of return, FNPV = financial net present value.

Source: Asian Development Bank.

5. Economic Analysis

57. The economic analysis of the Samarkand ALC results in an EIRR of 16.8%, well above the ADB economic cut-off rate of 9%, indicating that the ALC is economically viable. Sensitivity analysis also indicates that the economic cash flow is highly robust with respect to adverse changes in benefit and cost streams. Switching values are estimated at 35.5% for benefits, 76.5% for investment costs, and 223.9% for combined operating and staff costs. Summary economic benefits and costs and economic indicators are in Table 25. The Samarkand detailed economic cash flow is in Table A4 in the appendix.

Table 25: Samarkand Agro-Logistic Center Summary Economic Cash Flow and Indicators

Unit: SUM million

Year	Revenue	Cost					Net Cash Flow
		Investment Cost	Overhead Cost	Operating Cost	Staff Cost	Total Cost	
2019	0.0	0.0	16,197.3	0.0	0.0	16,197.3	(16,197.3)
2020	0.0	237,218.9	10,966.7	0.0	0.0	248,185.6	(248,185.6)
2021	0.0	383,473.8	10,672.5	0.0	0.0	394,146.4	(394,146.4)
2022	0.0	310,709.5	5,357.9	0.0	1,283.7	317,351.2	(317,351.2)
2023	175,483.9	0.0	2,047.5	11,402.5	26,401.0	39,851.0	135,632.9
2024	199,520.2	0.0	0.0	10,039.8	26,889.4	36,929.2	162,591.0
2025	223,556.5	0.0	0.0	11,357.5	26,889.4	38,246.9	185,309.6
2026	247,592.8	0.0	0.0	12,610.8	26,889.4	39,500.2	208,092.6
2027	271,629.0	1,686.9	0.0	13,799.6	26,889.4	42,375.9	229,253.1
2028	295,665.3	0.0	0.0	14,924.1	26,889.4	41,813.5	253,851.8
2029	295,665.3	0.0	0.0	15,533.4	26,889.4	42,422.8	253,242.5
2030	295,665.3	26,923.8	0.0	16,142.7	26,889.4	69,956.0	225,709.4
2031	295,665.3	0.0	0.0	17,074.1	26,889.4	43,963.6	251,701.7
2032	295,665.3	1,686.9	0.0	17,074.1	26,889.4	45,650.5	250,014.9
2033	295,665.3	0.0	0.0	17,074.1	26,889.4	43,963.6	251,701.7
2034	295,665.3	0.0	0.0	17,074.1	26,889.4	43,963.6	251,701.7
2035	295,665.3	0.0	0.0	17,074.1	26,889.4	43,963.6	251,701.7
2036	295,665.3	0.0	0.0	17,074.1	26,889.4	43,963.6	251,701.7
2037	295,665.3	1,686.9	0.0	17,074.1	26,889.4	45,650.5	250,014.9
2038	295,665.3	26,923.8	0.0	17,074.1	26,889.4	70,887.4	224,777.9
2039	295,665.3	0.0	0.0	17,074.1	26,889.4	43,963.6	251,701.7
ENPV@9.0%	1,579,444.6	731,875.0	37,457.9	86,749.8	163,341.0	1,019,423.6	560,020.9
EIRR	16.8%						
Switching Value	35.5%	76.5%		223.9%			

EIRR = economic internal rate of return, ENPV = economic net present value.

Source: Asian Development Bank.

H. Employment and Social Impact

58. The development and operation of the ALCs will have significant employment impacts in their local areas. There will be long-term, permanent employment opportunities in the operation of the ALCs and short-term employment opportunities during the period of ALC construction.

59. The Andijan ALC will generate around 1,160 full-time jobs, the majority of which will be in miscellaneous employment in security, ALC cleaning and maintenance, etc. (220), and in post-harvest processing facilities (840). These jobs will require a mix of skilled and semi-skilled workers and, in the case of post-harvest processing in which they specialize, significant employment for women. Together, these two employment categories will generate total annual wages of \$1.5 million when the Andijan ALC is operating at full capacity. It is estimated that construction of the Andijan ALC will directly generate between 420 and 500 jobs during the three-year construction period. A further 115 jobs will be created indirectly in companies in the construction materials and equipment sectors that will supply goods and services for ALC construction. The type and value of such jobs has not been quantified.

60. The Samarkand ALC will generate around 1,510 full-time jobs, the majority of which will be in miscellaneous employment in security, ALC cleaning and maintenance, etc. (220), and in post-harvest processing facilities (1,190). These jobs will require a mix of skilled and semi-skilled

workers and, in the case of post-harvest processing in which they specialize, significant employment for women. Together, these two employment categories will generate total annual wages of \$2.1 million when the Samarkand ALC is operating at full capacity. It is estimated that construction of the Samarkand ALC will directly generate between 560 and 600 jobs during the three-year construction period. A further 150 jobs will be created indirectly in companies in the construction materials and equipment sectors that will supply goods and services for ALC construction. The type and value of such jobs has not been quantified.

61. Based on the assumed income tax rate of 25% chargeable against net income, it is estimated that the Andijan ALC will generate up to \$5.8 million and the Samarkand ALC up to \$8.0 million per year in tax revenues for the national government. In addition, there will be various payments into social insurance funds.

I. Risks

62. There are a number of potential market and business risks to the attainment of ALC financial and economic viability. These relate to:

- (i) market access and the volume of exports to CIS countries and beyond will be affected by increasing competition from other CIS countries;
- (ii) the delayed introduction of quality standards and certification will delay access to higher-value markets such as the European Union, Middle East, East Asia, etc. Competing fruit and vegetable exporting countries are already in the process of adopting enhanced agricultural practices, such as GlobalGap, and improved sanitary and phytosanitary standards and certification;
- (iii) continued interference in the operation of a free market by the government, for instance in the form of border closures or restrictions on the form of transport allowed to transport exports, may act as a disincentive to the realization of export potential and farm and agribusiness investment;
- (iv) unwillingness on the part of farmers and traders to abandon existing low-cost marketing channels in favor of improved but more expensive market outlets offered by ALCs;
- (v) availability and quality of transport infrastructure to cope with the expected increase in the volume of exports promoted by the ALCs;
- (vi) reported unofficial payments for customs clearance, etc. that exporters are required to pay to facilitate free movement of their produce;
- (vii) failure of producers and processors to embrace the need to provide better quality product of international standards to penetrate new, more sophisticated and higher-value markets, including increasingly quality-conscious Uzbek consumers (evidenced by the growth in supermarket outlets);
- (viii) macroeconomic downturn that leads to a decline in consumer demand for non-staple foods, and increasing interest rates making loans and investments less attractive and viable; and
- (ix) continuing general constraints on doing business in Uzbekistan.

APPENDICES

Table A1: Andijan Agro-Logistic Center Financial Cash Flow

Financial Flows (SUM million)		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Output/Revenue												
Wholesale market area (8,426 m2 per month)	m2	0.0	0.0	0.0	0.0	1,851.9	1,975.3	2,098.8	2,222.2	2,345.7	2,469.2	2,469.2
Small farmers' area (8,426 m2 for 313 days rented per year)	m2	0.0	0.0	0.0	0.0	3,220.2	3,434.9	3,649.5	3,864.2	4,078.9	4,293.6	4,293.6
Post-harvest processing - export (small fruit)	ton	0.0	0.0	0.0	0.0	10,175.0	12,210.0	14,245.0	16,280.0	18,315.0	20,350.0	20,350.0
Post-harvest processing - export (tubers)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (tomato and similar)	ton	0.0	0.0	0.0	0.0	30,525.0	36,630.0	42,735.0	48,840.0	54,945.0	61,050.0	61,050.0
Post-harvest processing - export (carrot, pepper, melon, etc)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (cabbage, lettuce, etc)	ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Post-harvest processing - domestic	ton	0.0	0.0	0.0	0.0	1,168.1	1,246.0	1,323.9	1,401.8	1,479.6	1,557.5	1,557.5
Cold storage (daily) - 40,500 m3 per day	m3	0.0	0.0	0.0	0.0	63,173.0	67,384.5	71,596.1	75,807.6	80,019.2	84,230.7	84,230.7
Cold storage (monthly) - 13,500 m3 per month	m3	0.0	0.0	0.0	0.0	3,956.0	4,219.8	4,483.5	4,747.2	5,011.0	5,274.7	5,274.7
Freezer storage (daily) - 1,500 m3 per day	m3	0.0	0.0	0.0	0.0	2,807.7	2,994.9	3,182.0	3,369.2	3,556.4	3,743.6	3,743.6
Freezer storage (monthly) - 4,500 m3 per month	m3	0.0	0.0	0.0	0.0	1,648.4	1,758.2	1,868.1	1,978.0	2,087.9	2,197.8	2,197.8
Market (1st Floor) rental areas - 1,620 m2 per month	m2	0.0	0.0	0.0	0.0	830.8	886.2	941.5	996.9	1,052.3	1,107.7	1,107.7
Customs office rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Administration office area rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Other areas rental - 72,499 m2 per month	m2	0.0	0.0	0.0	0.0	885.2	1,062.3	1,239.3	1,416.3	1,593.4	1,770.4	1,770.4
Vehicle entry fee - cars - 2,220 per day	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle entry fee - pick-ups/light trucks - 596 per day	vehicle	0.0	0.0	0.0	0.0	136.8	145.9	155.0	164.1	173.2	182.3	182.3
Vehicle entry fee - trucks - 179 per day	vehicle	0.0	0.0	0.0	0.0	41.0	43.8	46.5	49.2	52.0	54.7	54.7
Vehicle entry fee - semi-trailers - 0 per day	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle entry fee - trailers - 112 per day	vehicle	0.0	0.0	0.0	0.0	53.4	57.0	60.5	64.1	67.7	71.2	71.2
Weighing charge (50% weighed) - pick-ups/light trucks	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighing charge (50% weighed) - trucks	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighing charge (50% weighed) - semi-trailers	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighing charge (50% weighed) - trailers	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advertising fees (for market traders)	unit	0.0	0.0	0.0	0.0	358.1	358.1	358.1	358.1	358.1	358.1	358.1
Accommodation fees (5% of number of trailers)	day	0.0	0.0	0.0	0.0	7.1	8.5	10.0	11.4	12.8	14.2	14.2
Total		0.0	0.0	0.0	0.0	136,515.3	153,091.7	169,668.1	186,244.5	202,820.9	219,397.3	219,397.3

Table A1 (continued)

Costs		Development											
		Total											
Investment costs													
Groundwork and Infrastructure													
ALC Entrance	m2	2,534.0	0.0	253.4	1,267.0	1,013.6	0.0	0.0	0.0	0.0	0.0	0.0	
Land Levelling, Roads, Parking, etc	m2	135,706.9	0.0	67,853.5	54,282.8	13,570.7	0.0	0.0	0.0	0.0	0.0	0.0	
Electricity Distribution Network	m2	5,897.4	0.0	0.0	0.0	5,897.4	0.0	0.0	0.0	0.0	0.0	0.0	
Water Supply	m2	7,064.1	0.0	3,532.0	3,532.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Waste Water Treatment Plant	m2	13,581.2	0.0	6,790.6	6,790.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Solid Waste Management System	m2	2,585.0	0.0	258.5	2,326.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Railway Line	m2	1,946.2	0.0	1,556.9	389.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Highway Access	m2	1,859.8	0.0	1,859.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Buildings													
Fruit and Vegetable Storage/Sale - Wholesalers	m2	63,436.0	0.0	6,343.6	31,718.0	25,374.4	0.0	0.0	0.0	0.0	0.0	0.0	
Fruit and Vegetable Storage/Sale - Small Farmers	m2	63,436.0	0.0	6,343.6	31,718.0	25,374.4	0.0	0.0	0.0	0.0	0.0	0.0	
Post-harvest Processing Building (Exports)	m2	80,696.3	0.0	8,069.6	48,417.8	24,208.9	0.0	0.0	0.0	0.0	0.0	0.0	
Post-harvest Processing Building (Domestic)	m2	26,851.3	0.0	2,685.1	13,425.6	10,740.5	0.0	0.0	0.0	0.0	0.0	0.0	
Cold Storage	m2	120,213.1	0.0	12,021.3	60,106.6	48,085.3	0.0	0.0	0.0	0.0	0.0	0.0	
Containers Area	m2	23,960.9	0.0	11,980.5	9,584.4	2,396.1	0.0	0.0	0.0	0.0	0.0	0.0	
Administration	m2	21,626.4	0.0	2,162.6	10,813.2	8,650.5	0.0	0.0	0.0	0.0	0.0	0.0	
Plant and Equipment													
Processing Lines (Washing/Sorting)	No	37,528.7	0.0	0.0	0.0	37,528.7	0.0	0.0	0.0	0.0	0.0	0.0	
Pallet Trucks (Electric)	No	2,005.7	0.0	0.0	0.0	2,005.7	0.0	0.0	0.0	0.0	0.0	0.0	
Forklift Trucks	No	1,113.6	0.0	0.0	0.0	1,113.6	0.0	0.0	0.0	0.0	0.0	0.0	
Cold Storage Forklift Trucks	No	2,807.6	0.0	0.0	0.0	2,807.6	0.0	0.0	0.0	0.0	0.0	0.0	
Wheelbarrows	No	1,035.0	0.0	0.0	0.0	1,035.0	0.0	0.0	0.0	0.0	0.0	0.0	
Road Sweeper	No	4,505.5	0.0	0.0	0.0	4,505.5	0.0	0.0	0.0	0.0	0.0	0.0	
Scrub Driver	No	951.2	0.0	0.0	0.0	951.2	0.0	0.0	0.0	0.0	0.0	0.0	
Skid Steer	No	3,671.1	0.0	0.0	0.0	3,671.1	0.0	0.0	0.0	0.0	0.0	0.0	
Refuse Bins (1,100 liter)	No	542.3	0.0	0.0	0.0	542.3	0.0	0.0	0.0	0.0	0.0	0.0	
Vehicle Access Control	No	679.8	0.0	0.0	0.0	679.8	0.0	0.0	0.0	0.0	0.0	0.0	
Video Surveillance System	No	2,133.1	0.0	0.0	0.0	2,133.1	0.0	0.0	0.0	0.0	0.0	0.0	
Computers	No	1,246.2	0.0	0.0	0.0	1,246.2	0.0	0.0	0.0	0.0	1,246.2	0.0	
Office Desks	No	85.5	0.0	0.0	0.0	85.5	0.0	0.0	0.0	0.0	0.0	0.0	
Desk Drawer Set	No	59.8	0.0	0.0	0.0	59.8	0.0	0.0	0.0	0.0	0.0	0.0	
Office Cabinet	No	111.1	0.0	0.0	0.0	111.1	0.0	0.0	0.0	0.0	0.0	0.0	
Chairs	No	188.0	0.0	0.0	0.0	188.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total		630,058.8	0.0	131,711.1	274,371.7	223,976.1	0.0	0.0	0.0	0.0	1,246.2	0.0	0.0

Table A1 (continued)

Operating costs												
Electricity (1,730.0 kWh/hour, 10 hours/day, 26 days/month)	kWh	0.0	0.0	0.0	0.0	527.2	562.4	597.5	632.7	667.8	703.0	703.0
Water (515 m3/day, 365 days per year)	m3	0.0	0.0	0.0	0.0	110.2	117.5	124.9	132.2	139.5	146.9	146.9
Hygienic Pallets	No	0.0	0.0	0.0	0.0	1,953.6	390.7	390.7	390.7	390.7	390.7	390.7
Boxes (85 liter)	No	0.0	0.0	0.0	0.0	260.5	312.6	364.7	416.8	468.9	521.0	521.0
Boxes (54 liter)	No	0.0	0.0	0.0	0.0	317.5	381.0	444.4	507.9	571.4	634.9	634.9
Boxes (33 liter)	No	0.0	0.0	0.0	0.0	311.4	373.6	435.9	498.2	560.4	622.7	622.7
Boxes (28 liter)	No	0.0	0.0	0.0	0.0	390.7	468.9	547.0	625.2	703.3	781.4	781.4
Plastic boxes (Local market)	No	0.0	0.0	0.0	0.0	561.7	112.3	112.3	112.3	112.3	112.3	112.3
Public relations and advertising	sum	0.0	0.0	0.0	0.0	976.8	244.2	244.2	244.2	244.2	244.2	244.2
Insurance	sum	0.0	0.0	0.0	0.0	897.5	897.5	897.5	897.5	897.5	897.5	897.5
Communications	sum	0.0	0.0	0.0	0.0	284.9	284.9	284.9	284.9	284.9	284.9	284.9
Waste treatment (declining % of total processing tons)	ton	0.0	0.0	0.0	0.0	1,052.8	1,123.0	1,146.4	1,123.0	1,052.8	935.8	467.9
Cleaning (based on surface area)	m2	0.0	0.0	0.0	0.0	335.5	357.9	380.3	402.6	425.0	447.4	447.4
Cleaning consumables and uniforms	sum	0.0	0.0	0.0	0.0	611.7	611.7	611.7	611.7	611.7	611.7	611.7
Surveillance and security	sum	0.0	0.0	0.0	0.0	70.3	70.3	70.3	70.3	70.3	70.3	70.3
Maintenance (1.0% of investment cost at full development)	sum	0.0	0.0	0.0	0.0	1,260.1	1,890.2	2,520.2	3,150.3	3,780.4	4,410.4	6,300.6
Total		0.0	0.0	0.0	0.0	9,922.3	8,198.6	9,173.0	10,100.5	10,981.2	11,815.2	13,237.4
Staff costs												
Managing Director	year	0.0	0.0	0.0	148.8	297.6	297.6	297.6	297.6	297.6	297.6	297.6
Operations Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Technical Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Administration Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Financial Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Business Units Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Legal and Human Resources Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Sales and Marketing Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Engineering/Services Managers	year	0.0	0.0	0.0	176.8	353.5	353.5	353.5	353.5	353.5	353.5	353.5
Department Managers/Heads	year	0.0	0.0	0.0	0.0	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5
Subject specialists	year	0.0	0.0	0.0	62.4	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6
Miscellaneous staff	year	0.0	0.0	0.0	0.0	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1
Post-harvest staff	year	0.0	0.0	0.0	0.0	10,352.1	10,352.1	10,352.1	10,352.1	10,352.1	10,352.1	10,352.1
Life insurance (5.0% of staff salary costs)	sum	0.0	0.0	0.0	53.4	1,031.8	1,031.8	1,031.8	1,031.8	1,031.8	1,031.8	1,031.8
Staff training	sum	0.0	0.0	0.0	0.0	0.0	488.4	488.4	488.4	488.4	488.4	488.4
Other social costs	sum	0.0	0.0	0.0	0.0	40.7	40.7	40.7	40.7	40.7	40.7	40.7
Board member expenses (10 members)	meeting	0.0	0.0	0.0	162.8	162.8	162.8	162.8	162.8	162.8	162.8	162.8
Total		0.0	0.0	0.0	1,283.7	21,872.0	22,360.4	22,360.4	22,360.4	22,360.4	22,360.4	22,360.4
Total Operating and Fixed Costs		0.0	0.0	0.0	1,283.7	31,794.3	30,559.0	31,533.3	32,460.9	33,341.6	34,175.5	35,597.8
Net Cash Flow before Financing		0.0	(131,711.1)	(274,371.7)	(225,259.8)	104,721.0	122,532.7	138,134.8	153,783.6	168,233.1	185,221.7	183,799.5
Project Overhead Costs												
Category	Andijan											
	Share (%)	Total										
	43.22											
Capacity Development for ALC Operation and Management	8,796.0	0.0	3,518.4	3,518.4	1,759.2	0.0						
Project Management	8,311.3	1,688.0	1,821.0	1,630.3	1,630.3	1,541.6						
Project Management and Supervision Consultants	10,946.3	4,322.4	2,992.4	2,959.2	672.4	0.0						
Environmental Management/Mitigation	234.0	144.2	22.5	22.5	22.5	22.5						
Resettlement	4,309.3	4,309.3	0.0	0.0	0.0	0.0						
Total	32,596.9	10,463.8	8,354.3	8,130.4	4,084.4	1,564.1	0.0	0.0	0.0	0.0	0.0	0.0
(Project Overhead Costs Switch)												
Net Cash Flow before Financing after Project Overheads		(10,463.8)	(140,065.4)	(282,502.0)	(229,344.1)	103,156.9	122,532.7	138,134.8	153,783.6	168,233.1	185,221.7	183,799.5

Source: Asian Development Bank.

Table A2: Andijan Agro-Logistic Center Economic Cash Flow

Economic Flows (SUM million)		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Output/Revenue												
Wholesale market area (8,426 m2 per month)	m2	0.0	0.0	0.0	0.0	1,851.9	1,975.3	2,098.8	2,222.2	2,345.7	2,469.2	2,469.2
Small farmers' area (8,426 m2 for 313 days rented per year)	m2	0.0	0.0	0.0	0.0	3,220.2	3,434.9	3,649.5	3,864.2	4,078.9	4,293.6	4,293.6
Post-harvest processing - export (small fruit)	ton	0.0	0.0	0.0	0.0	10,175.0	12,210.0	14,245.0	16,280.0	18,315.0	20,350.0	20,350.0
Post-harvest processing - export (tubers)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (tomato and similar)	ton	0.0	0.0	0.0	0.0	30,525.0	36,630.0	42,735.0	48,840.0	54,945.0	61,050.0	61,050.0
Post-harvest processing - export (carrot, pepper, melon, etc)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (cabbage, lettuce, etc)	ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Post-harvest processing - domestic	ton	0.0	0.0	0.0	0.0	1,168.1	1,246.0	1,323.9	1,401.8	1,479.6	1,557.5	1,557.5
Cold storage (daily) - 40,500 m3 per day	m3	0.0	0.0	0.0	0.0	63,173.0	67,384.5	71,596.1	75,807.6	80,019.2	84,230.7	84,230.7
Cold storage (monthly) - 13,500 m3 per month	m3	0.0	0.0	0.0	0.0	3,956.0	4,219.8	4,483.5	4,747.2	5,011.0	5,274.7	5,274.7
Freezer storage (daily) - 1,500 m3 per day	m3	0.0	0.0	0.0	0.0	2,807.7	2,994.9	3,182.0	3,369.2	3,556.4	3,743.6	3,743.6
Freezer storage (monthly) - 4,500 m3 per month	m3	0.0	0.0	0.0	0.0	1,648.4	1,758.2	1,868.1	1,978.0	2,087.9	2,197.8	2,197.8
Market (1st Floor) rental areas - 1,620 m2 per month	m2	0.0	0.0	0.0	0.0	830.8	886.2	941.5	996.9	1,052.3	1,107.7	1,107.7
Customs office rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Administration office area rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Other areas rental - 72,499 m2 per month	m2	0.0	0.0	0.0	0.0	885.2	1,062.3	1,239.3	1,416.3	1,593.4	1,770.4	1,770.4
Vehicle entry fee - cars - 2,220 per day	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle entry fee - pick-ups/light trucks - 596 per day	vehicle	0.0	0.0	0.0	0.0	136.8	145.9	155.0	164.1	173.2	182.3	182.3
Vehicle entry fee - trucks - 179 per day	vehicle	0.0	0.0	0.0	0.0	41.0	43.8	46.5	49.2	52.0	54.7	54.7
Vehicle entry fee - semi-trailers - 0 per day	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle entry fee - trailers - 112 per day	vehicle	0.0	0.0	0.0	0.0	53.4	57.0	60.5	64.1	67.7	71.2	71.2
Weighing charge (50% weighed) - pick-ups/light trucks	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighing charge (50% weighed) - trucks	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighing charge (50% weighed) - semi-trailers	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighing charge (50% weighed) - trailers	vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advertising fees (for market traders)	unit	0.0	0.0	0.0	0.0	358.1	358.1	358.1	358.1	358.1	358.1	358.1
Accommodation fees (5% of number of trailers)	day	0.0	0.0	0.0	0.0	7.1	8.5	10.0	11.4	12.8	14.2	14.2
Total		0.0	0.0	0.0	0.0	136,515.3	153,091.7	169,668.1	186,244.5	202,820.9	219,397.3	219,397.3

Table A2 (continued)

Costs		Development										
		Total										
Investment costs												
Groundwork and Infrastructure												
ALC Entrance	m2	2,811.4	0.0	281.1	1,405.7	1,124.6	0.0	0.0	0.0	0.0	0.0	0.0
Land Levelling, Roads, Parking, etc	m2	150,564.5	0.0	75,282.2	60,225.8	15,056.4	0.0	0.0	0.0	0.0	0.0	0.0
Electricity Distribution Network	m2	6,543.1	0.0	0.0	0.0	6,543.1	0.0	0.0	0.0	0.0	0.0	0.0
Water Supply	m2	7,837.5	0.0	3,918.7	3,918.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waste Water Treatment Plant	m2	15,068.1	0.0	7,534.0	7,534.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solid Waste Management System	m2	2,868.1	0.0	286.8	2,581.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Railway Line	m2	2,159.2	0.0	1,727.4	431.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Highway Access	m2	2,063.4	0.0	2,063.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buildings												
Fruit and Vegetable Storage/Sale - Wholesalers	m2	68,643.8	0.0	6,864.4	34,321.9	27,457.5	0.0	0.0	0.0	0.0	0.0	0.0
Fruit and Vegetable Storage/Sale - Small Farmers	m2	68,643.8	0.0	6,864.4	34,321.9	27,457.5	0.0	0.0	0.0	0.0	0.0	0.0
Post-harvest Processing Building (Exports)	m2	87,321.2	0.0	8,732.1	52,392.7	26,196.3	0.0	0.0	0.0	0.0	0.0	0.0
Post-harvest Processing Building (Domestic)	m2	29,055.6	0.0	2,905.6	14,527.8	11,622.3	0.0	0.0	0.0	0.0	0.0	0.0
Cold Storage	m2	130,082.1	0.0	13,008.2	65,041.1	52,032.9	0.0	0.0	0.0	0.0	0.0	0.0
Value-added and Logistics	m2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dry Port	m2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Containers Area	m2	25,964.0	0.0	12,964.0	10,371.2	2,592.8	0.0	0.0	0.0	0.0	0.0	0.0
Administration	m2	23,401.8	0.0	2,340.2	11,700.9	9,360.7	0.0	0.0	0.0	0.0	0.0	0.0
Plant and Equipment												
Processing Lines (Washing/Sorting)	No	50,801.4	0.0	0.0	0.0	50,801.4	0.0	0.0	0.0	0.0	0.0	0.0
Pallet Trucks (Electric)	No	2,715.1	0.0	0.0	0.0	2,715.1	0.0	0.0	0.0	0.0	0.0	0.0
Forklift Trucks	No	1,507.4	0.0	0.0	0.0	1,507.4	0.0	0.0	0.0	0.0	0.0	0.0
Cold Storage Forklift Trucks	No	3,800.6	0.0	0.0	0.0	3,800.6	0.0	0.0	0.0	0.0	0.0	0.0
Wheelbarrows	No	1,401.1	0.0	0.0	0.0	1,401.1	0.0	0.0	0.0	0.0	0.0	0.0
Road Sweeper	No	6,098.9	0.0	0.0	0.0	6,098.9	0.0	0.0	0.0	0.0	0.0	0.0
Scrub Driver	No	1,287.6	0.0	0.0	0.0	1,287.6	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer	No	4,969.5	0.0	0.0	0.0	4,969.5	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Bins (1,100 liter)	No	734.1	0.0	0.0	0.0	734.1	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle Access Control	No	920.3	0.0	0.0	0.0	920.3	0.0	0.0	0.0	0.0	0.0	0.0
Video Surveillance System	No	2,887.5	0.0	0.0	0.0	2,887.5	0.0	0.0	0.0	0.0	0.0	0.0
Computers	No	1,686.9	0.0	0.0	0.0	1,686.9	0.0	0.0	0.0	0.0	1,686.9	0.0
Office Desks	No	115.7	0.0	0.0	0.0	115.7	0.0	0.0	0.0	0.0	0.0	0.0
Desk Drawer Set	No	81.0	0.0	0.0	0.0	81.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Cabinet	No	150.4	0.0	0.0	0.0	150.4	0.0	0.0	0.0	0.0	0.0	0.0
Chairs	No	254.5	0.0	0.0	0.0	254.5	0.0	0.0	0.0	0.0	0.0	0.0
Total		702,403.6	0.0	144,772.6	298,774.8	258,856.1	0.0	0.0	0.0	0.0	1,686.9	0.0

Table A2 (continued)

Operating costs												
Electricity (1,730.0 kWh/hour, 10 hours/day, 26 days/month)	kWh	0.0	0.0	0.0	0.0	527.2	562.4	597.5	632.7	667.8	703.0	703.0
Water (515 m3/day, 365 days per year)	m3	0.0	0.0	0.0	0.0	110.2	117.5	124.9	132.2	139.5	146.9	146.9
Hygienic Pallets	No	0.0	0.0	0.0	0.0	1,953.6	390.7	390.7	390.7	390.7	390.7	390.7
Boxes (85 liter)	No	0.0	0.0	0.0	0.0	260.5	312.6	364.7	416.8	468.9	521.0	521.0
Boxes (54 liter)	No	0.0	0.0	0.0	0.0	317.5	381.0	444.4	507.9	571.4	634.9	634.9
Boxes (33 liter)	No	0.0	0.0	0.0	0.0	311.4	373.6	435.9	498.2	560.4	622.7	622.7
Boxes (28 liter)	No	0.0	0.0	0.0	0.0	390.7	468.9	547.0	625.2	703.3	781.4	781.4
Plastic boxes (Local market)	No	0.0	0.0	0.0	0.0	561.7	112.3	112.3	112.3	112.3	112.3	112.3
Public relations and advertising	sum	0.0	0.0	0.0	0.0	976.8	244.2	244.2	244.2	244.2	244.2	244.2
Insurance	sum	0.0	0.0	0.0	0.0	897.5	897.5	897.5	897.5	897.5	897.5	897.5
Communications	sum	0.0	0.0	0.0	0.0	284.9	284.9	284.9	284.9	284.9	284.9	284.9
Waste treatment (declining % of total processing tons)	ton	0.0	0.0	0.0	0.0	1,052.8	1,123.0	1,146.4	1,123.0	1,052.8	935.8	467.9
Cleaning (based on surface area)	m2	0.0	0.0	0.0	0.0	335.5	357.9	380.3	402.6	425.0	447.4	447.4
Cleaning consumables and uniforms	sum	0.0	0.0	0.0	0.0	611.7	611.7	611.7	611.7	611.7	611.7	611.7
Surveillance and security	sum	0.0	0.0	0.0	0.0	70.3	70.3	70.3	70.3	70.3	70.3	70.3
Maintenance (1.0% of investment cost at full development)	sum	0.0	0.0	0.0	0.0	1,404.8	2,107.2	2,809.6	3,512.0	4,214.4	4,916.8	7,024.0
Total		0.0	0.0	0.0	0.0	10,067.0	8,415.7	9,462.3	10,462.2	11,415.3	12,321.6	13,960.9
Staff costs												
Managing Director	year	0.0	0.0	0.0	148.8	297.6	297.6	297.6	297.6	297.6	297.6	297.6
Operations Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Technical Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Administration Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Financial Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Business Units Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Legal and Human Resources Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Sales and Marketing Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Engineering/Services Managers	year	0.0	0.0	0.0	176.8	353.5	353.5	353.5	353.5	353.5	353.5	353.5
Department Managers/Heads	year	0.0	0.0	0.0	0.0	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5
Subject specialists	year	0.0	0.0	0.0	62.4	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6
Miscellaneous staff	year	0.0	0.0	0.0	0.0	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1
Post-harvest staff	year	0.0	0.0	0.0	0.0	10,352.1	10,352.1	10,352.1	10,352.1	10,352.1	10,352.1	10,352.1
Life insurance (5.0% of staff salary costs)	sum	0.0	0.0	0.0	53.4	1,031.8	1,031.8	1,031.8	1,031.8	1,031.8	1,031.8	1,031.8
Staff training	sum	0.0	0.0	0.0	0.0	488.4	488.4	488.4	488.4	488.4	488.4	488.4
Other social costs	sum	0.0	0.0	0.0	0.0	40.7	40.7	40.7	40.7	40.7	40.7	40.7
Board member expenses (10 members)	meeting	0.0	0.0	0.0	162.8	162.8	162.8	162.8	162.8	162.8	162.8	162.8
Total		0.0	0.0	0.0	1,283.7	21,872.0	22,360.4	22,360.4	22,360.4	22,360.4	22,360.4	22,360.4
Total Operating and Fixed Costs		0.0	0.0	0.0	1,283.7	31,939.0	30,776.0	31,822.7	32,822.6	33,775.7	34,682.0	36,321.3
Net Cash Flow		0.0	(144,772.6)	(298,774.8)	(260,139.8)	104,576.3	122,315.6	137,845.4	153,421.9	167,358.3	184,715.3	183,076.0
Project Overhead Costs												
		Andijan										
		Share (%)	Total									
Category		43.22										
Capacity Development for ALC Operation and Management		8,796.0	0.0	3,518.4	3,518.4	1,759.2	0.0					
Project Management		8,311.3	1,688.0	1,821.0	1,630.3	1,630.3	1,541.6					
Project Management and Supervision Consultants		10,946.3	4,322.4	2,992.4	2,959.2	672.4	0.0					
Environmental Management/Mitigation		234.0	144.2	22.5	22.5	22.5	22.5					
Resettlement		4,309.3	4,309.3	0.0	0.0	0.0	0.0					
Total		32,596.9	10,463.8	8,354.3	8,130.4	4,084.4	1,564.1	0.0	0.0	0.0	0.0	0.0
(Project Overhead Costs Switch)												
Net Cash Flow after Project Overheads		(10,463.8)	(153,126.9)	(306,905.2)	(264,224.2)	103,012.2	122,315.6	137,845.4	153,421.9	167,358.3	184,715.3	183,076.0

Source: Asian Development Bank.

Table A3: Samarkand Agro-Logistic Center Financial Cash Flow

Financial Flows (SUM million)		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2039
Output/Revenue												
Wholesale market area (12,000 m2 per month)	m2	0.0	0.0	0.0	0.0	2,637.4	2,813.2	2,989.0	3,164.8	3,340.7	3,516.5	3,516.5
Small farmers' area (12,000 m2 for 313 days rented per year)	m2	0.0	0.0	0.0	0.0	4,586.1	4,891.8	5,197.6	5,503.3	5,809.0	6,114.8	6,114.8
Post-harvest processing - export (small fruit)	ton	0.0	0.0	0.0	0.0	30,525.0	36,630.0	42,735.0	48,840.0	54,945.0	61,050.0	61,050.0
Post-harvest processing - export (tubers)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (tomato and similar)	ton	0.0	0.0	0.0	0.0	35,612.5	42,735.0	49,857.5	56,980.0	64,102.5	71,225.0	71,225.0
Post-harvest processing - export (carrot, pepper, melon, etc)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (cabbage, lettuce, etc)	ton	0.0	0.0	0.0	0.0	10,175.0	12,210.0	14,245.0	16,280.0	18,315.0	20,350.0	20,350.0
Post-harvest processing - domestic	ton	0.0	0.0	0.0	0.0	1,168.1	1,246.0	1,323.9	1,401.8	1,479.6	1,557.5	1,557.5
Cold storage (daily) - 40,500 m3 per day	m3	0.0	0.0	0.0	0.0	63,173.0	67,384.5	71,596.1	75,807.6	80,019.2	84,230.7	84,230.7
Cold storage (monthly) - 13,500 m3 per month	m3	0.0	0.0	0.0	0.0	3,956.0	4,219.8	4,483.5	4,747.2	5,011.0	5,274.7	5,274.7
Freezer storage (daily) - 1,500 m3 per day	m3	0.0	0.0	0.0	0.0	2,807.7	2,994.9	3,182.0	3,369.2	3,556.4	3,743.6	3,743.6
Freezer storage (monthly) - 4,500 m3 per month	m3	0.0	0.0	0.0	0.0	1,648.4	1,758.2	1,868.1	1,978.0	2,087.9	2,197.8	2,197.8
Market (1st Floor) rental areas - 2,160 m2 per month	m2	0.0	0.0	0.0	0.0	1,107.7	1,181.5	1,255.4	1,329.2	1,403.1	1,476.9	1,476.9
Customs office rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Administration office area rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Other areas rental - 142,133 m2 per month	m2	0.0	0.0	0.0	0.0	1,735.4	2,082.5	2,429.6	2,776.7	3,123.8	3,470.9	3,470.9
Vehicle entry fee - pick-ups/light trucks - 799 per day	vehicle	0.0	0.0	0.0	0.0	183.2	195.4	207.6	219.8	232.0	244.2	244.2
Vehicle entry fee - trucks - 240 per day	vehicle	0.0	0.0	0.0	0.0	54.9	58.6	62.3	65.9	69.6	73.3	73.3
Vehicle entry fee - trailers - 144 per day	vehicle	0.0	0.0	0.0	0.0	68.7	73.3	77.8	82.4	87.0	91.6	91.6
Advertising fees (for market traders)	unit	0.0	0.0	0.0	0.0	358.1	358.1	358.1	358.1	358.1	358.1	358.1
Accommodation fees (5% of number of trailers)	day	0.0	0.0	0.0	0.0	9.2	11.0	12.8	14.7	16.5	18.3	18.3
Total		0.0	0.0	0.0	0.0	175,483.9	199,520.2	223,556.5	247,592.8	271,629.0	295,665.3	295,665.3

Table A3 (continued)

Costs		Development											
		Total											
Investment costs													
Groundwork and Infrastructure													
	ALC Entrance	m2	2,534.0	0.0	253.4	1,267.0	1,013.6	0.0	0.0	0.0	0.0	0.0	0.0
	Land Levelling, Roads, Parking, etc	m2	270,426.4	0.0	135,213.2	108,170.6	27,042.6	0.0	0.0	0.0	0.0	0.0	0.0
	Electricity Distribution Network	m2	5,897.4	0.0	0.0	0.0	5,897.4	0.0	0.0	0.0	0.0	0.0	0.0
	Water Supply	m2	7,064.1	0.0	3,532.0	3,532.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Waste Water Treatment Plant	m2	13,581.2	0.0	6,790.6	6,790.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Solid Waste Management System	m2	2,585.0	0.0	258.5	2,326.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Railway Line	m2	3,317.3	0.0	2,653.8	663.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Highway Access	m2	10,112.8	0.0	8,090.2	2,022.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buildings													
	Fruit and Vegetable Storage/Sale - Wholesalers	m2	85,146.5	0.0	8,514.7	42,573.3	34,058.6	0.0	0.0	0.0	0.0	0.0	0.0
	Fruit and Vegetable Storage/Sale - Small Farmers	m2	85,146.5	0.0	8,514.7	42,573.3	34,058.6	0.0	0.0	0.0	0.0	0.0	0.0
	Post-harvest Processing Building (Exports)	m2	78,148.0	0.0	7,814.8	46,888.8	23,444.4	0.0	0.0	0.0	0.0	0.0	0.0
	Post-harvest Processing Building (Domestic)	m2	24,634.2	0.0	2,463.4	12,317.1	9,853.7	0.0	0.0	0.0	0.0	0.0	0.0
	Cold Storage	m2	114,503.0	0.0	11,450.3	57,251.5	45,801.2	0.0	0.0	0.0	0.0	0.0	0.0
	Containers Area	m2	35,082.4	0.0	17,541.2	14,032.9	3,508.2	0.0	0.0	0.0	0.0	0.0	0.0
	Administration	m2	21,626.4	0.0	2,162.6	10,813.2	8,650.5	0.0	0.0	0.0	0.0	0.0	0.0
Plant and Equipment													
	Processing Lines (Washing/Sorting)	No	53,165.6	0.0	0.0	0.0	53,165.6	0.0	0.0	0.0	0.0	0.0	0.0
	Pallet Trucks (Electric)	No	2,005.7	0.0	0.0	0.0	2,005.7	0.0	0.0	0.0	0.0	0.0	0.0
	Forklift Trucks	No	1,113.6	0.0	0.0	0.0	1,113.6	0.0	0.0	0.0	0.0	0.0	0.0
	Cold Storage Forklift Trucks	No	2,807.6	0.0	0.0	0.0	2,807.6	0.0	0.0	0.0	0.0	0.0	0.0
	Wheelbarrows	No	1,035.0	0.0	0.0	0.0	1,035.0	0.0	0.0	0.0	0.0	0.0	0.0
	Road Sweeper	No	4,505.5	0.0	0.0	0.0	4,505.5	0.0	0.0	0.0	0.0	0.0	0.0
	Scrub Driver	No	951.2	0.0	0.0	0.0	951.2	0.0	0.0	0.0	0.0	0.0	0.0
	Skid Steer	No	3,671.1	0.0	0.0	0.0	3,671.1	0.0	0.0	0.0	0.0	0.0	0.0
	Refuse Bins (1,100 liter)	No	542.3	0.0	0.0	0.0	542.3	0.0	0.0	0.0	0.0	0.0	0.0
	Vehicle Access Control	No	679.8	0.0	0.0	0.0	679.8	0.0	0.0	0.0	0.0	0.0	0.0
	Video Surveillance System	No	2,133.1	0.0	0.0	0.0	2,133.1	0.0	0.0	0.0	0.0	0.0	0.0
	Computers	No	1,246.2	0.0	0.0	0.0	1,246.2	0.0	0.0	0.0	0.0	1,246.2	0.0
	Office Desks	No	85.5	0.0	0.0	0.0	85.5	0.0	0.0	0.0	0.0	0.0	0.0
	Desk Drawer Set	No	59.8	0.0	0.0	0.0	59.8	0.0	0.0	0.0	0.0	0.0	0.0
	Office Cabinet	No	111.1	0.0	0.0	0.0	111.1	0.0	0.0	0.0	0.0	0.0	0.0
	Chairs	No	188.0	0.0	0.0	0.0	188.0	0.0	0.0	0.0	0.0	0.0	0.0
Total			834,106.4	0.0	215,253.5	351,222.8	267,630.2	0.0	0.0	0.0	0.0	1,246.2	0.0

Table A3 (continued)

Operating costs												
Electricity (2,366.0 kWh/hour, 10 hours/day, 26 days/month)	kWh	0.0	0.0	0.0	0.0	721.1	769.1	817.2	865.3	913.4	961.4	961.4
Water (779 m3/day, 365 days per year)	m3	0.0	0.0	0.0	0.0	166.6	177.8	188.9	200.0	211.1	222.2	222.2
Hygienic Pallets	No	0.0	0.0	0.0	0.0	1,953.6	390.7	390.7	390.7	390.7	390.7	390.7
Boxes (85 liter)	No	0.0	0.0	0.0	0.0	260.5	312.6	364.7	416.8	468.9	521.0	521.0
Boxes (54 liter)	No	0.0	0.0	0.0	0.0	317.5	381.0	444.4	507.9	571.4	634.9	634.9
Boxes (33 liter)	No	0.0	0.0	0.0	0.0	311.4	373.6	435.9	498.2	560.4	622.7	622.7
Boxes (28 liter)	No	0.0	0.0	0.0	0.0	390.7	468.9	547.0	625.2	703.3	781.4	781.4
Plastic boxes (Local market)	No	0.0	0.0	0.0	0.0	561.7	112.3	112.3	112.3	112.3	112.3	112.3
Public relations and advertising	sum	0.0	0.0	0.0	0.0	976.8	244.2	244.2	244.2	244.2	244.2	244.2
Insurance	sum	0.0	0.0	0.0	0.0	1,202.0	1,202.0	1,202.0	1,202.0	1,202.0	1,202.0	1,202.0
Communications	sum	0.0	0.0	0.0	0.0	284.9	284.9	284.9	284.9	284.9	284.9	284.9
Waste treatment (declining % of total processing tons)	ton	0.0	0.0	0.0	0.0	1,449.3	1,545.9	1,578.2	1,545.9	1,449.3	1,288.3	644.1
Cleaning (based on surface area)	m2	0.0	0.0	0.0	0.0	583.5	622.4	661.3	700.1	739.0	777.9	777.9
Cleaning consumables and uniforms	sum	0.0	0.0	0.0	0.0	248.7	248.7	248.7	248.7	248.7	248.7	248.7
Surveillance and security	sum	0.0	0.0	0.0	0.0	111.6	111.6	111.6	111.6	111.6	111.6	111.6
Maintenance (1.0% of investment cost at full development)	sum	0.0	0.0	0.0	0.0	1,668.2	2,502.3	3,336.4	4,170.5	5,004.6	5,838.7	8,341.1
Total		0.0	0.0	0.0	0.0	11,207.9	9,747.9	10,968.3	12,124.3	13,215.9	14,243.0	16,101.2
Staff costs												
Managing Director	year	0.0	0.0	0.0	148.8	297.6	297.6	297.6	297.6	297.6	297.6	297.6
Operations Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Technical Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Administration Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Financial Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Business Units Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Legal and Human Resources Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Sales and Marketing Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Engineering/Services Managers	year	0.0	0.0	0.0	176.8	353.5	353.5	353.5	353.5	353.5	353.5	353.5
Department Managers/Heads	year	0.0	0.0	0.0	0.0	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5
Subject specialists	year	0.0	0.0	0.0	62.4	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6
Miscellaneous staff	year	0.0	0.0	0.0	0.0	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1
Post-harvest staff	year	0.0	0.0	0.0	0.0	14,665.5	14,665.5	14,665.5	14,665.5	14,665.5	14,665.5	14,665.5
Life insurance (5.0% of staff salary costs)	sum	0.0	0.0	0.0	53.4	1,247.5	1,247.5	1,247.5	1,247.5	1,247.5	1,247.5	1,247.5
Staff training	sum	0.0	0.0	0.0	0.0	488.4	488.4	488.4	488.4	488.4	488.4	488.4
Other social costs	sum	0.0	0.0	0.0	0.0	40.7	40.7	40.7	40.7	40.7	40.7	40.7
Board member expenses (10 members)	meeting	0.0	0.0	0.0	162.8	162.8	162.8	162.8	162.8	162.8	162.8	162.8
Total		0.0	0.0	0.0	1,283.7	26,401.0	26,889.4	26,889.4	26,889.4	26,889.4	26,889.4	26,889.4
Total Operating and Fixed Costs		0.0	0.0	0.0	1,283.7	37,608.9	36,637.4	37,857.7	39,013.7	40,105.3	41,132.4	42,990.6
Net Cash Flow before Financing		0.0	(215,253.5)	(351,222.8)	(268,913.9)	137,875.0	162,882.9	185,698.7	208,579.0	230,277.6	254,532.9	252,674.7
Project Overhead Costs												
		Samarkand										
Category		Share (%)	Total									
		56.78										
Capacity Development for ALC Operation and Management		11,554.0	0.0	4,621.6	4,621.6	2,310.8	0.0					
Project Management		10,917.2	2,217.2	2,392.0	2,141.5	2,141.5	2,025.0					
Project Management and Supervision Consultants		14,378.4	5,677.6	3,930.7	3,887.0	883.2	0.0					
Environmental Management/Mitigation		491.5	401.6	22.5	22.5	22.5	22.5					
Resettlement		7,900.8	7,900.8	0.0	0.0	0.0	0.0					
Total		45,241.9	16,197.3	10,966.7	10,672.5	5,357.9	2,047.5	0.0	0.0	0.0	0.0	0.0
(Project Overhead Costs Switch)												
1												
Net Cash Flow before Financing after Project Overheads		(16,197.3)	(226,220.2)	(361,895.3)	(274,271.8)	135,827.5	162,882.9	185,698.7	208,579.0	230,277.6	254,532.9	252,674.7

Source: Asian Development Bank.

Table A4: Samarkand Agro-Logistic Center Economic Cash Flow

Economic Flows (SUM million)		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2039
Output/Revenue												
Wholesale market area (12,000 m2 per month)	m2	0.0	0.0	0.0	0.0	2,637.4	2,813.2	2,989.0	3,164.8	3,340.7	3,516.5	3,516.5
Small farmers' area (12,000 m2 for 313 days rented per year)	m2	0.0	0.0	0.0	0.0	4,586.1	4,891.8	5,197.6	5,503.3	5,809.0	6,114.8	6,114.8
Post-harvest processing - export (small fruit)	ton	0.0	0.0	0.0	0.0	30,525.0	36,630.0	42,735.0	48,840.0	54,945.0	61,050.0	61,050.0
Post-harvest processing - export (tubers)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (tomato and similar)	ton	0.0	0.0	0.0	0.0	35,612.5	42,735.0	49,857.5	56,980.0	64,102.5	71,225.0	71,225.0
Post-harvest processing - export (carrot, pepper, melon, etc)	ton	0.0	0.0	0.0	0.0	7,326.0	8,791.2	10,256.4	11,721.6	13,186.8	14,652.0	14,652.0
Post-harvest processing - export (cabbage, lettuce, etc)	ton	0.0	0.0	0.0	0.0	10,175.0	12,210.0	14,245.0	16,280.0	18,315.0	20,350.0	20,350.0
Post-harvest processing - domestic	ton	0.0	0.0	0.0	0.0	1,168.1	1,246.0	1,323.9	1,401.8	1,479.6	1,557.5	1,557.5
Cold storage (daily) - 40,500 m3 per day	m3	0.0	0.0	0.0	0.0	63,173.0	67,384.5	71,596.1	75,807.6	80,019.2	84,230.7	84,230.7
Cold storage (monthly) - 13,500 m3 per month	m3	0.0	0.0	0.0	0.0	3,956.0	4,219.8	4,483.5	4,747.2	5,011.0	5,274.7	5,274.7
Freezer storage (daily) - 1,500 m3 per day	m3	0.0	0.0	0.0	0.0	2,807.7	2,994.9	3,182.0	3,369.2	3,556.4	3,743.6	3,743.6
Freezer storage (monthly) - 4,500 m3 per month	m3	0.0	0.0	0.0	0.0	1,648.4	1,758.2	1,868.1	1,978.0	2,087.9	2,197.8	2,197.8
Market (1st Floor) rental areas - 2,160 m2 per month	m2	0.0	0.0	0.0	0.0	1,107.7	1,181.5	1,255.4	1,329.2	1,403.1	1,476.9	1,476.9
Customs office rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Administration office area rental - 1,000 m2 per month	m2	0.0	0.0	0.0	0.0	512.8	547.0	581.2	615.4	649.6	683.8	683.8
Other areas rental - 142,133 m2 per month	m2	0.0	0.0	0.0	0.0	1,735.4	2,082.5	2,429.6	2,776.7	3,123.8	3,470.9	3,470.9
Vehicle entry fee - pick-ups/light trucks - 799 per day	vehicle	0.0	0.0	0.0	0.0	183.2	195.4	207.6	219.8	232.0	244.2	244.2
Vehicle entry fee - trucks - 240 per day	vehicle	0.0	0.0	0.0	0.0	54.9	58.6	62.3	65.9	69.6	73.3	73.3
Vehicle entry fee - trailers - 144 per day	vehicle	0.0	0.0	0.0	0.0	68.7	73.3	77.8	82.4	87.0	91.6	91.6
Advertising fees (for market traders)	unit	0.0	0.0	0.0	0.0	358.1	358.1	358.1	358.1	358.1	358.1	358.1
Accommodation fees (5% of number of trailers)	day	0.0	0.0	0.0	0.0	9.2	11.0	12.8	14.7	16.5	18.3	18.3
Total		0.0	0.0	0.0	0.0	175,483.9	199,520.2	223,556.5	247,592.8	271,629.0	295,665.3	295,665.3

Table A4 (continued)

Costs		Development											
Investment costs		Total											
Groundwork and Infrastructure													
ALC Entrance	m2	2,811.4	0.0	281.1	1,405.7	1,124.6	0.0	0.0	0.0	0.0	0.0	0.0	
Land Levelling, Roads, Parking, etc	m2	300,033.5	0.0	150,016.7	120,013.4	30,003.3	0.0	0.0	0.0	0.0	0.0	0.0	
Electricity Distribution Network	m2	6,543.1	0.0	0.0	0.0	6,543.1	0.0	0.0	0.0	0.0	0.0	0.0	
Water Supply	m2	7,837.5	0.0	3,918.7	3,918.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Waste Water Treatment Plant	m2	15,068.1	0.0	7,534.0	7,534.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Solid Waste Management System	m2	2,868.1	0.0	286.8	2,581.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Railway Line	m2	3,680.5	0.0	2,944.4	736.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Highway Access	m2	11,220.0	0.0	8,976.0	2,244.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Buildings													
Fruit and Vegetable Storage/Sale - Wholesalers	m2	92,136.7	0.0	9,213.7	46,068.3	36,854.7	0.0	0.0	0.0	0.0	0.0	0.0	
Fruit and Vegetable Storage/Sale - Small Farmers	m2	92,136.7	0.0	9,213.7	46,068.3	36,854.7	0.0	0.0	0.0	0.0	0.0	0.0	
Post-harvest Processing Building (Exports)	m2	84,563.6	0.0	8,456.4	50,738.2	25,369.1	0.0	0.0	0.0	0.0	0.0	0.0	
Post-harvest Processing Building (Domestic)	m2	26,656.5	0.0	2,665.7	13,328.3	10,662.6	0.0	0.0	0.0	0.0	0.0	0.0	
Cold Storage	m2	123,903.2	0.0	12,390.3	61,951.6	49,561.3	0.0	0.0	0.0	0.0	0.0	0.0	
Value-added and Logistics	m2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Dry Port	m2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Containers Area	m2	37,962.5	0.0	18,981.2	15,185.0	3,796.2	0.0	0.0	0.0	0.0	0.0	0.0	
Administration	m2	23,401.8	0.0	2,340.2	11,700.9	9,360.7	0.0	0.0	0.0	0.0	0.0	0.0	
Plant and Equipment													
Processing Lines (Washing/Sorting)	No	71,968.6	0.0	0.0	0.0	71,968.6	0.0	0.0	0.0	0.0	0.0	0.0	
Pallet Trucks (Electric)	No	2,715.1	0.0	0.0	0.0	2,715.1	0.0	0.0	0.0	0.0	0.0	0.0	
Forklift Trucks	No	1,507.4	0.0	0.0	0.0	1,507.4	0.0	0.0	0.0	0.0	0.0	0.0	
Cold Storage Forklift Trucks	No	3,800.6	0.0	0.0	0.0	3,800.6	0.0	0.0	0.0	0.0	0.0	0.0	
Wheelbarrows	No	1,401.1	0.0	0.0	0.0	1,401.1	0.0	0.0	0.0	0.0	0.0	0.0	
Road Sweeper	No	6,098.9	0.0	0.0	0.0	6,098.9	0.0	0.0	0.0	0.0	0.0	0.0	
Scrub Driver	No	1,287.6	0.0	0.0	0.0	1,287.6	0.0	0.0	0.0	0.0	0.0	0.0	
Skid Steer	No	4,969.5	0.0	0.0	0.0	4,969.5	0.0	0.0	0.0	0.0	0.0	0.0	
Refuse Bins (1,100 liter)	No	734.1	0.0	0.0	0.0	734.1	0.0	0.0	0.0	0.0	0.0	0.0	
Vehicle Access Control	No	920.3	0.0	0.0	0.0	920.3	0.0	0.0	0.0	0.0	0.0	0.0	
Video Surveillance System	No	2,887.5	0.0	0.0	0.0	2,887.5	0.0	0.0	0.0	0.0	0.0	0.0	
Computers	No	1,686.9	0.0	0.0	0.0	1,686.9	0.0	0.0	0.0	0.0	1,686.9	0.0	
Office Desks	No	115.7	0.0	0.0	0.0	115.7	0.0	0.0	0.0	0.0	0.0	0.0	
Desk Drawer Set	No	81.0	0.0	0.0	0.0	81.0	0.0	0.0	0.0	0.0	0.0	0.0	
Office Cabinet	No	150.4	0.0	0.0	0.0	150.4	0.0	0.0	0.0	0.0	0.0	0.0	
Chairs	No	254.5	0.0	0.0	0.0	254.5	0.0	0.0	0.0	0.0	0.0	0.0	
Total		931,402.3	0.0	237,218.9	383,473.8	310,709.5	0.0	0.0	0.0	0.0	1,686.9	0.0	0.0

Table A4 (continued)

Operating costs												
Electricity (2,366.0 kWh/hour, 10 hours/day, 26 days/month)	kWh	0.0	0.0	0.0	0.0	721.1	769.1	817.2	865.3	913.4	961.4	961.4
Water (779 m3/day, 365 days per year)	m3	0.0	0.0	0.0	0.0	166.6	177.8	188.9	200.0	211.1	222.2	222.2
Hygienic Pallets	No	0.0	0.0	0.0	0.0	1,953.6	390.7	390.7	390.7	390.7	390.7	390.7
Boxes (85 liter)	No	0.0	0.0	0.0	0.0	260.5	312.6	364.7	416.8	468.9	521.0	521.0
Boxes (54 liter)	No	0.0	0.0	0.0	0.0	317.5	381.0	444.4	507.9	571.4	634.9	634.9
Boxes (33 liter)	No	0.0	0.0	0.0	0.0	311.4	373.6	435.9	498.2	560.4	622.7	622.7
Boxes (28 liter)	No	0.0	0.0	0.0	0.0	390.7	468.9	547.0	625.2	703.3	781.4	781.4
Plastic boxes (Local market)	No	0.0	0.0	0.0	0.0	561.7	112.3	112.3	112.3	112.3	112.3	112.3
Public relations and advertising	sum	0.0	0.0	0.0	0.0	976.8	244.2	244.2	244.2	244.2	244.2	244.2
Insurance	sum	0.0	0.0	0.0	0.0	1,202.0	1,202.0	1,202.0	1,202.0	1,202.0	1,202.0	1,202.0
Communications	sum	0.0	0.0	0.0	0.0	284.9	284.9	284.9	284.9	284.9	284.9	284.9
Waste treatment (declining % of total processing tons)	ton	0.0	0.0	0.0	0.0	1,449.3	1,545.9	1,578.2	1,545.9	1,449.3	1,288.3	644.1
Cleaning (based on surface area)	m2	0.0	0.0	0.0	0.0	583.5	622.4	661.3	700.1	739.0	777.9	777.9
Cleaning consumables and uniforms	sum	0.0	0.0	0.0	0.0	248.7	248.7	248.7	248.7	248.7	248.7	248.7
Surveillance and security	sum	0.0	0.0	0.0	0.0	111.6	111.6	111.6	111.6	111.6	111.6	111.6
Maintenance (1.0% of investment cost at full development)	sum	0.0	0.0	0.0	0.0	1,862.8	2,794.2	3,725.6	4,657.0	5,588.4	6,519.8	9,314.0
Total		0.0	0.0	0.0	0.0	11,402.5	10,039.8	11,357.5	12,610.8	13,799.6	14,924.1	17,074.1
Staff costs												
Managing Director	year	0.0	0.0	0.0	148.8	297.6	297.6	297.6	297.6	297.6	297.6	297.6
Operations Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Technical Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Administration Director	year	0.0	0.0	0.0	108.7	217.4	217.4	217.4	217.4	217.4	217.4	217.4
Financial Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Business Units Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Legal and Human Resources Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Sales and Marketing Director	year	0.0	0.0	0.0	88.4	176.8	176.8	176.8	176.8	176.8	176.8	176.8
Engineering/Services Managers	year	0.0	0.0	0.0	176.8	353.5	353.5	353.5	353.5	353.5	353.5	353.5
Department Managers/Heads	year	0.0	0.0	0.0	0.0	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5	2,338.5
Subject specialists	year	0.0	0.0	0.0	62.4	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6	1,870.6
Miscellaneous staff	year	0.0	0.0	0.0	0.0	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1	4,065.1
Post-harvest staff	year	0.0	0.0	0.0	0.0	14,665.5	14,665.5	14,665.5	14,665.5	14,665.5	14,665.5	14,665.5
Life insurance (5.0% of staff salary costs)	sum	0.0	0.0	0.0	53.4	1,247.5	1,247.5	1,247.5	1,247.5	1,247.5	1,247.5	1,247.5
Staff training	sum	0.0	0.0	0.0	0.0	488.4	488.4	488.4	488.4	488.4	488.4	488.4
Other social costs	sum	0.0	0.0	0.0	0.0	40.7	40.7	40.7	40.7	40.7	40.7	40.7
Board member expenses (10 members)	meeting	0.0	0.0	0.0	162.8	162.8	162.8	162.8	162.8	162.8	162.8	162.8
Total		0.0	0.0	0.0	1,283.7	26,401.0	26,889.4	26,889.4	26,889.4	26,889.4	26,889.4	26,889.4
Total Operating and Fixed Costs		0.0	0.0	0.0	1,283.7	37,803.5	36,929.2	38,246.9	39,500.2	40,689.1	41,813.5	43,963.6
Net Cash Flow		0.0	(237,218.9)	(383,473.8)	(311,993.3)	137,680.4	162,591.0	185,309.6	208,092.6	229,253.1	253,851.8	251,701.7
Project Overhead Costs												
Category	Samarkand											
	Share (%)	Total										
	56.78											
Capacity Development for ALC Operation and Management	11,554.0	0.0	4,621.6	4,621.6	2,310.8	0.0						
Project Management	10,917.2	2,217.2	2,392.0	2,141.5	2,141.5	2,025.0						
Project Management and Supervision Consultants	14,378.4	5,677.6	3,930.7	3,887.0	883.2	0.0						
Environmental Management/Mitigation	491.5	401.6	22.5	22.5	22.5	22.5						
Resettlement	7,900.8	7,900.8	0.0	0.0	0.0	0.0						
Total	45,241.9	16,197.3	10,966.7	10,672.5	5,357.9	2,047.5	0.0	0.0	0.0	0.0	0.0	0.0
(Project Overhead Costs Switch)	1											
Net Cash Flow after Project Overheads		(16,197.3)	(248,185.6)	(394,146.4)	(317,351.2)	135,632.9	162,591.0	185,309.6	208,092.6	229,253.1	253,851.8	251,701.7

Source: Asian Development Bank.