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**Private Sector Competitiveness  
Enhancement Program**

# **Domestic Resource Cost Analysis of Azerbaijan**

## **Final Report**

**Presented by Chemonics International**

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## ACRONYMS

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ADDY	Azerbaijan Railway
AZN	Azerbaijani Manat
CIF	Cost, Insurance, and Freight
CIS	Commonwealth of Independent States
CPI	Consumer Price Index
DRC	Domestic Resource Cost
EPC	Effective Protection Coefficient
ERER	Equilibrium Real Exchange Rate
FOB	Free on Board
GDP	Gross Domestic Product
GOAJ	Government of Azerbaijan
ICT	Information Communication Technology
IMPACT	Integrated Model for Policy Analysis Computer Template
IT	Information Technology
MB	Macroeconomic Balance
NFA	Net Foreign Asset
NPC	Nominal Protection Coefficient
NRP	Nominal Rate of Protection
NSP	Net Social Profitability
PSCEP	Private Sector Competitiveness Enhancement Program
PVC	Polyvinyl chloride
REER	Real Effective Exchange Rate
SER	Shadow Exchange Rate
SPS	Sanitary and Phyto-Sanitary
TIRSP	Trade and Investment Reform Support Program
USSR	Union of Soviet Socialist Republics
VAT	Value Added Tax
WTO	World Trade Organization

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## SECTION I

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### **Executive Summary**

The focus of this Domestic Resource Cost (DRC) analysis is to identify and evaluate 30 sub-sectors of the Azerbaijani economy from which a more limited number will be chosen for assistance under the USAID Private Sector Competitiveness Enhancement Program (PSCEP). Identified sub-sectors should demonstrate high potential for income growth, employment, and either export expansion or the ability to substitute competitively for imports. The study also aims to aid the Government of Azerbaijan (GOAJ) in the formulation of policies that will promote the most economically efficient allocation of capital and budget resources.

The DRC concept is relatively simple: it measures the efficiency by which a unit of scarce domestic resources produces or saves a unit of foreign exchange. If the DRC is less than one, the value of resources used in production is worth less than the foreign exchange earned or saved and the country has a comparative advantage in that specific product; if the DRC is greater than one, the value of resources used in production is worth more than the foreign exchange earned or saved and the country has a comparative disadvantage in that specific product. The DRC analysis estimates the economic (exclusive of taxes and subsidies) as well as the financial (inclusive of taxes and subsidies) profitability of entire value chains as well as individual segments within these chains. It also calculates the degree to which the sectors are subject to positive or negative protection in relation to world market conditions. An additional indicator used to measure profitability is the profit rate, or net profits divided by gross revenue.

To conduct the DRC analysis, PSCEP contracted five local consulting companies to carry out over 150 surveys of farmers, processors, manufactures, traders, and exporters across the country. It also gathered data and analyzed the structure of prices and costs connecting world market prices with those prevailing on the domestic market. The study incorporated various taxes and subsidies, including import duties, the value added tax, subsidies on area devoted to wheat production, and subsidies on the sale of fertilizer.

The DRC consultant, Dr. Dirck Strycker, utilized sensitivity analysis to examine the impact on the results of changes in world market prices, exchange rate, rates of subsidization, and the return on capital. The consultant analyzed the shadow exchange rate and the shadow price of capital as the opportunity cost of these scarce resources in the absence of distortions in their markets; or, if the distortions continue to exist, their opportunity cost at the margin in the market-distorted situation. Since the government has decided to make use of this foreign exchange to improve the infrastructure of the country and increase the standard of living of the population, there have been substantial pressures on the real exchange rate. This has tended to injure the export sector and to make it more difficult to compete with imports. In addition, however, the increased protection that has occurred because of rising import transactions costs has put even greater pressure on the foreign exchange market, encouraging further appreciation of the real exchange rate and further distorting producer incentives. All of this has been exacerbated by depreciation of the Russian ruble and the currency of a number of Azerbaijan's other competitors.

The results of the DRC analysis are subdivided here into: (a) export activities; (b) import substitution for the domestic Baku market; and (c) import substitution for local markets. In addition, the report presents several other conclusions emerging from the DRC analysis.

*Export Activities:* Azerbaijan's comparative advantage in exporting fresh fruits and vegetables is very strong, especially for the Russian market. The advantage results from several factors. One is favorable climate and soils. Another is the capacity to produce these products on small farms using relatively labor-intensive techniques. A third is the country's location south of Russia, which allows it to take advantage of high prices in Russia after production there has declined seasonally. A fourth is proximity to the Russian market. A fifth is the existence of an extensive network of Azeri traders within Russia, which cater to the lower end of the market in bazaars and small shops. Finally, Azerbaijan has a substantial number of orchards left over from the Soviet era. Although these are not very productive, capital costs have long since been written off and harvesting that remains continues to be profitable. Apples, cherries, persimmons, fresh pomegranate, pomegranate juice, apple juice, greenhouse tomatoes and cucumbers, tomatoes paste, early potatoes, hazelnuts, kiwi, and feykhoa are all found to have favorable DRCs (less than one). Outside of agriculture, the same is true of some building finishes, carpets, and some computer assembly. At this stage, Azerbaijan's non-oil related and non-agricultural exports are limited.

*Import Substitution to the Domestic Baku Market:* Import substitution for the domestic market in Baku tends to have DRCs that are often considerably greater than one, indicating a comparative disadvantage. This is true, for example, with dairy products. One reason for this is that transportation costs work against the producers of these products. That is, they have to incur the cost of transporting the products to Baku and are not sheltered from imports paying the cost of transporting the products up country. Another reason is the substantial barriers to imports that exist because of high transactions costs, sometimes due to trade monopolies. These result in imported products being sold locally for prices that are substantially above their import parity price – for example, chicken broilers which incur transactions costs that are three times greater than their combination of customs duty and VAT. This results in high domestic prices, which encourages local firms to compete with imports even if they incur high costs, leading to inefficient production. Grain crops show a diversity of results explained by several factors. Some large wheat farms surveyed with substantial economies of scale have relative low DRCs; smaller wheat farms, on the other hand, have DRCs greater than one. Most barley production is inefficient, with DRCs greater than one, meaning that they do not demonstrate comparative advantage. Among those firms surveyed, rice and corn production is efficient with DRCs less than one. The results are sensitive, however, to large recent variations in world market prices.

*Import Substitution to the Local Market:* There is a strong divergence between a relatively small number of well protected larger firms producing for the Baku market and the more diffused and smaller scale production activities that are supplying the upcountry market. Although the DRCs for the latter are generally lower than for the larger firms producing for Baku, this is not universally true. There is substantial heterogeneity in these sub-sectors and more care is required in order to avoid supporting activities that are not sustainable in the longer run without substantial import protection.

*Constraints on finance, export contacts, and warehousing:* Survey respondents reported that among the main constraints to growth are access to unsustainable finance, locating export buyers, and lack of cold storage and refrigerated transport facilities. There are many opportunities for financially and economically profitable investment in new plant and equipment. Much of the orchards, storage facilities, machinery, and equipment in Azerbaijan are old and obsolete. Many entrepreneurs are eager to invest but do not have the capital. The Government of Azerbaijan (GOAJ) has attempted to address this constraint by creating an equity capital company and through a program of highly subsidized credit programs. Given the dearth of equity capital in the country, the former is an appropriate response, as long as it maintains a private sector focus, investments are made on sound financial principles, and the fund provides adequate exit strategies. On the other hand, experience world-wide has demonstrated that directed, subsidized government credit lines are not the solution in making access to credit sustainable. Loan terms and conditions already vary enormously in Azerbaijan, partly because of these credit programs, leading to a highly fragmented and inefficient financial market. PSCEP is addressing this issue. This will involve working with commercial banks to develop new financial instruments such as purchase order finance, enhanced leasing, and a system of warehouse receipts. On the equity side, the program will link new opportunities with sources of investment funds such as the Azerbaijan Investment Company and the Caspian International Investment Fund. Actions will include technical assistance regarding investment strategies, transactions, and development of new products.

PSCEP will also help to link producers and buyers, to overcome the shortage of warehouses and cold storage facilities, and to promote the expansion of refrigerated transport. Promoting the construction of cold storage will enable farmers and traders to take advantage of seasonal changes in product prices and avoid having to transport their goods during the peak season when refrigerated trucks are scarce and rates are very high.

*Market Changes:* Azerbaijan should look toward market up scaling and diversification, particularly the possibility of exporting more to the European Union. As Azerbaijan begins shifting to markets other than the CIS countries, it will have to satisfy higher sanitary and phyto-sanitary (SPS) standards and to assure traceability regarding working conditions, chemical/fertilizer usage, and environmental impact. There are major needs for equipment and a regulatory framework for cleaning, grading, and assuring quality control, animal and human health and safety standards, and phyto-sanitary control. Identifying new niche markets and assisting companies to meet the demands of these new markets will be a major PSCEP objective.

*Agricultural Subsidies:* One of the most pressing issues facing the government is whether to continue, expand, or eliminate agricultural subsidies used to promote production of wheat and other crops in accordance with the Food Security Program. According to the sensitivity analysis, removal of the subsidies on wheat production would have a negligible effect on the DRC ratios. It would reduce the average profit on wheat measured in the survey from 41% of gross revenue to 35%. In other words, despite their costs, the subsidies do not appear to provide a significant incentive. Large wheat farmers capture most of these subsidies. Given that their farms are relatively profitable in any case, it is unlikely that they would reduce their production if the subsidy were removed.

In the meantime, if fully implemented, the wheat subsidy would cost the government more than 40,000,000 AZN per annum. This subsidy equals approximately 10% of

the government's agricultural budget for 2009. It is a very high price to pay given that the state could use these funds to invest in agriculture through research and development, construction of primary irrigation infrastructure, developing pre-feasibility studies for the numerous private sector investments that are needed, and other needed investments. Furthermore, the wheat subsidy is applied to the area of land planted in wheat, which encourages the use of extensive techniques of production rather than those resulting in higher yields and greater utilization of labor. While this may be appropriate for those who are able to take advantage of the economies of scale implicit in highly mechanized systems of production, it is not efficient for small farmers operating on very limited and often fragmented land holdings, especially given the alternatives that are available to them such as producing more profitable crops such as fruits and vegetables.

If the government chooses to provide subsidies, a more efficient system would be a broad direct income agricultural subsidy that does not discriminate between alternative crops. Experience with the existing 40 AZN per hectare fuel and motor oil subsidy that applies to crops other than wheat suggests that the criteria and procedures for receiving a direct income Subsidy should be simple and transparent. Furthermore, the subsidy should be related to past, not future production in order to avoid distorting agricultural market incentives.

The current fertilizer subsidy needs to be reconsidered. Farmers report not being able to obtain their fertilizer needs from Agro Leasing, which supplies the subsidized fertilizer. At the same time, this subsidy drives private sector input companies out of the business of distributing fertilizer. This creates substantial uncertainty and has an adverse impact, especially, on smaller farmers who have poor access to fertilizer from any source.

*Manufacturing and Services:* The study identifies a number of economically profitable activities in manufacturing and services in which Azerbaijan has a comparative advantage – either for export or for substitution against imports. These include building finishes, carpets, some computer assembly, catering services, waste management, some protective clothing, and truck transportation. However, there is much more disparity in DRCs among firms in these sectors than for agriculture and agro industry. This is because agro climatic conditions, location in relation to markets, land/labor ratios, size distribution of farms, and other relatively immutable variables determine comparative advantage to a much more powerful extent than they do for manufacturing and services. In the latter case, economic profitability depends more on technology, labor skills, capital accumulation, management, and the history of the firm and industry. This suggests considerable scope for PSCEP intervention in this area.

## SECTION II

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### **Introduction**

#### **A. Objectives and Organization**

##### **A1. Study Objectives**

The USAID Private Sector Competitiveness Enhancement Program (PSCEP) is US\$6.6 million, three-year project designed to offer Azerbaijan the tools it needs to create jobs, expand sales, increase trade and investment, and promote the competitiveness of a number of sub-sectors in the agricultural, industrial, and services sectors. PSCEP works to enhance competitive value chains through enterprise level support and to develop stakeholder cooperation institutions at the broader sector level.

The focus of this study is to identify and evaluate 30 sub-sectors from which a more limited number of these will be chosen for assistance. Identified sub-sectors should demonstrate high potential for increases in sales, employment, and either exports or the ability to substitute competitively for imports. The study aims to assist PSCEP in the selection of sub-sectors in which Azerbaijan has a strong comparative advantage, as well as in identifying key economic constraints to be addressed. Beyond PSCEP, the study aims to aid the Government of Azerbaijan (GOAJ) in the formulation of policies that will promote the most economically efficient allocation of capital and budgetary resources.

An important early step in assessing the comparative advantage of the 30 sub-sectors is the application of domestic resource cost (DRC) methodology. At its core what the DRC methodology measures is relatively simple: the efficiency by which a unit of domestic resources earns or saves a unit of foreign exchange. The presentation in the main body of the report maintains this level of simplicity, leaving the details of the calculations and methodology to a technical annex (attached), intended for economists and others who may wish to examine the details in more depth.

##### **A2. Organization**

The following section presents an overview of the agricultural, industrial, and service sectors of the economy. The section highlights a number of issues that are critical to the development of these sectors and to the implications of the results of the study for policy and PSCEP programming. The study then presents the approach used to identify the sub-sectors that were selected for analysis.

Section 3 provides a brief and simplified overview of the DRC methodology and its application, the details of which are described in the technical annex. This is followed by a presentation in Section 4 of the DRC results, as well as those of the sensitivity analysis conducted regarding the consequences of changes in world market prices, application of the opportunity cost of foreign exchange rate, and the changes in the system of agricultural subsidies. This analysis is particularly important for some sub-sectors, such as wheat, because of recent sharp fluctuations in world market prices and the use of wheat subsidies to increase production in Azerbaijan. Section 4 also presents some qualitative results of the study, which were drawn primarily from survey questions regarding the major barriers and constraints faced by farmers,

traders, processors, and manufacturers in the various sub-sectors. This assists in the interpretation of the DRC analysis.

Implications for policy and PSECP programming of both the quantitative DRC analysis and the qualitative assessment are explored in Section 5 in light of the major issues that were raised in Section 2 and elsewhere in the report. This is done in terms of both cross-cutting themes and sub-sector issues.

Section 5 also summarizes the principal conclusions of the analysis and presents its recommendations regarding future policy and programming actions. Annex A presents the DRC methodology in some detail, including its more technical dimensions. An appendix to this Annex presents specific examples of how the analysis was applied to apple exports and poultry production. The other annexes provide details of comparisons between world market prices and domestic prices in Azerbaijan; an analysis of the opportunity cost, or shadow price, of foreign exchange; a detailed list of the problems considered as most important by survey respondents; and details from the questionnaires regarding lending and borrowing by the firms that were surveyed.

## **B. Major Issues Confronting Azerbaijan's Sub-Sectors**

### **B1. Agriculture**

#### **B1a. Agriculture Landscape <sup>1</sup>**

The territory of the Azerbaijan Republic encompasses nine of the eleven world climatic zones, giving the country a rich agro-climatic diversification. In a number of these zones, however, rainfall is relatively low, making much of the country dependent on irrigation. While livestock also plays a large role in the Azerbaijani economy and is widespread throughout the country, for purposes of this study, the DRC analysis concentrates within livestock on the poultry, dairy and processed meat subsectors. Table 1 presents basic information on Azerbaijan's agro-climatic zones.

Agriculture accounts for approximately 40% of employment in Azerbaijan, and slightly more than half of the territorial land. Approximately 4.74 million hectares (55%), is used for agricultural purposes, including cultivation, pastures, and rangeland. Until 1991, the Azerbaijan agriculture sector comprised 983 collective (kolkhoz) and 820 state-owned farms (sovkhoz), which cultivated a total of 1.46 million hectares. In 1996, after the collapse of this system, Azerbaijan passed the Land Reform Act, which transferred state-owned lands to individuals. By 2001, the reforms had helped create approximately 800,000 small private farms. While the average farm size after this redistribution was 2.6 hectares, the majority of farm families (45%) owned only between 0.1 and 2 hectares. Thus, while the process of land reform effectively privatized land, it also created a pattern of small, fragmented plots. This has had a significant impact on the opportunities to achieve economies of scale in production, services, and equipment usage.

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<sup>1</sup> This section relies to a considerable extent on the Project Framework Paper (PFP) for the Agricultural Development and Credit Project, financed by the World Bank.

**Table 1: Agro-climatic Zones of Azerbaijan**

<b>Agro-climatic Zone</b>	<b>Agro-climatic Condition</b>	<b>Agricultural Products</b>	<b>% Arable Land Irrigated</b>	<b>Precipitation</b>
Ganja - Qazakh	diverse	Potato, cereals, vegetable, meat and milk		
Shirvan	mountain - plain	Wheat, barley, cotton, melon crops, fruit, vegetables, grape	20.9	220-240 mm
Mugan - Salyan	strongly salinated soils	Cereals, cotton, forage crops	39.4	180-220mm
Shaki - Zagatala	subtropical	Cereals, tobacco, nut crops, forage crops	22.3	600-700 (900)mm
Guba - Khachmaz	forest, chestnut, salinated soils	Vegetables, maize, fruit, barley, potato	13.7	250-500mm
Lenkaran - Astara	wet subtropical, yellow soils, meadows – boggy, loamy – boggy soils	Cereal, vegetables, fruits, potato, grape, citrus	4.8	1300mm
Mil – Garabagh	dry-subtropical, chestnut, grey soil	Cotton, forage, wheat, grape	36	200-400mm
Nakhchivan	chestnut, grey, grey-brown soil	Sugar, grain legumes, grape, fruit	10.3	300-600mm
Absheron	dry climate,	Fruit, forage, grape, vegetables	10.5	150-200mm

As noted by the World Bank, one response to small farm size has been to concentrate on labor-intensive and fairly scale-neutral production and export of fresh fruits and vegetables. For example, there is growing demand in foreign markets, particularly Russia, for Azerbaijani apples, resulting in a doubling of exports in the last five years. The particular soils required for pomegranates are found in Azerbaijan, and farmers are actively expanding their orchards. Both apples and pomegranates are increasingly being processed into juice and juice concentrates. Although Russia and the Ukraine are the major markets, exporters are also targeting Western Europe. Fresh vegetable exports grown in greenhouses have increase 4 to 5 times in the past five years, mostly to Russia and the Ukraine. The climate and weather conditions in Azerbaijan allow for 3 to 4 growing cycles per year in greenhouses, and lower energy cost make Azerbaijan very competitive. Other fruit and vegetable products for which exports are growing rapidly include cherries, persimmon, hazelnuts, early potatoes, kiwi, feykhoa, and tomato paste concentrate.

Another response has been the consolidation of land holdings through purchase of land by larger farmers or the rental, borrowing, or usage of land belonging to others by larger farm operators. In addition, larger farmers who own more farm machinery than they need may rent out their services for land preparation, seeding, fertilization, and harvesting. Although consolidation of land holdings and rental of farm machinery

have helped to solve the problem of land fragmentation and small plot size, the markets for land and machinery services are still not very well developed, leading to considerable inefficiencies and inequities in the use of land.

### **B1b. Constraints to Agricultural Development**

Among the most pressing constraints in the agriculture sector today are small land plots; fragmented farm systems; antiquated, dilapidated, or non-existent equipment and technology; limited use of and access to fertilizer; dysfunctional irrigation systems; and lack of access to financing and leasing programs for agricultural inputs.

As with land holdings, the government distributed farm equipment and machinery among smallholders. Due to lack of financing, however, very few of these farmers were able to operate this equipment, much of which was aged and technologically obsolete. This impeded the institutional development of cooperatives, leasing companies, or tractor hire services, which could have provided ways of allocating mechanized services for land preparation, seeding, and harvesting to smaller farmers. As a result it has been very difficult for these farmers to cultivate field crops such as wheat and barley efficiently.

Subsidized fertilizer is sold to farmers via the state-owned Agro Leasing Company. Supplies are limited, especially for smaller farmers, and alternative sources are few and expensive. As a result, the World Bank estimates that only 4% of the optimal levels of fertilizer are actually being used. Although agricultural herbicides, pesticides, and insecticides are available through commercial sources, the quality of these chemicals is not effectively assured by a government certification process. Consequently, farmers frequently use too much of these chemicals in order to assure protection. The result is high cost and extensive environmental damage.

Another major constraint is irrigation. As shown in Table 1, for most of the country except the foothills and southeastern regions, irrigation is essential to production, given average annual rainfall in these regions of only about 200-300 millimeters. In fact, 80% of all crop production is realized on land that is at least partially irrigated. For this purpose, extensive irrigation systems were constructed before and after Azerbaijan became part of the Soviet Union. These systems were not always well designed, however, and they frequently lacked adequate drainage systems and were poorly maintained. The result in many areas was water logging and salinization, which severely damaged about 425,000 hectares out of a total irrigated area of 1,272,000 hectares.<sup>2</sup> In other areas, the land is cultivable, but irrigation water is in short supply -- partly because farmers on average pay only 12% of the cost of water delivery. As a result, many farmers rely on their own devices for obtaining irrigation water -- by having water delivered by truck or by pumping from wells, major irrigation canals, and rivers and streams.

Given the fragmentation and dispersion of farms, collecting products is costly and slow. Losses can be high. This is particularly a problem for sub-sectors such as dairy products, which are dependent on highly perishable raw materials such as fresh milk. One potential solution to this problem has been the development of vertically integrated operations, which incorporate input supply, production, processing, and sales all under one roof. One good example is the poultry industry, where six large, vertically integrated farms supply a large part of the domestic market.

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<sup>2</sup> Project Framework Paper, p. 84.

### **B1c. Primary Market for Agricultural Products**

Azerbaijan has historical ties to the Russian fresh fruit and vegetable markets. During the Soviet regime, Azerbaijani agricultural products met 20-30% of demand for fresh fruits and vegetables across the Soviet Union. Today, there is still high demand for Azerbaijani produce in Russia, particularly in Moscow, where Azerbaijani merchants dominate these markets. While some of these markets decreased in importance after the collapse of the Soviet system and dismantling of large farms, Azerbaijani products such as tomatoes, potatoes, apples pomegranates, feykhoa, kiwi, and many others have received good prices in Russia in recent years. Furthermore, the proximity of the markets and the less stringent quality and food safety standards across the CIS region make Russia and the other CIS countries a favorite market. Exports of fresh fruits and vegetables to Russia in the past five years have increased steadily, and although the state statistics are not currently disaggregated by product, experts estimate that most fresh fruits and vegetables are exported to Russia, especially in the peak season, with apples and persimmons alone accounting for approximately 80% of fruit exports, and greenhouse vegetables—tomatoes and cucumbers—accounting for 45% of vegetable exports.

Although the current market for Azerbaijani fruit and vegetable exports today may not be very demanding in terms of packaging, quality, and safety standards, this market is evolving and is likely to require greater adhesion to these standards in the future. Furthermore, other markets in Europe, the Middle East, and elsewhere are much more difficult to penetrate without meeting these standards. Furthermore, the increasing importance of supermarkets and other demanding buyers in food markets all over the world implies that Azerbaijan is likely to increasingly have to meet these standards in order to survive. Helping producers and exporters to meet these standards will be a PSCEP priority.

### **B1d. Issues Raised**

This brief review of agriculture raises a number of issues that are investigated in this study.

- The breakup of large state and collective farms and their redistribution to mostly smallholders raises the question of what types of crops are likely to be most suitable in this environment. For example, one would expect that labor-intensive crops that do not have important economies of scale would be most successful. Is this the case?
- Another possible response to this problem, especially in areas where field crops such as wheat are most suitable, is consolidation of land holdings and the development of mechanisms for sharing equipment through cooperative arrangements, tractor-hire services, and leasing. Is there evidence that this is happening and that it is leading to a more efficient allocation of resources?
- What are the infrastructural, institutional, and other constraints that stand in the way of Azerbaijan's achieving a more rational allocation of resources along the lines of its comparative advantage? To what extent are these constraints better dealt with through policy measures or the types of assistance that the PSECP might provide?
- What is the importance of subsidies on fertilizers and area planted and harvested in wheat in making this crop profitable and in encouraging its

production? If these subsidies were abandoned, would production continue to be profitable?

- Given the important role that irrigation has to play in Azerbaijani agriculture, what is the economic profitability of rehabilitation of the existing irrigation system and its extension?
- To what extent are Azerbaijan's markets in Russia and other countries dependable? Are they evolving in terms of price, degree of competition, and quality and safety standards? What does this imply for the types of assistance that the PSCEP might provide?
- At present, many import substituting industries are heavily dependent on imported inputs and a bifurcated structure in which a few large companies produce for the market in Baku, while a number of smaller scale enterprises produce for the upcountry market. Can and should these structures be better integrated, especially with respect to substituting local for imported raw materials? Examples are poultry and the dairy industry. What can the PSCEP do to assist this process?
- There is an increasing tendency for international trade in fruit juices to be dominated by the flow of concentrates rather than bottled juices. This saves considerably on transportation costs but prevents the development of brand identification. Which is better for Azerbaijani producers?
- One response to the fragmented, dispersed pattern of farms in Azerbaijan, with the difficulties this poses for supplying raw materials to agro-processors, has been to create larger, vertically integrated enterprises, especially in the poultry and dairy industries. Are these enterprises more successful and do they have more of a comparative advantage than when the different stages of production are handled by separate enterprises.
- Financing is cited as a constraint by most producers and farmers. Are current state-subsidized financing schemes most effective in reaching the greatest number of farmers and providing sustainable access to finance? Is Azerbaijan effectively utilizing financial instruments developed in many other countries to ensure both the strength of financial institutions and to serve producers?

## **B2. Industry and Services**

### **B2a. Industry**

Azerbaijan's industrial economy is heavily dominated by the petroleum sector, which in 2008 accounted for over half of GDP. By the end of 2008, the non-oil sector was growing even more rapidly than the oil sector, driven by activity in construction, commerce, and communications. Nevertheless, the growth rate of both oil and non-oil sectors declined dramatically in January 2009, as a consequence of the reduction in world oil prices and the global financial crisis.

Although oil and natural gas continues to dominate the economy, Azerbaijan is rich in many other natural resources. For example, there are extensive reserves of iron, manganese, titanium, chromium, cobalt, molybdenum, copper, gold, silver, and alunite. The natural gas industry supports the chemical industry as well as ferrous and non-ferrous metallurgy. There are a number of industrial enterprises producing equipment, metal products, PVC piping, aluminum, paints and varnishes, building materials, building finishes, packaging, furniture, and other goods, in addition to the fruit juices and other agro-industrial products mentioned above. In the services area, in addition to construction and commerce, Azerbaijan has a nascent banking sector

faced with serious limitations but also with a number of progressive banks willing to expand their financial products and productivity. It is beginning to develop tourism, and has a budding information and communications industry, which supports many of its other sectors.

At the end of the Soviet era, Azerbaijan inherited a range of state-owned industrial enterprises that had been created as part of the network of trade within the USSR. Many of these enterprises were not efficient, but this was often disguised by a system of production and distribution that did not relate prices very closely to costs. Once independence had been achieved, decisions had to be made regarding what was to be done with these enterprises. In some cases, where the enterprises appeared to be reasonably profitable, they were sold to the private sector, often becoming Limited Liability Companies. In others, the private sector provided equity investment, and often new management, creating Joint Stock Companies. In still others, the state continued to own the enterprises as Public Stock Companies.

In addition to these older enterprises, a number of newer firms emerged. Many of these were locally-owned small and medium enterprises, which endeavored to fill a niche in the marketplace. Others might have some equity participation from foreign investors as joint ventures. Still others were branches or subsidiaries that were wholly owned by foreign firms.

Many of these industrial enterprises were focused primarily on the domestic market, where they competed with each other and with imports. Some sought – and gained – monopoly positions that have made them wealthy at the expense of an efficient economy. Others sought to enter foreign markets via exports. Exporting enterprises were forced to compete head to head not so much with other firms in Azerbaijan as with firms exporting to these markets from other countries. An important issue addressed in the study is whether the need to compete in foreign markets tends to increase the competitiveness and profitability of these firms compared with those that produce and sell only on the local market where they usually receive substantial tariff, and in some cases nontariff, protection.

## **B2b. Services**

Within the services sector, the state has played an important role in areas such as transportation and telecommunications. However it has also had to compete increasingly with services provided by the private sector. This section reviews briefly aspects of these two sub-sectors that are related most closely to economic development. It also touches on a few other services sub-sectors.

### **Transportation**

The Azerbaijan Railway (ADDY) is a state-owned enterprise, which is the sole rail operator under the Ministry of Transport.<sup>3</sup> It was originally one of 26 regional railroad administrations operating as semi-autonomous organizations throughout the Soviet Union. These administrations operated under common rules, regulations, and technical protocols. As a result, much of the equipment and track in Azerbaijan is of the same specifications found in other CIS countries, which greatly facilitates trade

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<sup>3</sup> Asian Development Bank, *Republic of Azerbaijan: Overview of the Azerbaijan Transport System and Transport Sector Development Strategy*, June 2006. Report 2, p. 26.

Azerbaijan's location as part of the shortest land corridor (Azerbaijan-Georgia) from the Caspian Sea to the nearest open sea, the Black Sea, make this an attractive route not only for the country's own exports and imports but also for significant transit trade. This route and the corridor from Baku to the Russian border carry 96 % of all railway traffic.

The ADDY is generally profitable, but it lags seriously behind in maintenance and renewal investment. Overcoming this constraint is one of the objectives of the Government Program for the Development of Azerbaijan State Railways, 2008-2011.<sup>4</sup>

Rates for export, import, and transit traffic are set by the CIS tariff setting organization. These rates are quite high so that each country applies a series of discount factors in order to take into account competition and varying freight demand. In order to be competitive, ADDY applies these discount factors rather aggressively.

In contrast to the railroad, road transport is completely dominated by the private sector. State-owned road transport operators have been largely privatized, and foreign road transport operators are allowed to set up their own businesses and to operate freely. Freight charges for domestic road transport are based on market conditions. Though the government in principle sets tariffs for cross-border and international transit vehicles, the high seasonal variability of cross-border rates suggests that any official tariffs that are issued are not widely respected.

The condition of many of Azerbaijan's roads is poor due to inadequate construction quality and lack of maintenance. The government until recently was embarked on a major program to rehabilitate and improve the road infrastructure. This program has been slowed, but not stopped, by the decline in petroleum prices in late 2008 and early 2009.

### **Information and Communications Technology**

One of the most important sub-sectors from the perspective of economic development is information and communications technology. Most of this falls within the services sector, though there is local assembly of computers by three firms large firms (and a large number of microenterprises), which has the advantage of linking production and sales with Azeri keyboards and local follow-up services. Other services provided by the ICT sub-sector include IT consulting, software solutions, networking and internet connection, and telecommunications.<sup>5</sup>

The greatest role of the state is in the telecommunications sub-sector. Historically, state-owned enterprises have provided land-line communications. For, example, Aztelecom was formed in 1997 to provide long-distance and international telephone service throughout Azerbaijan and to furnish telephone service in regions other than Baku and Nakhchivan. However, within the past few years, mobile telephone networks, led by foreign direct investment, have eclipsed the use of land lines. Mobile communications operators have a key competitive advantage in that they are not required to comply with the low telecom tariffs established by the government. They also benefit from not having to invest in expensive landline infrastructure. This is the fastest growing and most dynamic part of the ICT sub-sector, with mobile penetration at 60% and growing each month.

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<sup>4</sup> World Bank, Project Appraisal Document for the Rail Trade and Transport Facilitation Project, p. 2.

<sup>5</sup> PSCEP, "ICT Sector Concept Paper".

Unlike computer equipment, for which imports comprise 70% of market sales, the provision of IT services is almost entirely from local sources. Here the major problem is lack of trained and skilled IT professionals. Most in demand is software development for the financial sector, government, and large trading companies. To satisfy this demand, some IT service providers are specializing in the translation and customization of business software solutions.

The weakest link in the ICT value chain is the internet. Unrealistically high tariffs, poor infrastructure, and low connection speed hamper the development of internet-based applications. Delta Telecom is the sole national provider that supplies internet from Moscow through the fiber optic cable laid along the Baku-Tbilisi pipeline. There is also a satellite channel but this is used only as a backup. The AzDataCom project initiated by the Ministry of Communications and Information Technology and the United Nations Development Program has as its purpose to create a high-speed national backbone for network infrastructure covering both Baku and the regions by the year 2012. PSCEP has selected ICT as one of its target sectors. The program will address not only computer assembly but other key areas in which ICT can contribute to a modern economy such as e-commerce and e-business services.

### **Other Services**

There are numerous other sub-sectors within the services sector. Commerce and trade is an important one, which contributes substantially to economic development and is referred to frequently in this report. Construction is another, which has been very important in improving the road infrastructure that is so vital to commerce and trade. Azerbaijan has even developed a capacity to export construction services to other CIS countries because of the skills learned at home and fluency in the Russian language. Tourism is a third sub-sector that may prove to be very important in the future but currently lacks basic infrastructure.

Other local services are tied closely to the oil industry. One is catering, which provides workers with meals. Another is waste management, which is necessary to avoid the adverse impact on the environment of drilling, pumping, and shipping of oil and its products.

### **C. Sub-sectors Chosen for the Study**

Early in project implementation, PSCEP reviewed past experiences and undertook research, as well as stakeholder interviews, to identify the following broad sectors as offering sufficient potential to be screened for further quantitative analysis:

1. Fruit and vegetable production and processing (including nuts and related products)
2. Animal husbandry and related products (dairy, meats, others)
3. Light manufacturing and non-oil services related to the petroleum industry
4. Textiles and carpets
5. Construction finishes
6. ICT
7. Tourism
8. Furniture

The DRC Consultant and the PSCEP team conducted preliminary analyses of these sectors to define the 30 sub-sectors for DRC analysis. The purpose was to identify

sub-sectors that the PSCEP could usefully target as well as others that are important for both the private sector and policy makers in the Government of Azerbaijan (GOAJ). The criteria that were used in this selection process were one or more of the following:

- Expansion of the sub-sector will result in substantial increases in income and employment.
- The sub-sector demonstrates, through recent trends, potential for successful expansion of exports or substitution of local production for imports. Examples include fresh fruits and vegetables (exports) and poultry (import substitution).
- The sub-sector is deemed to be critical by government. A major example is wheat.
- The sub-sector has critical synergies with other sub-sectors included in the analysis. Examples include feed mills, packing materials, and truck transportation.
- The sub-sector is one in which there are a number of small and medium enterprises that can be assisted.
- The sub-sector is defined in such a way that a limited number of products can be identified for which cost data are available and for which comparison with world market prices can be made.

For this assessment, the consultant reviewed existing studies as well as the results of extensive field investigations by local consulting firms subcontracted by PSCEP. Ultimately the team chose the sub-sectors highlighted in Table 2 for further quantitative analysis:

<b>Table 2: Sectors and Sub-sectors Studied</b>	
<b><u>Exports</u></b>	<b><u>Import Substitution</u></b>
1. Apples	14. Wheat
2. Cherries	15. Rice
3. Persimmons	16. Barley
4. Fresh pomegranate	17. Corn
5. Pomegranate juice	18. Animal feed
6. Apple juice	19. Grapes
7. Greenhouse vegetables	20. Poultry
8. Tomato paste	21. Meat processing
9. Early potatoes	22. Dairy
10. Hazelnuts	23. Furniture
11. Citrus (kiwi, feykhoa)	24. Building finishes
12. Carpets	25. Catering services
13. Low voltage equipment	26. Waste management (brine recycling)
	27. Computer assembly
	28. Protective clothing
	29. Packing materials
	30. Truck transportation

## SECTION III

### Methodology

#### A. DRC Analysis

DRC analysis estimates the economic as well as the financial profitability of entire value chains as well as individual segments within these chains. It also calculates the degree to which the chains are subject to positive or negative protection in relation to world market conditions. The analysis identifies ways in which tariffs, subsidies, and non-tariff barriers to trade affect the prices of outputs and inputs, as well as variations in benefits and costs associated with location of production, location of markets, scale of activity, and other factors. This comprehensive analysis reveals critical areas that require development of a strategy for detailed targeted assistance. In addition, the analysis covers numerous qualitative dimensions of comparative advantage related to infrastructure, market development, human resource constraints, and other issues that may impact on the sub-sector.

#### Box 1: Economic versus Financial Profitability

The methodology and calculations for measuring a DRC are complex. The message, however, is simple – the DRC shows whether a product is profitable, both financially *and* economically. While a product may be financially profitable—i.e.: will earn a profit; it may *not* be economically profitable if it only earns a profit due to subsidies, protection, or other market distortions. In other words, an investment in this sector would not be profitable if the subsidies or protection did not exist. Only if a product is economically profitable will it have a comparative advantage.

Example:	Item A	Item B
Production Cost	\$2.00	\$1.50
Transport Cost	\$1.00	\$0.75
State Subsidy	- \$1.00	
Effective Cost	\$2.00	\$2.25
Foreign Sale Price	\$2.50	\$2.50
Profit	\$0.50	\$0.25

As we can see from the example, Item A is only profitable while the state subsidy is in place; remove the subsidy and the company will lose \$0.50 rather than gain \$0.50 per item, whereas Item B has a comparative advantage and is also financially profitable without state subsidy even though its profit margin is smaller. While this is a simplified model, the same situation exists when states introduce high import taxes to keep foreign products out of the market, or provide producers with export subsidies to promote local production. Short-term barriers may be useful to build up fledgling sectors within a country, but over the long-term they decrease the productivity of the local firm, which does not need to innovate, modernize, or in some cases even compete for market share.

The DRC is an indicator of the efficiency with which a country's domestic resources, such as labor and capital, are converted into useful output. More precisely, it is the ratio of the true economic cost of these domestic resources to the value added created. This value added is measured in terms of world market prices, which are an indicator of the true economic value of internationally traded resources. The text box in the next page provides a brief technical overview of DRC measurement.

For some time, DRC models have been used as a tool for analyzing the sub-sectors of less developed countries, especially where economies have been subjected to powerful forces such as those induced by surges of petroleum exports. These models, which calculate the DRC as an indicator of comparative advantage, have served in many

countries as an important input into decisions related to trade policy and the promotion of value chains.

### Box 2: A Quick DRC Primer

The DRC is an indicator of the efficiency with which a country's domestic resources, such as labor and capital, are converted into useful output. This efficiency is measured as follows:

$$\text{DRC ratio} = (\text{Labor} + \text{Capital}) / \text{Value Added in World Prices}$$

Where:

Labor = labor input measured at market wages

Capital = capital costs measured at real rates of interest (with sensitivity analysis)

World Prices (PW) for the product as an indicator of the true economic value of internationally traded resources.

To convert the world price for a product to a common currency, as in this case the manat (AZN), the methodology estimates a "shadow" exchange rate for the AZN, which measures the true economic value of foreign exchange (See Annex C for a discussion of shadow exchange rates). When measured in terms of a common currency, the DRC indicates whether a product or sub-sector has a comparative advantage in the market.

**When the DRC is less than 1:** There is comparative *advantage*. The DRC indicates that the value of the domestic resources used in production is less than the "value added" created. Since less than one unit of domestic resources is used to produce one unit of value added, production is economically profitable and efficient.

**When the DRC is greater than 1:** The country has a comparative *disadvantage* in the sub-sector. This means that the value of domestic resources used in production is greater than the "value added" created.

When measured in terms of a common currency that reflects the true economic value of foreign exchange, the DRC is a measure of comparative advantage in a particular sub-sector. If the value of domestic resources used in production is less than the value added created, the DRC ratio is less than one, and the country has a comparative advantage in the sub-sector. If the value of domestic resources used in production is greater than the value added created, the DRC ratio is greater than one, and the country has a comparative disadvantage in the sub-sector. The text box below offers an example of *comparative advantage* in the case of fresh apples exported from Guba to Russia.

### Box 3: Comparative Advantage of Fresh Apples Exported to Russia

Value of domestic resources used in production = 42,298 AZN

Value added in world prices = 131,158 AZN

Domestic Resource Cost Ratio = 0.322

What does this mean?

Azerbaijan has a *comparative advantage* in growing apples in Guba and exporting them to Russia. It takes 0.322 units of domestic resources to generate 1 unit of foreign exchange.

In contrast, the following text box presents an example of *comparative disadvantage* in the case of wheat produced in Jalilabad, which substitutes for imports in Baku.

**Box 4: Comparative Disadvantage of Wheat in Jalilabad That Competes with Imports in Baku**

Value of domestic resources used in production = 12,820 AZN

Value added in world prices = 5,784 AZN

Domestic Resource Cost Ratio = 2.217

What does this mean?

Azerbaijan has, in this case, a *comparative disadvantage* in producing wheat in Jalilabad that competes with imports in Baku. It takes 2.217 units of domestic resources to produce 1 unit of foreign exchange

It is important to highlight the fact that this farm does not show a comparative advantage in producing wheat that competes with imports in Baku, but this does not mean that Azerbaijan has a comparative disadvantage *everywhere* and *on every size farm* in producing wheat. In fact the empirical analysis shows considerable variation in the DRC results across farms within this sub-sector, as discussed further below.

## **B. Effective Protection**

While the DRC indicator is related to the theory of comparative advantage, nominal and effective protection refers to the structure of incentives involving international trade (import duties, export taxes, quantitative restrictions on imports, etc.). The nominal protection coefficient is the ratio of the domestic price of a product to its world market price. It measures the extent to which trade and other distortions cause domestic prices to differ from world market prices. It may be applied to inputs as well as final products. Effective protection measures incentives that affect the prices of both outputs and inputs, and is therefore a better indicator of protection offered to producers. The effective protection coefficient (EPC) is the ratio of value added in domestic prices to value added in world market prices. If the EPC is greater than one, then domestic production is being protected vis-à-vis foreign competition. If the EPC is less than one, then, domestic production is being discriminated against.

## **C. Previous DRC Analysis**

The World Bank undertook an extensive analysis of domestic resource costs in agriculture as part in preparation for the Agricultural Development and Credit Project. These results subsequently appeared in a 2006 World Bank publication which made an important contribution to quantitative analysis of the agricultural sector, especially in its use of DRCs to identify comparative advantage.<sup>6</sup> The study noted the importance of the shift during the 1990s from large collective or state-owned farms to much smaller private farms of no more than five hectares. These farms are much more conducive to the production of labor-intensive, high value crops such as fruit and vegetables than were the larger, older farms. Based on the DRC analysis, the study concluded that Azerbaijan has a comparative advantage in the production of perennial

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<sup>6</sup>William Sutton and Daniele Giovannucci, *Realizing Azerbaijan's Comparative Advantages in Agriculture*, World Bank Report No. 36283-AZ, May 2006.

crops such as oranges, apples, pomegranates, grapes, and olives, as well as in annual crops such as tomatoes, cabbage, chick peas, and oilseeds such as sunflower. In addition, it also has a comparative advantage in livestock products such as beef, mutton, and milk. According to the study, Azerbaijan has a comparative disadvantage in field crops such as irrigated and dry land wheat, barley, corn, and cotton. In addition, the study showed a shift from cash, industrial, and export-oriented products such as tea, fodder, cotton, and pork towards production of potatoes, fruits, vegetables, milk, beef, and mutton, which can be produced easily on small farms and consumed on the farm or sold locally.

What the study did not undertake was an analysis of the relationship of domestic resource costs to markets. For example, the study referred to the tendency of domestic prices to be low in relation to prices on the world market, but it did not look at the relationship between these relative prices and whether or not the product was being exported, substituted for imports in Baku or other major urban areas, or consumed only locally. Yet this is a key dimension of DRC analysis, which can be critically important for the results.

As an example, an exported product such as apples will typically cost less locally than the price it receives in foreign markets. The DRC in this case will be less than one. Yet exports may not be taking place if there are significant barriers to trade. The fact that the DRC is less than one is an indication that removing these barriers will have a high payoff in expanding exports.

Similarly, a product produced in competition with imports, such as cheese, may have a difficult time competing with imports if it has to be shipped to Baku rather than if it is being produced and consumed upcountry, where it receives some natural protection because of the cost of shipping imported goods to the same locale. Transportation costs in fact play a very important role in DRC analysis.

#### **D. Data Sources**

There are a number of ways in which the data may be acquired for DRC analysis. Where extensive studies and project analyses have already been undertaken, these will frequently provide most of the information on producer and wholesale prices, production and processing costs, technical input-output coefficients, and other variables that is required. This is not the case in Azerbaijan, where such studies are relatively rare or seriously out of date.<sup>7</sup> On the other hand, there are quite good and relatively available data on consumer prices, macroeconomic variables, financial statistics, and other areas of importance.

##### **D1. Survey of Farmers, Processors/Manufacturers, Traders/Exporters**

In order to acquire the specific data required to conduct the DRC analysis, PSCEP contracted five local consulting companies to carry out approximately 150 surveys of farmers, processors, manufacturers, traders, and exporters throughout the country. Under PSCEP guidance, the firms undertook surveys for the following products in the regions specified.

##### Export activities:

- Apples and cherries (Guba, Khachmaz)

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<sup>7</sup> The World Bank report cited previously, for example, uses data that apply for the most part to 2001.

- Persimmons (Ganja, Barda)
- Pomegranates (Goychay, Sabirabad)
- Pomegranate juice (Lenkaran, Goychay)
- Apple juice (Guba, Khachmaz, Baku)
- Greenhouse tomatoes and cucumbers (Shamkir, Absheron)
- Tomato paste (Masalli, Lenkaran)
- Early potatoes (Jalilabad)
- Hazelnuts (Zagatala, Gakh)
- Citrus (Astara, Lenkaran)
- Carpets (Guba, Davechi)
- Low voltage electrical equipment (Baku)

#### Import substitution activities:

- Wheat (Jalilabad, Sheki, Sabirabad)
- Rice (Astara)
- Barley (Sheki)
- Corn (Sheki, Tovus, Zagatala, Shamkir)
- Animal feed (Sheki, Sabirabad, Tartar)
- Grapes (Samukh, Xanlar, Jalilabad)
- Poultry (Shamkir, Barda, Siyazan, Goy Gol, Ganja)
- Meat processing (Baku)
- Dairy (Gazakh, Ganja, Barda, Goychay, Lenkaran)
- Furniture (Ganja, Agstafa, Khachmaz)
- Building finishes (Baku, Lenkaran, Masalli)
- Waste management (Baku)
- Computer assembly (Baku)
- Protective clothing (Baku)
- Packing materials (Khachmaz, Guba)
- Truck transportation (various)

## **D2. Price Comparisons**

DRC and effective protection analysis involves comparison between domestic prices, generally at the wholesale level, and either export parity prices, where the products are exported, or import parity prices, where the products are produced domestically as substitutes for imports. In the case of export parity prices, the relevant price is the FOB price of exports at the border. In some instances, this price is not available because transport tariff rates are quoted all the way to the final destination, or because the tariffs include payments to customs on both sides of the border. This is the case, for example, with the tariffs charged for shipment to Russia by rail. In these instances, best efforts are made to arrive at an FOB price that is as close to the border price as possible.

Import parity prices are those that apply at the point where both domestically produced products and imported products are consumed. Sometimes this is in Baku and sometimes it is upcountry. In either case, we start with the CIF price and add the costs of transportation and handling to arrive at the “import parity price” at the point of common consumption. There we compare the import parity price with the domestic wholesale price to determine the level of protection. Where quality differences are apparent, for example in retail markets, adjustments are made to the import parity price to render it comparable to the domestic price. The difference between the two

prices must be due to customs duties, valued added taxes applied only to imports and not to domestically produced goods, and various nontariff barriers or “transactions costs.” The latter might include the effects of monopoly restrictions, high transactions costs associated with clearing customs, and other not-fully-explained factors.

Accurate price comparisons require detailed consumer and producer price data. One source of these data is the State Statistical Committee. These data are useful for examining the relationship between domestic produced goods and those imported from the world market. For this purpose, retail prices are adjusted to the wholesale level since both imports and domestically produced goods pay pretty much the same margin between the two, especially in the open markets and smaller shops where most Azeri products are sold.

In a number of instances CIF prices are estimated from trade data. The trade data are available through 2007. Serious questions have arisen regarding the quality of these data because of problems in recording and handling them at customs. Generally, there is a tendency to under report actual trade. This is not an important problem because the major purpose for which the data are used for the DRC analysis is in estimating export and import unit values from both the values and the quantities that are in fact recorded by customs. However, two problems are encountered. One is that the data are not available for all products at the level of product specification required to make careful comparisons with domestic price data. The other is that the quality of imports often is quite different from the quality of domestically produced products, making direct comparisons difficult. For this reason, wherever possible, direct CIF price quotations for products of similar quality are obtained rather than using unit values from the trade data.

Customs duties in Azerbaijan are readily available on the internet and are quite uniform.<sup>8</sup> Most imported goods are subject to a duty rate of 15%. Lower rates are applied for some intermediate inputs and raw materials. In addition, the value added tax of 18% is applied to the landed (CIF) value of the goods plus the customs duty paid. This acts as an additional barrier to trade where the valued added tax is not applied to locally produced goods such as agricultural commodities. The result is often a combined rate of protection of 36%.

Comparisons between CIF prices and domestic wholesale and retail prices, taking into account customs duties, the value added tax, and the cost of handling and delivering imported goods, leaves in many cases a substantial margin of high transactions costs that cannot be explained by the normal cost of doing business under competitive conditions. This is consistent with the latest *Doing Business* report of the World Bank, which finds that Azerbaijan in comparison with other countries has high costs associated with cross-border trade. As an example, data for the cost of importing whole broilers are shown in Table 3 in comparison with domestic prices.

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<sup>8</sup> In some cases duties other than those available on the internet are in fact applied. The best source of information regarding these discrepancies is the importers. For example, the official customs rates listed for barley and corn are 5 %, but in fact this duty is not applied. What is applied is the value added tax of 18 %, which acts as a customs duty since it is not applied to domestic production of these crops.

Table 3: Comparisons of CIF and Domestic Prices for Chicken Broilers							
	Unit	2003	2004	2005	2006	2007	2008*
Poultry/Chicken							
CIF (\$/kg)		1,5	1,46	1,61	1,49	1,51	1,63
Exchange rate (AZN/\$)		0,98	0,98	0,95	0,89	0,86	0,825
CIF (AZN/kg)		1,47	1,43	1,52	1,33	1,30	1,34
Import tariff and VAT (%)	35,70%	0,53	0,51	0,54	0,47	0,46	0,48
Handling and transport to Bacu	20,00%	0,29	0,29	0,30	0,27	0,26	0,27
Transactions costs		-0,32	-0,18	-0,15	0,33	0,73	1,65
Wholesale (AZN/kg)	10,00%	1,97	2,05	2,22	2,40	2,75	3,75
Consumer (AZN/kg)	kg	2,17	2,26	2,44	2,64	3,02	4,12
Consumer price/CIF		1,47	1,58	1,60	1,98	2,33	3,06

Transactions costs, which were negative in 2003-2005, suggesting considerable competition with imports in those years, grew steadily until they were greater than the CIF cost of importing broilers by 2008. As another measure, the ratio of the consumer price of broilers to the CIF price increased from 1.47 in 2003 to 3.06 in 2008.<sup>9</sup> The particularly high level of transactions costs in 2008 may be partially due to the granting to one firm of a monopoly on chicken imports in the third quarter of 2008. Generally a monopolist importer may be expected to assess a higher margin on its imports than if there are a number of importers competing with each other.

Other products for which direct price comparisons are possible tell a similar story (see Annex B). These high transactions costs are important not only because they indicate the magnitude of monopoly pricing and or wastage within the import chain, but also because they provide substantial protection against imports, encouraging inefficient domestic protection.

### D3. Other Taxes and Subsidies

Aside from customs duties and the value added tax, the DRC analysis incorporated various other taxes and subsidies. These are mostly taxes on labor and capital, although there is a low land tax as well. In addition, allowance is made for subsidies on the number of hectares under wheat cultivation and subsidized prices of fertilizers. Wheat farmers are paid 40 AZN per hectare at the time of planting and another 40 AZN per hectare at harvest. All farmers benefit from a 50% subsidy on fertilizers up to a given maximum, depending on the type of fertilizer. Generally they do not exceed this maximum. The subsidized fertilizer is distributed by the state-owned enterprise Agro-Leasing, though farmers report difficulties in getting all the subsidized fertilizer to which they are entitled. There is also a 50% subsidy on the cost of growing certified wheat seed, though it is not clear how widespread is the use of that seed or at what price it is sold, so the subsidy has not been introduced into the DRC analysis.

Use of irrigation water furnished by the state is also heavily subsidized in that the charge is far below actual costs of delivery. Although detailed data are not available on the amount of subsidization by region and type of irrigation system, the average subsidization rate throughout the country has been estimated at 88%. However, it appears that most farmers rely on their own wells or other sources of water such as

<sup>9</sup> This price comparison is based on quoted landed prices in Dubai of imported broilers from Brazil, adjusted for transportation costs to Baku.

rivers and major canals, from which water is pumped by the farmers to their fields. Others bring water in by truck. While there may be some state cost associated with delivering water to the canals, this seems to be relatively minor compared with the cost of pumping water and delivering to the fields, which is born entirely by the farmer. Therefore, the subsidy on state-furnished irrigation water is not introduced into the DRC analysis.

In addition to the subsidies noted above, all farmers are supposed to receive a subsidy of 40 AZN per hectare to cover the cost of fuel and motor oil. The procedures for obtaining this subsidy, as well as the subsidies on wheat, fertilizers, and wheat seed production, are laid out in detail in a series of Council of Ministers decrees issued in 2007. These procedures are quite complicated. Aside from the wheat farmers, all of whom reported receiving at least some direct subsidy, none of the farmers interviewed in other agricultural sectors reported receiving the 40 AZN per hectare subsidy, despite this question being specifically asked of them. Furthermore, the survey teams, who are quite familiar with the farmers in their areas, are unaware of any farmers receiving this subsidy. Instead, they report that farmers claim it is not worth preparing the documents for the subsidies and that in some cases local officials want to be paid for approving the documents. Thus, while the 40 AZN per hectare subsidy to all farmers has been officially promulgated, the fact that the majority of farmers surveyed, except for wheat farmers, are not receiving it leads to the conclusion that it need not be taken into account in the DRC analysis.

It should be noted that the incentive to apply for the fuel and motor oil subsidy is stronger for field crops such wheat and barely, grown on lots of land using relatively extensive, mechanized techniques of production, than for more intensively grown products such as greenhouse vegetables, which use relatively little land. This may account for the low level of interest of many farmers in trying to obtain this subsidy. It also may be that farmers are unaware of the availability of this subsidy since it has been in effect for less than two years.

#### **D4. Input-output Table**

PSCEP used the 2006 input-output table developed by the State Statistical Commission to develop a set of coefficients breaking the value of inputs down into their tax or subsidy components, as well as the relative importance in total costs of labor, capital, and traded inputs. These coefficients were adjusted to allow for subsidies to wheat farmers and subsidies on fertilizers.

#### **E. Analysis of Shadow Prices of Foreign Exchange and Interest Rates**

By the shadow exchange rate and the shadow price of capital, we mean the opportunity cost of these scarce resources in the absence of distortions in their markets, or, if these distortions continue to exist, their opportunity cost at the margin in the market-distorted situation. The following section provides an overview of shadow price considerations while Annex C provides a more technical explanation of the shadow price of foreign exchange.

##### **E1. Shadow Price of Foreign Exchange**

Until recently, Azerbaijan experienced a substantial increase in foreign exchange inflows as a result of its rapidly expanding oil production and exports. This resulted in the current account balance rising from US\$167 million in 2005 to a projected

value of US\$19.391 billion in 2008. The government decided to significantly expand public expenditures and make use of a significant portion of these revenues to improve the infrastructure of the country and increase the standard of living of the population; while the National Bank implemented an accommodative monetary management policy designed to effectively peg the nominal exchange rate against the dollar. As a result of this expansive macroeconomic policy framework, there was a major rise in inflation and resulting pressure towards appreciation of the real exchange rate. This decreased the manat prices of exports and imports relative to those of non-traded goods and services, including labor and capital, which tended to injure the export sector and to make it more difficult for domestic production to compete with imports. The latter effect was effectively counterbalanced by an increase in non-tariff barriers to trade, which lessened the increased demand for imports but also created a bias against non-oil exports.

Towards the end of 2008, the price of oil on the world market fell dramatically from about \$130 per barrel to about \$45 a barrel. This led to some decline in the government's public expenditure program. Although data are not yet available, a safe presumption is that the decrease in oil prices has substantially reduced the current account surplus, lessening the pressure on the manat. However, at the same time, the currencies of Azerbaijan's major non-oil trading partners, Russia and other CIS countries, have been allowed to appreciate by up to 50% against the U.S. dollar at the same time that the Azerbaijani authorities have endeavored to stabilize the manat in relation to the U.S. dollar. Thus there has been continued appreciation of the manat in relation to the currencies of Azerbaijan's major non-oil trading partners.

The analysis of the real effective exchange rate (REER) presented in Annex C and the analysis above suggests the possibility of overvaluation of the manat in the short-run. In light of this, and given uncertainties regarding the price of oil and the projected volume of oil revenues over the medium-term, we have examined a range of alternative shadow exchange rates to estimate their impact on the profitability of the sectors analyzed.

## **E2. Shadow Price of Capital**

At present, nominal interest rates are generally quite high, ranging from 18% to 30%. But given rates of inflation until recently, these interest rates are not nearly as high in real terms. For example, the CPI in 2008 increased to as much as 22%, making some real interest rates negative and leading to others attaining levels as high as 8%. However, towards the end of that year, prices on average actually fell, causing real rates of interest to increase substantially.

At the present time, it is difficult to predict the levels at which real rates of interest will tend to level off, providing some indication of the real rate of return, or shadow price of capital. The situation in the financial markets is much too uncertain. Furthermore, the rates at which lending takes place currently vary markedly across borrowers because of the fragmentation of the financial market discussed elsewhere in this report (see Section 4.3.3). Furthermore, the real return on capital is likely to be higher because of risk and because taxes drive a wedge between these two rates of return. The base shadow price of capital used in the DRC analysis is 7%. What is important is not so much the base used, but undertaking sensitivity analysis to test what effect higher or lower rates would have on the DRCs. In general, the answer is not very much.

### **E3. Sensitivity Analysis**

The study undertook sensitivity analysis was conducted with respect to the following key parameters.

- world market prices
- exchange rate
- interest rates
- subsidies on fertilizer and wheat acreage

The sensitivity analysis for wheat, rice, barley, and corn focused on world market prices, which rose sharply, especially for wheat and rice, during 2008, the year to which most of the cost data apply but which was not by any means a representative year as far as world prices are concerned. In the exchange rate analysis, we look at how sensitive the DRC and EPC are to the depreciation of the Russian ruble of about 50% that has occurred over the past few months, as well as their sensitivity to alternative shadow exchange rates. We also investigate the sensitivity of these results to changes in the interest rate, as described above. Finally, we investigate the impact of the elimination of the subsidies on wheat and fertilizer.

## SECTION IV

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### Results

#### A. DRC Results

Table 4 presents the results of the DRC analysis. These results are broken down into those for exports, import substitution in Baku, and import substitution locally or upcountry. They show a wide range of DRCs, suggesting that there are some sub-sectors and markets in which Azerbaijan has a strong comparative advantage and others in which there is either little or no comparative advantage or where there is substantial comparative disadvantage.

#### A1. Export Activities

Most export activities, illustrated here by apples, cherries, persimmons, fresh pomegranate, pomegranate juice, apple juice, greenhouse tomatoes and cucumbers, tomato paste, early potatoes, hazelnuts, kiwi, feykhoa, some building finishes, carpets, and some computer assembly, have quite favorable DRCs (less than one). This is not surprising given that exporters are acting on the basis of private profitability. Thus if exporting is economically profitable (i.e., DRCs are less than one), you would expect them to export. Only if financial profitability were reduced below the level of economic profitability because of export taxes and other barriers to trade would one expect to see some reduction in export trade. Even if this were the case, the DRCs are sufficiently low for most products that one would expect exports still to be financially remunerative.

Azerbaijan's comparative advantage in exporting fresh fruits and vegetables is very strong, especially for the Russian market. The advantage results from several factors. The first is the proximity to that market. The second is favorable climate and soils, which allows farmers to take advantage of high prices in Russia after production there has declined seasonally. The third advantage is the capacity to produce these products on small farms using relatively labor-intensive techniques. A fourth is the existence of an extensive network of Azeri traders within Russia, which cater to the lower end of the market in green bazaars and small shops. Finally, Azerbaijan has a substantial number of orchards left over from the Soviet era. Although these are not very

<b>Table 4. Selected Preliminary DRC and EPC Results</b>					
<b>Product</b>	<b>Source</b>	<b>Destination</b>	<b>DRC Range</b>	<b>EPC Range</b>	<b>Profit as % Revenue</b>
<b>Exports</b>					
Apples	Guba, Khachmaz	Russia	0.28 – 0.32	0.89	57% – 76%
Cherries	Guba, Khachmaz	Russia	0.10 – 0.16	0.93 – 0.96	62% – 82%
Persimmons	Samuxi	Russia	0.86	0.67	15%
Fresh pomegranate	Goychay	Russia	0.74	0.97	-27%
Pomegranate juice	Ganja, Barda, Goychay	Russia	0.26 – 0.66	0.90 – 0.99	8% – 14%
Apple juice	Guba	Russia, Europe	0.19 – 0.20	0.94 – 0.96	73% – 76%
Greenhouse tomatoes and cucumbers	Absheron, Shamkir	Russia	0.14 – 0.36	0.89 – 0.96	12% – 68%
Tomato paste	Lenkaran, Masalli	Russia, Ukraine	0.42 – 0.73	0.94 – 0.95	29% – 42%
Early potatoes	Jalilabad	Russia	0.15	1.00	43%
Hazelnuts	Zaqatala, Gakh	Russia, Europe	0.47 – 0.56	0.93 – 0.94	16%
Kiwi	Astara, Lenkaran	Russia	0.20 – 0.94	0.96 – 0.99	36% – 56%
Feykhoa	Astara	Russia	0.31	0.96	25%
Building finishes	Baku, Masalli	Europe, CIS, Iran	0.39 -- 1.20	0.64 -- 0.73	-37% -- 15%
Carpets	Guba, Gusar, Davechi	Europe, SE Asia, Turkey	0.58 – 0.88	0.95 – 0.99	1% – 24%
Computer Assembly	Baku	Kazakhstan	0.68	1.33	9%
<b>Import Substitution in Baku</b>					
Wheat*	Jalilabad, Sheki	Baku, local	0.31 – 2.22	0.97 – 0.99	21% – 60%
Rice*	Astara	Baku, local	0.48	4.18	80%
Barley*	Sheki	Baku, local	0.81 – 1.33	1.31 – 1.39	49% – 52%
Corn	Zaqatala, Shamkir	Baku, local	0.41 – 0.73	1.25 – 1.30	62% -- 73%
Animal feed	Sheki, Tovuz	Baku	0.72 – 1.12	1.27 – 1.30	4% – 14%
Grapes	Jalilabad	Baku, local	0.18– 0.26	1.17	24% – 30%
Broilers	Siyazan, Shamkir	Baku, local	2.07 – 6.06	4.04 – 6.47	11% – 24%
Eggs	Shamkir	Various	5.32	5.25	-12%
Meat processing	Baku	Baku	0.98 – 2.75	1.35 – 1.63	-22% – 4%
Cheese	Barda, Dashkasan	Baku	0.67 – 1.78	1.81 – 2.71	0% – 6%
Building finishes	Baku, Masalli	Baku, local	1.27 – 3.07	1.28 – 1.52	-53% -- 9%
Catering services	Baku	Baku	0.45 – 0.90	0.98 – 0.98	8% – 33%
Waste management (brine recycling)	Baku	Baku	0.45	0.99	5%
Computer assembly	Baku	Baku	1.70 – 2.75	1.30 -1.97	-4% – 6%
Protective clothing	Baku	Baku	0.71 – 1.64	0.97 – 0.98	-44% – 12%
Packing materials	Guba, Kachmaz	Baku, local	0.84 – 1.40	1.45 – 2.03	6% – 22%
<b>Import Substitution Upcountry</b>					
Rice	Astara	Local	0.30 – 0.42	3.77 – 4.49	80% – 88%
Barley	Sabirabad, Jalilabad	Local	1.17 – 1.40	1.39 – 1.82	4% – 63%
Grapes	Samukh, Goy Gol	Local	0.34 – 0.58	1.18 – 1.19	8% – 63%
One-day chicks	Goy Gol, Ganja	Local	0.78 – 0.82	1.51 – 1.57	2% – 19%
Broilers	Barda	Local	0.71	2.96	60%
Milk	Barda, Qazax	Local	1.16 – 1.96	1.72 – 1.76	-33% -- -24%
Cheese	Goy Gol, Samukh	Ganja, Samukh, local	0.94 – 3.06	1.54 – 1.92	16% – 22%
Cheese	Goychay	Shirvan	1.31	2.36	7%
Furniture	Ganja	Ganja, Shamkir	1.09 – 1.36	1.32 – 1.51	1% – 22%

\* Note: For wheat, rice, barley, and corn, uses world market price in February 2009.

productive, capital costs have long since been written off and harvesting what remains continues to be profitable. As noted elsewhere in this report, however, over reliance on the Russian market puts Azerbaijan's businesses in a vulnerable near-term position.

In most instances, the effective protective coefficient is considerably higher than the DRC. This suggests that the incentives to produce and export these products are very

strong. This is probably because the free market has not been operating in Azerbaijan for long, so that substantial economic rents are accruing to those who have first taken advantage of these opportunities. As structural impediments are removed and other investors move into these sub-sectors – and there is considerable evidence that this is happening – more marginal lands will be brought under cultivation, less profitable investments will be made, and marginal costs will increase. The impact of expanded investment and production, not only in Azerbaijan but also in other supplying countries, will lead to a decrease in prices. The net result will be an increase in DRC ratios to approach more closely the EPCs.

Another factor influencing the relationship between the DRCs and the EPCs is that there are no explicit export taxes. There are delays and inconveniences, many of which generate strong complaints from stakeholders concerned with passing through customs. What is particularly annoying to exporters is the long wait experienced at customs because of the many trucks trying to pass through during the busy season. As a result, many traders make use of the railroad company and refrigerated truck companies to cross the border, with the costs at customs on both the Azeri and Russian sides of the border being included in their overall transport tariff schedules. These companies are able to negotiate relatively favorable terms and avoid many of the delays and inconveniences faced by small exporters.

More important in some sectors are the effects of monopoly power. This seems to be particularly true in the fruit juice industry, where competing firms are restricted from selling and exporting to their capacity without paying an implicit tax. Much remains to be learned about these monopolies and their impact on overall trade.

## **A2. Import Substitution for the Domestic Market in Baku**

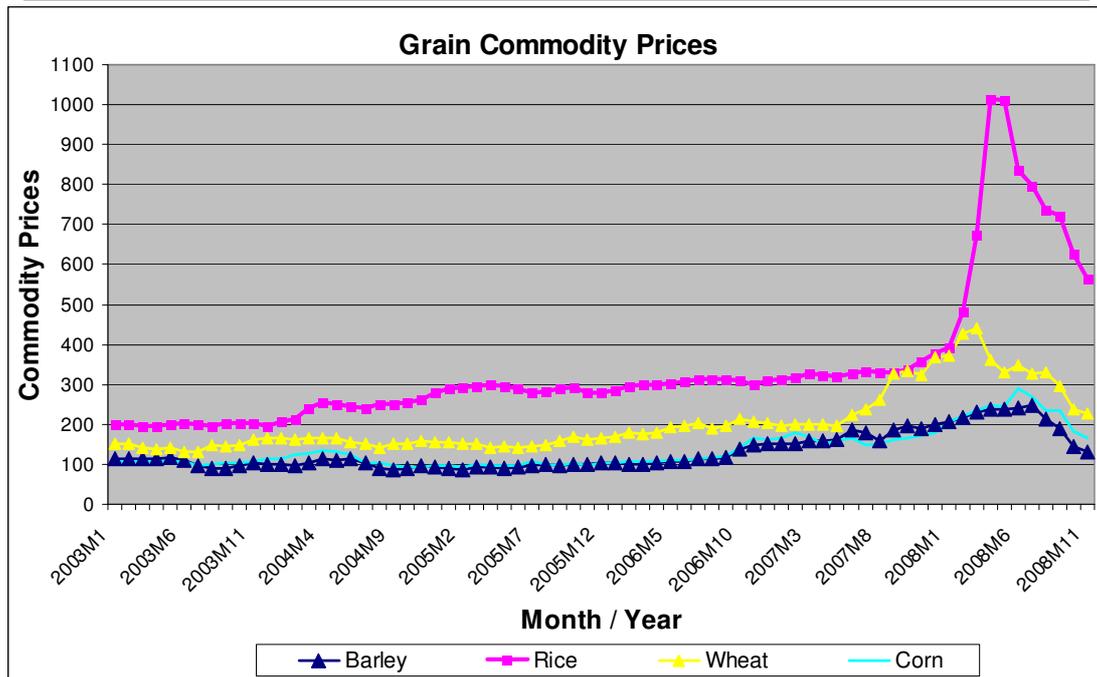
### **A2a. Food and Feed Grains**

The initial analysis using 2008 prices showed low DRCs for wheat, rice, barley, and corn. This seemed to contradict the expectation that import substitution for these crops occurs behind high trade barriers, encouraging inefficient production for the local market and leading to high DRCs. However, it is important to highlight that the DRC results for grains in Table 4 are very sensitive to the sharp movements of food and feed grain prices that occurred in world markets during the course of that year. This is illustrated in Figure 1. Here we see that the price of wheat on the international market remained at about USD\$150 per ton during the period from 2003 through most of 2005.<sup>10</sup> Thereafter it increased gradually in 2006 and the first-half of 2007, at which point it accelerated sharply, reaching a peak of about US\$450 in mid-2008. This was about the time of the wheat harvest in Azerbaijan, so the prices farmers received were seriously influenced by the price of imported wheat. Farmers in fact reported receiving about

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<sup>10</sup> These prices are from the International Monetary Fund and apply to hard red winter wheat No. 1, FOB Gulf of Mexico.

**Figure 1: Grain Commodity Prices on the World Market**



Source: International Monetary Fund

0.30 AZN/kg at that time and a bit later, whereas today the price within Azerbaijan has fallen to about 0.16 AZN/kg. The experience with rice was even more dramatic. Here world market prices soared to over US\$1,000/ton.

Because the prices farmers received for food and feed grains in 2008 were not representative of long-term trends in the market, alternative calculations were made of the DRCs and EPCs using two benchmarks. The first was the CIF prices prevailing in February 2009. As seen in Figure 1, these prices had fallen significantly on the world market, though not back to the levels that prevailed earlier. Consequently a second benchmark was also applied – the average CIF prices that prevailed from 2003 to 2006 as an indicator of possible long-run levels.

The results are shown in Table 5. It is clear that the results are very different when the analysis is conducted using the abnormal CIF prices that prevailed in 2008 and those that existed in February 2009 or especially the lower prices that characterized the earlier period from 2003 to 2006. While Azerbaijan appears to have a comparative advantage in wheat, rice, barley, and corn at the high prices prevailing in 2008, it does not have a comparative advantage in any of these if one applies the average prices prevailing on world markets during the relatively stable period of 2003-06.

**Table 5: Average DRC and EPC Results Using Alternative World Market Prices**

	2008		February 2009		Long-Term	
	DRC	EPC	DRC	EPC	DRC	EPC
Wheat	0.56	0.99	1.17	0.97	4.45	0.91
Rice	0.34	3.55	0.39	4.12	1.15	8.30
Barley	0.83	1.33	1.66	1.48	2.86	1.63
Corn	0.35	1.23	0.54	1.27	1.29	1.38

Using February 2009 prices, the results fall somewhere between these two extremes. They show that Azerbaijan has a comparative advantage in producing rice and corn, but a slight comparative disadvantage in producing wheat and a relatively large disadvantage in producing barley. Since commodity forecasts for the next few years suggest that grain prices are unlikely to fall any time soon, using the February 2009 prices as the benchmark seems reasonable, and these are the figures shown in Table 4.

As discussed elsewhere in this report, DRCs for wheat production vary according to farm size. Wheat production in a few large and mechanized farms tends to be profitable, with DRCs under one, while unprofitable for smaller farms with DRCs above one and thus show this production to have a comparative disadvantage. In either case, production is less profitable than for most fruits and vegetables.

Table 5 also highlights the high level of effective protection received by rice. In fact, what is remarkable is that retail prices of rice in Azerbaijan have declined only slightly after their peak in 2008 despite the fact that world market prices have fallen substantially. This is partly due to the reimposition of import tariffs and the value added tax after the world food crisis. But the margin between domestic prices and world market prices is sufficiently wide that there appears some monopoly power is being exercised on rice imports. This is supported by the fact that the retail price of rice in February 2009 was 3.7 times higher than its CIF price, whereas the effect of import taxation, transport, handling, and margins should have caused it to be only 1.8 times higher.

Except for wheat, levels of effective protection are fairly high for the other grain crops. This is not true of wheat because this product was exempted from payment of customs duties and the value added tax (VAT) starting in 2008 because of the world food crisis and this exemption continues today. Barley and corn do not pay any customs duty, but do pay the VAT. Although this tax should be deducted from the VAT paid on processed livestock products such as poultry, this is not always done according to the responses received on the questionnaires. The VAT thus acts as an import duty, which discriminates against imports, resulting in fairly high effective protection, especially if it is not deducted from the VAT paid on the final product. This effectively underscores the importance of ensuring through better communications that the duty is indeed deducted from processed products (until/unless the VAT exemption for domestic production is phased out).

Some insights into variations in farm size, yields, and comparative advantage can be seen from the comparative data by crop, region, farm size, and the importance of irrigation in Table 6. For wheat, we see a significant difference between the yields and especially the DRCs of wheat grown on large farms in Sheki and those grown on smaller farms in Jalilabad. This is a clear indication of the advantages that large

farms have in terms of greater economies of scale, especially in the use of machinery. This suggests that appropriate institutions for assuring more equitable access to machinery services, such as cooperatives and tractor-hire services, have not yet taken root. In addition, larger farms are likely to use better seeds and more appropriate quantities of fertilizers. None of the wheat farms in the survey pay for irrigation water, according to the questionnaires, though there may have been some limited pumping from wells or nearby rivers.

For rice, the farms are considerably smaller, but cultivation is fairly intensive in the use of labor, involving transplanting after the land has been prepared by tractors and manual harvesting. High yields of five or more tons on most of these farms with only very limited use of fertilizer may reflect some mining of the soil. In any case, given the high price of rice currently prevailing on the international market, and expected to prevail for some time in the future, Azerbaijan would seem to have a comparative advantage in rice cultivation, at least for the local market.

In the case of barley, at least one DRC is quite high at 3.31. The lowest DRC is 0.81. This applies to the only barley farm reporting payment for irrigation water. The analysis assumes that all the cost of water is covered with this payment. In other words, the farmer pumps the water from his own well or another publically available source that does not have any other costs associated with its use. According to the national average, however, irrigation fees only pay for 12% of the total cost of irrigation. This means the true economic cost of state supplied irrigation water is much higher than the financial cost. If this were the case for this farmer, then the DRC would be also be unfavorable.

**Table 6: Yields and DRCs in Relation to Region, Farm Size, and Irrigation**

Crop	Region	Farm Size (ha)	Area Planted to Crop (ha)	Irrigation Payment per Hectare (AZN)	Yield (mt/ha)	DRC (Feb 09)
<b>Wheat</b>						
1	Jalilabad	160	85	0	2.0	1.32
2	Jalilabad	85	60	0	2.0	2.22
3	Sheki	1500	1000	0	2.4	0.82
4	Sheki	2000	1500	0	4.0	0.31
<b>Rice</b>						
1	Astara	28	25	45	2.6	0.42
2	Astara	30	30	20	5.3	0.48
3	Astara	15	15	25	5.0	0.30
4	Astara	25	22	50	5.0	0.37
<b>Barley</b>						
1	Sabirabad	80	35	0	2.9	1.18
2	Sheki	500	500	50	4.2	0.81
3	Jalilabad	90	55	0	2.2	3.31
4	Sheki	400	400	0	4.0	1.33
<b>Corn</b>						
1	Zaqatala	150	85	30	6.5	0.41
2	Shemkir	80	50	10	4.4	0.51
3	Zaqatala	180	100	25	6.8	0.52
4	Sheki	120	90	20	4.2	0.73

Finally, the results for corn suggest that Azerbaijan may have a comparative advantage in producing for the domestic market despite corn's dependence on irrigation. In fact, simulation analysis assuming all the water charges were paid to the state, and thus the price of water was highly subsidized, resulted in DRCs that were still well below one. The favorable results for corn are in part because, with its worldwide use in the manufacturing of bio-fuels, the price of corn has risen substantially on world markets. Many of those interviewed expressed an interest in producing corn. This is particularly important for the poultry industry, for which corn is a major input into feeds.

## A2b. Other Products

Import substitution for the domestic market in Baku tends to have DRCs that are often considerably greater than one, indicating a comparative disadvantage.

This is true, for example, with poultry and other meat products, some dairy products, building finishes, most computer assembly, some protective clothing, and most packing materials. One of the reasons, referred to earlier, is that transportation costs work against the producers of these products. That is, they have to incur the cost of transporting these products to Baku and are not sheltered

### Box 5: How Location is Important

From Table 4, we see some examples of how the dairy industry can be profitable producing for the upcountry market but not producing as a substitute for imports in Baku. For example, cheese from Dashkasen selling in Baku has a DRC of 1.78, suggesting a strong comparative disadvantage, whereas several cheeses from Goy Gol and Samukh selling locally have DRCs of 0.94 to 1.31, indicating marginal profitability. One of the reasons is that imported cheese, for example from Iran, has higher costs because it has to be transported upcountry, while the upcountry cheese is spared the cost of transport to Baku. So value added measured in terms of the price of imported cheese will be higher upcountry than in Baku, and this will lower the DRC. This relationship is not uniform, however, as illustrated by the case of cheese produced in Barda and sold in Baku, which has a DRC of 0.85. Thus there is variation across companies in their ability to compete in any given environment. It is just that the environment is tougher if you are trying to compete in the Baku market than in the markets upcountry.

from imports paying the cost of transporting the products up country. The text box in the next page provides some illustrations.

Even more important in explaining the high DRCs are the substantial barriers to imports that exist not only from customs duties and the VAT but also because of high transactions costs. These result in imported products being sold locally for prices that are substantially above their import parity price. For example, chicken broilers incur transactions costs that are greater than their CIF cost and are more than three times the combination of customs duty and VAT. This results in high domestic prices, which encourages local firms to compete with imports even if they incur high costs, leading to inefficient production. The situation has deteriorated sharply within the past year, reportedly because of the establishment of an import monopoly. Imported cheese is another product that appears to have significant non-tariff barriers to trade.

Despite relatively high protection in industries such as poultry and dairy products, there are a number of import-competing activities with DRCs close to or well below one. Animal feed is one example. Catering services is another. Waste management through the chemical recycling of brine is a third. There are also industries for which some firms have high DRCs, and are relatively inefficient, whereas others have low DRCs, and are efficient. Computer assembly is one example. Two of the firms in this industry have DRCs between 1.70 and 2.75, but the third has a DRC of 0.68. In

addition to swerving the domestic market, this firm also exports to Kazakhstan and thus has been classified in Table 4 with exports. There is in fact a tendency for firms that are more efficient to also be firms that export. This is true, for example, of building finishes, where two firms in the sample export to other countries while three supply only the domestic market. Even though these firms export only a relatively small share of their total sales, this helps them to remain competitive and keep their costs down in comparison with firms that are only producing for the domestic market.

There is also another exception to the generalization that DRCs for import substitution activities tend to be greater than one. The DRCs for grapes vary between 0.18 and 0.26, suggesting very high profitability. In fact grapes should be an export crop, even though calculating the DRCs in this way would lower somewhat the parity price at which the calculations are made because transportation costs for exports tend to lower the export parity price relative to the import parity price. Nevertheless, there is no doubt that the DRCs for grape exports would be very favorable even at these lower prices. This conclusion is confirmed by the strong interest that grape farmers and traders show in developing export contacts.

### **A3. Import Substitution for the Local Market**

Import substitution for the local market within the regions tends to have DRCs either below or closer to one, indicating often positive, albeit fairly marginal, profitability. This is because, in comparison with production for the Baku market, transportation costs act to raise import parity prices, providing natural, as opposed to policy-related, protection against imports. Important examples are dairy products and poultry.

The survey and DRC analysis, as well as interviews with BDS providers and other knowledgeable informants, clearly indicate a large degree of heterogeneity of producing, processing, and trading enterprises within the regions. The poultry industry is a good example. There are a number of different sizes of poultry farms in our sample, ranging from a very large layer operation to broiler farms with 100,000 birds per year down to farms that produce a few thousand birds. Many chickens are sold live, whereas others are slaughtered and frozen before being sold. There are also hatcheries that import fertilized eggs, incubate them, and sell the chicks to farmers for growing out. The medium size broiler operations and chicken hatcheries serving the upcountry market appear to be quite profitable. On the other hand, some of the larger layer and broiler operations that serve the Baku market appear to be profitable only because of heavy protection against imports.

An important nexus exists between the poultry industry and the animal feed subsector. The feed industry covers a vast range in line with the poultry industry – from a few very large poultry farms of over a million birds per year, through medium-size farms of about 50,000 to 100,000 birds per year, down to very small operations with just a handful of birds. The large farms have their own mills and their operations are integrated into those of these farms. The small-scale feeding operations involve little if any processing of feed, though some may have their feed custom ground. The medium-size farms, on the other hand, use a variety of feeds, some of which they buy from or have custom milled in relatively sophisticated feed mills. The DRC analysis shows these mills to be quite profitable, with DRCs ranging from 0.72 to 1.12. For the most part they are supplied by local producers of wheat, barley, and corn until supplies run out, at which time they switch to imports.

#### A4. Comparison of Results with the World Bank Agricultural Development and Credit Report

In general the results of this DRC analysis compare well with those of the World Bank Project Framework Paper. Fruits and vegetables have the lowest DRCs in both studies, with the exception of hazelnuts, which did not have a comparative advantage in the World Bank study but do in the current study. The other major exception is rice and corn. These had DRCs greater than one in the World Bank report, but they have DRCs less than one in the current study. This is to be explained principally by the rise in world market prices that has occurred since the date of the World Bank Report.

#### B. Sensitivity Analysis

##### B1. Depreciation of the Russian Ruble and the Shadow Exchange Rate

Most of the data for the DRC analysis apply to the calendar year 2008. Over the period from October 2008 until February 2009, however, the Russian ruble depreciated from about 30 RR /AZN to about 45 AZN / RR. This was accompanied by similar, though not quite as great, depreciations of the currencies of a number of Azerbaijan's competitors. The question arises as to what effect this has had on the competitiveness of Azerbaijan's exports and import competing production. To answer this, the unweighted average DRCs and EPCs for each sub-sector were recalculated using the more recent exchange rate. The results are shown in Tables 7 and 8.

It is clear from Table 7 that depreciation of the ruble has reduced the competitiveness of Azerbaijan's non-oil exports. However, of the 15 export sub-sectors shown in Table 7, only 5 have DRCs that exceed one at the new exchange rate, and most of

Products	30 RR/AZN		45 RR/AZN	
	DRC	NEPC	DRC	NEPC
Apples	0.30	0.89	0.45	1.33
Cherries	0.13	0.93	0.20	1.40
Persimmon	0.86	0.67	1.28	1.01
Pomegranate	0.74	0.97	1.11	1.45
Pomegranate Juice	0.53	0.96	0.79	1.43
Apple Juice	0.19	0.95	0.29	1.42
Tomato/Cucumber	0.21	0.94	0.32	1.41
Tomato Paste	0.56	0.95	0.84	1.42
Early Potato	0.15	1.00	0.22	1.50
Hazelnuts	0.52	0.93	0.77	1.40
Citrus	0.28	0.98	0.42	1.47
Building Finishes	0.79	0.69	1.19	1.03
Carpets	0.72	0.98	1.07	1.47
Computer Assembly	0.69	1.33	1.03	2.00

these values are not far in excess of one. Furthermore, 3 out these 5 sub-sectors are in manufacturing, for which competitiveness depends more on cost considerations and less on the economic rents derived from climate and soils, proximity to markets, and other such immutable factors.

Table 8 looks at the impact of this depreciation on sub-sectors that compete with imports in Baku, the major geographic center within Azerbaijan where the effects of depreciation of other currencies are most likely to be felt. As expected, all of the sub-

sectors have DRCs that increase with depreciation of the ruble. However, five of them remain below one – rice, corn, grapes, waste management (brine recycling), and truck transportation. In contrast, wheat, barley, poultry, meat processing, dairy, building finishes, computer assembly, protective clothing, and packing materials become even more unprofitable. Many other industries would also become unprofitable without the changes in productivity that would be required to compete on a cost basis in the Russian market or without identifying new niche markets.

**Table 8: Sensitivity Analysis of Import Substitutes to the Russian Ruble Exchange Rate**

Products	30 RR/AZN		45 RR/AZN	
	DRC	NEPC	DRC	NEPC
Wheat	1.17	0.97	1.75	1.46
Rice	0.48	4.18	0.73	6.27
Barley	1.07	1.35	1.60	2.02
Corn	0.54	1.26	0.81	1.90
Animal Feed	0.89	1.28	1.33	1.92
Grapes	0.22	1.17	0.33	1.76
Poultry	4.48	5.25	6.72	7.88
Meat Processing	1.86	1.49	2.80	2.24
Dairy	1.22	2.26	1.84	3.39
Building Finishes	2.00	1.37	3.01	2.05
Catering Services	0.68	0.98	1.01	1.47
Waste Management	0.45	0.99	0.68	1.48
Comp. Assembly	2.22	1.64	3.33	2.46
Protective Clothing	2.22	1.64	3.33	2.46
Packing Materials	1.18	1.74	1.77	2.62
Truck Transport	0.39	2.27	0.59	3.41

In addition to the revised DRCs, Tables 7 and 8 also present net effective protection coefficients (NEPC), which are the original EPCs adjusted in the denominator for the changes in the exchange rate, i.e., what value added in world prices would be at the new exchange rate. This assumes that value added in domestic prices would remain the same. However, to the extent that domestic prices are determined by ad valorem import duties and the VAT, these prices would decrease with the decline in world prices measured in AZN at the new exchange rate. This means that import substitution sub-sectors would be exposed to much greater competition from imports, ceterus paribus. Again, without appropriate adjustments in productivity these companies will find themselves in a difficult competitive environment. Increasing the productivity, i.e., the competitiveness of Azerbaijani firms is imperative in this environment.

## **B2. Elimination of Subsidies**

Given the importance of the debate over agricultural subsidies, one of the simulations performed was to eliminate the subsidies for grain crops to see what effect this would have on their DRCs, EPCs, and profit rates. This is shown in Table 9.

As can be seen, the effect of the subsidies is not very great. The most important effect is on the profit rate, which is reduced somewhat without the subsidies, but the extent of this reduction is only from 41% to 34% for wheat, from 47% to 39% for barley, and from 68% to 63% for corn. These declines are quite modest given the high level of financial profitability that pertains in these sub-sectors. The change in the profit rate for rice, because no fertilizer is used and rice is not eligible for the subsidy on wheat. The implications of these findings will be explored in Section 5.

**Table 9: DRCs, EPCs, and Profit Rates With and Without Agricultural Subsidies\***

Product	With Subsidy			Without Subsidy*		
	DRC	EPC	Profit Rate	DRC	EPC	Profit Rate
Wheat	1.17	0.97	41%	1.17	0.97	34%
Rice	0.40	4.12	84%	0.40	4.12	84%
Barley	1.66	1.48	47%	1.66	1.48	39%
Corn	0.54	1.26	68%	0.54	1.26	63%

\*The 'With' and 'Without' estimates impact only the profit rate. Subsidies are not included in the DRC ratios

### B3. Rate of Return on Capital

The analysis included several simulations of the DRC results using alternative rates of return on capital of 2.5% and 15%, in addition to the base rate of 7%. As noted earlier, this base is an estimate. More important than the base rate itself is to include a sufficiently broad range of alternative rates to measure impact as these rates change. The rate of 2.5% was chosen because this was the average real rate of interest on many bank loans in 2008, when inflation was quite high; the rate of 15% is presumed to be an upper limit on the average return on capital. This analysis was conducted for all the sub-sectors reporting a capital stock that was not fully amortized, but only a few of the results are shown in Table 10 since other sub-sectors had very similar results. For the most part, the DRCs do not vary much with changes in the rate of return to capital. The major exceptions are a few fresh fruits (persimmon, pomegranate), pomegranate juice, building finishes, poultry, integrated dairy

**Table 10: Sensitivity Analysis of DRCs to the Rate of Return on Capital**

	2.5%	7.0%	15%
<b>Exports</b>			
Apples	0.29	0.30	0.32
Persimmon	0.80	0.86	0.97
Pomegranate	0.67	0.74	0.91
Pomegranate Juice	0.61	0.69	0.84
Tomato Paste	0.52	0.53	0.54
Building Finishes	0.68	0.79	1.03
Computer Assembly	0.68	0.68	0.69
<b>Import Substitutes</b>			
Animal Feed	0.88	0.89	0.90
Poultry	4.22	4.48	5.03
Integrated Dairy	2.34	3.06	4.94
Protective Clothing	1.02	1.17	1.49
Furniture	1.17	1.23	1.34
Truck Transport	0.70	0.79	0.97

production, protective clothing, and truck transport – all industries with a fair amount of capital investment. In contrast, apples, tomato paste, computer assembly, animal feed, and furniture are less sensitive to changes in capital costs either because much of their capital is sunk (older orchards), they are intensive in the use of raw material inputs (tomato paste, animal feed), or they use relatively labor-intensive techniques of production (computer assembly, furniture).

## C. Qualitative Results

### C1. Constraints

In addition to questions related to the DRC analysis, the survey questionnaire also asked respondents to list their three most important problems or constraints. Table 11 summarizes for different sub-sectors the frequency of problems cited by farmers, processors, and traders within each sub-sector.<sup>11</sup> It is clear from this table that the most important problem from the perspective of the respondents is the limited availability of efficiently administered finance in rural areas. In many sub-sectors, 100% of the respondents cited this as an important problem. Other parts of this report will address this problem from the perspective of what producers are already doing to finance their working and fixed capital needs, what are some of the needs, what needs to be done to administer finance more efficiently in rural areas, and what PSCEP plans to do. What is very clear is that it is essential to establish a *sustainable* mechanism to increase access to finance on an efficient and equitable basis. Experience world-wide has demonstrated that directed, subsidized government credit lines are not the solution to making access to credit sustainable. On the contrary, such systems tend to overcrowd commercial lending and thus reduce access to credit over the medium to longer term.

The second most important problem is finding export buyers. The empirical results above show that effective protection incentives for exports are well in excess of the DRCs and that profit is quite high in relation to total costs for most export activities. This suggests that survey participants recognize the profitable opportunities that exist for export expansion but need better contacts in order to realize these opportunities. PSCEP needs to play a key role in linking producers and sellers. This is especially important for kiwi, tomato paste, and apple juice. In addition, the managers at a major hazelnut processing facility said that finding new markets is a major goal for them.

The third most important problem cited is high cost and/or lack of raw materials. This is especially important for the recycling of brine used in oil drilling, processing of tomatoes and apples, milling of animal feed, construction of furniture and building finishes, and production of wool and silk carpets. Here the PSCEP can play an important role in linking up different value chains

Lack of warehousing space, especially refrigerated space, is the fourth most important problem along with high cost and lack of availability of refrigerated transport. This is especially important for fresh fruits and vegetables. One reason is to take advantage of seasonal variations in prices, where prices during the off season can be two to three times higher than during the busy season. In addition, greater availability of warehouse space would enable traders to avoid having to transport their goods during the peak season when refrigerated trucks are scarce and rates are very high. For example, the cost of transporting goods from Khachmaz to Moscow in a refrigerated 20-ton truck might be as high as \$8,000 during the busy season versus \$2,500, or even as low as \$1,000 in a Russian truck as return freight, during the slack season.

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<sup>11</sup> For a more complete listing of these problems, see Annex D.

**Table 11: Principal Problems Cited by Survey Respondents**

Product	Finding Export Buyers	Access to Financial Resources	Lack of Warehouses	Lack and High Cost of Refrigerated Trucks	High Cost and/or Lack of Raw
Apples	8%	33%	42%	17%	
Cherries		29%	29%	29%	
Persimmons	25%	25%	50%	25%	
Grapes		100%			
Pomegranate				25%	
Hazelnut		60%			
Early Potatoes			50%		
Tomatoe/Cucumber		25%		8%	
PomJuice	20%	20%	20%		20%
Poultry	14%	29%	14%	14%	
Dairy		9%			14%
B.Finishes		60%			60%
Furniture		33%			33%
Barley		50%			
Kiwi	100%	100%			
Rice	25%	75%			
Tomato Paste	75%	75%			100%
Wheat	25%	25%	50%		
Corn		100%			
Feed Meal		100%			75%
Feykhoa		100%	100%		
Apple Juice	100%	100%			75%
Carpet					50%
PomConcentrate					
Sausage					
Catering		50%			
Computers		67%			33%
Uniform		100%			
Recycled Brine					100%
Poultry		50%			

It is interesting to note how the responses do not align precisely to what industry experts identify as key constraints. In the case of dairy, for example, refrigeration is not identified as a major problem, although it has been identified as such in industry studies. The same is true for the non-identification of the lack of warehousing as a major constraint for some crops, when appropriate warehousing and cold storage may permit sales at much higher prices. In fact, the surveys may reveal the level of training and know-how transfer required for businesses and producers observing “best practices” to understand what they are missing.

### **C1a. Rating of problems related to trade and transportation**

The questionnaires asked processors and traders about the problems they experienced related to trade and transportation. They were asked to rate each of these on a scale between 1 and 5, with 1 being extremely important and 5 being not very important. The results are shown in Table 12.

**Table 12: Rating of Problems Related to Trade and Transportation**

Product	Problem					
	Bad State of Roads	High Cost of Purchasing Vehicles	High Cost of Operating Vehicles	Time & Expense of Obtaining Documentation	Police & Other Barriers on the Road	Clearing Customs
Apples	4.3	3.1	2.8	4.1	4.8	2
Cherries	4.7	3.3	3	3.9	5	2.4
Persimmons	3.3	2.3	1.3	2.7	2.3	0.7
Early Potatoes	3.7	3	1.7	3.3	4	1.3
B.Finishes	4.6	3.8	3.2	4	4	4.2
PomJuice	3.3	4.7	2.7	3	5	1.3
Grapes	5	2	2	5	4	0
Pomegranate	2	3	2	4.7	2.3	0.7
Tomatoe/Cucumber	5	2.5	2.5	2.3	3.5	2.5
Poultry	4	1.4	2.1	3.1	2.4	1.9
Hazelnut	1	1.5	4.5	4	4	4.5
Tomato Paste	3	2.8	3.8	3	3	2
Feed Meal	3.8	2.5	2.5	2.3	2.8	2
Apple Juice	3.5	4	3	1.5	1.5	2
Packing Material	5	5	3.5	2.5	5	1.75
Carpet	0	1	2	3	0	4
Sausage	2.7	1.7	3.7	4.7	2.3	3.7
Computer	2.7	1	3	4.7	4	3.7
Poultry	3	1	2	4	4	4
Average	3.4	2.6	2.7	3.5	3.4	2.3

Rating: 1= Extremely Important, 2=Very Important, 3=Quite Important, 4=Somewhat Important, 5=Not Very Important

This table suggests that the importance of the condition of roads varies by product. It is most important for hazelnuts and pomegranates and least important for grapes, tomato/cucumber, and packing materials, which are grown in more accessible regions or do not have to be transported long distances. The high cost of purchasing and operating vehicles is an important problem across most products, reflecting the advanced age of the vehicle stock. Among the majority of those interviewed, the time and cost of obtaining documentation does not appear to be a significant factor constraining trade, except for apple juice, perhaps because the exports of this product are going to the European market, which is more demanding in terms of certification. One explanation is that those interviewed are practitioners of “best practices” and the survey may be biased towards exporters who have learned to navigate the documentation process. While police and other barriers on the road appear to be a moderate constraint, except again for apple juice, most sub-sectors have serious problems in clearing customs. This supported by the fact that many exporters choose to load their produce onto railroad cars, even though it is subsequently reloaded onto trucks, when passing through customs in order to avoid delays and facilitate crossing the border. PSCEP is examining various options to address transportation constraints, including the promotion of joint ventures with international companies.

### **C1b. Limited Access to Sustainable Financing**

Each of the survey respondents was asked about working capital borrowed, working capital lent, and fixed capital borrowed. Out of 88 respondents in total, 16 had borrowed working capital, 16 had lent working capital, and 14 had borrowed fixed

capital (see Annex E for details). Nine out of sixteen of those borrowing working capital borrowed from friends and the rest from banks. The duration of working capital loans was as short as 2 months and as long as 36 months. Banks charged interest rates ranging from 18 to 24 %. Very little, if any, interest was paid to friends. Loan amounts varied up to 100,000 AZN.

Five farmers and three traders received working capital loans from traders or processors, normally without paying interest, though interest may have implicitly been paid through the prices received for their products. The duration of these loans was 1 to 12 months. The amounts varied up to 46,000 AZN.

Of the loans for fixed capital investment, eight were from banks, 6 from friends, and one from the national fund. Interest rates varied from 7% to 30%, with the banks reportedly receiving 6-7% in 5 out of 8 cases. Although not reported as such, these are likely to be loans subsidized by the government. In the other three bank loans, interest rates were either 18% or 30%. Terms of the loans were anywhere from one month to five years.

The conclusions that one can draw from this very limited sample is that loan conditions vary enormously, from low-interest, subsidized bank loans for fixed capital investment up to 5 years to high-interest bank loans for fixed and working capital. There is also quite a bit of trade credit and informal lending among friends. The large variation in loan conditions and interest rates suggests that there is much fragmentation and a large degree of inefficiency and wastage in the rural financial sector.

## SECTION V

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### **Implications for Policy and PSCEP Programming**

There are a number of implications of these qualitative and quantitative results for policy and PSCEP programming. Some of these implications are cross-cutting in nature and apply to all the sub-sectors to a greater or lesser degree. Others are related to a particular sub-sector or group of sub-sectors. Each of these is treated here in turn.

#### **A. Cross-Cutting Implications**

##### **A1. Need for Capital Investment**

It is clear that PSCEP needs to play a role in increasing access to investment capital. There are many opportunities for financially and economically profitable investment in new plant and equipment in the agricultural and non-agricultural industries, but this investment is being hamstrung by the highly fragmented nature of rural finance.

Production of fresh fruits and vegetables for export is clearly in Azerbaijan's comparative advantage and is consistent with its size distribution of farms and relatively abundant rural labor force. Much of this advantage, however, is based on the care and harvesting of existing orchards, many of which are very old. There is a need to replant Azerbaijan's orchards so as to sustain and increase production and exports. This means that capital costs will be incurred, and the higher yields will have to compensate for these costs. The data acquired on the cost of establishing new orchards indicate that these investments should be very profitable. The sector would benefit substantially from the development of new financial instruments, especially if these would allow farmers to use orchards as collateral.

Another area of need is the construction of greenhouses. This sector has been shown in the DRC analysis to be very profitable, especially for export to the Russian market. Another less expensive alternative is the use of greenhouse sheeting, which can help to advance the date at which crops can be harvested even if it does not permit the cultivation of crops year round. The advantage is that greenhouse sheeting costs US\$8,000 per hectare, whereas a full greenhouse costs US\$40,000 per hectare.

Production and export of aseptically packaged concentrates of tomato paste, pomegranate juice, and apple juice offer very profitable opportunities, but will require investment in new equipment. The same may be true of equipment for "Tetra Pak" packaging of juice that is exported under a brand label, but here the competition is much keener. Much depends on the ability of firms to market their juice products.

Other opportunities are evident in modern feed mills, which do not have to be of great size to serve the middle level of poultry producers but which need to have modern methods for controlling feed mixes according to the needs of the customers. Such equipment is available locally and can serve as an effective way of helping to modernize this segment of the poultry industry.

Much of the machinery and equipment in Azerbaijan is old and obsolete. This includes agricultural and non-agricultural machinery. As long as old equipment is being used to supply mechanized services, however, the prices of these services tends to be somewhat low in relation to what would have to be charged to pay for the new

equipment. The study did not include an analysis of the financial and economic profitability of investing in equipment services. However, it did look at the truck transportation sub-sector, where a similar problem exists, and where investment in new trucks is shown to be highly profitable.

When it comes to irrigation, the situation is quite complicated. Much of the irrigation infrastructure in Azerbaijan is in a state of disrepair. Substantial areas of land are salinated and depopulated. Bringing them back would be a major, and probably not very profitable, investment. There are investments in irrigation that make economic sense, but the current system of subsidies acts to hide these by inducing irrigated production in areas and crops where this is not economically profitable.

## **A2. Need More Efficient Small-Medium Enterprise Finance**

PSCEP should play a key role in promoting increased investments in agriculture and non-agriculture sectors. Although sensitivity analysis of the effects of depreciation of the Russian ruble indicates that the pattern of comparative advantage described in this report for many products continue to exist, it is also clear that there is need for substantial innovation in the financial sector if the kinds of investments described in the last section are to be made.

It is highly desirable that banks develop modern loan analysis and administration techniques, as well as the financial product development approaches that will help them deal with both uncertainty and transactions costs associated with lending in agriculture and other key sectors of the economy, particularly for small and medium-scale enterprises. Furthermore, additional legal and regulatory reforms are critical to promote the cost-effective leveraging of collateral (cadastral law, collateral law, civil code reforms) in a manner that reduces lender risk and lowers interest rates.

PSCEP will be working in this direction as part of its emphasis on the financial sub-sector. This will involve working with commercial banks to develop new financial instruments such as purchase order finance, letters of credit, and a system of warehouse receipts. On the equity side, the program will link new opportunities with sources of investment funds such as the Azerbaijan Investment Company and the Caspian International Investment Fund. Actions will include technical assistance regarding investment strategies, deal generation, and development of new products.

## **A3. Market Diversification**

Azerbaijani exports are often sold in small shops and open markets where quality standards, packaging, and brand names are not very important. This situation is likely to change over time with the growth of supermarkets linking retailers directly with producers. This will require a substantial upgrading of quality control and packaging. Many respondents acknowledged this by listing lack of quality packaging materials and equipment as one of their principal problems. PSCEP will address this constraint through its focus on the labeling and packaging sub-sector.

Most of the export sub-sectors analyzed in this report send their products to Russia. Although this currently is very profitable, there are certain risks involved. There is always the possibility of political problems, which could result in sudden shifts in Russia's trade policies. Another danger is the depreciation of the ruble, which has resulted in Azerbaijan's exports becoming less competitive, especially since some of the other countries with which it competes in the Russian market also have allowed

their currencies to depreciate. In any event, it is important that Azerbaijan begin to look toward market diversification and particularly the possibility of exporting more to the European Union. This is an important way of hedging against risks, especially when a country is as dependent as Azerbaijan is on one market for its non-oil exports. Moving increasingly into the European market will require upgrading of quality standards, better packaging, and a number of other changes with which the PSCEP can be of assistance.

As transport costs decline with road construction, exports will become more profitable and it will be cheaper to make use of imported inputs. The entire economy will in fact become more integrated with the global economy, increasing the need to become competitive in competition with imports. In the meantime, the trade and transport sector will continue to thrive with the major constraint being access to the finance needed for equipment.

The survey indicates large seasonal price fluctuations, both domestically and in the export market. There clearly is a major need to take advantage of this through investment in refrigerated storage, which the analysis shows to be highly profitable. The major constraint here is improved technology and better access to finance on reasonable terms. Another advantage of storage is to enable processors and traders to take advantage of greater availability and lower tariffs for transport during the slack season. There currently is an acute shortage of refrigerated transport, especially, during the peak season. With better storage, processors and traders could reduce their costs of refrigerated transport to Russia and other destinations.

#### **A4. Progress In Equipment and a Regulatory Framework for Cleaning, Grading, and Quality Control**

USAID's Trade and Investment Support Program (TIRSP) is one of several donor initiatives that are assisting the government to develop and implement a regulatory framework for cleaning, grading, and assuring quality control, animal and human health and safety standards, and phytosanitary control. For example, TIRSP is working with the GOAJ in accession to the Codex Alimentarius Commission standards. Nonetheless, there is still substantial work to be done. One area is in imported agricultural chemicals, the quality of which is highly variant, leading to wasteful overuse, pest damage to crops and environmental degradation. Another is the need to clean and grade wheat in order to be able to supply the big flour mills in competition with imported wheat. A third is the need for a reliable system for certifying and guaranteeing the quality of seed and for assuring that it is not degraded over time by being mixed with unimproved varieties. As Azerbaijan begins shifting to markets other than the CIS countries, it will have to satisfy higher Sanitary and Phytosanitary (SPS) standards and to assure traceability regarding working conditions and environmental impact.

#### **A5. Trade Policy Regime**

Although Azerbaijan has a strong comparative advantage in fresh fruits and vegetables, there will be an increasingly need to modernize customs processing and trade facilitation as the structure of exports moves towards higher value added and greater diversification. The fact that exporters rate clearing customs as their most significant problem shows that long delays at customs are already taking their toll.

The import trade regime is an even more formidable barrier to trade. First the tariff

structure needs to be updated in order to provide cheaper access to raw materials and intermediate inputs. Although this structure is already supposed to be in place, companies complain that many of their inputs are taxed as if they were final products. Second, the value added tax acts as an important trade barrier because it discriminates against imports, especially in agriculture, which is generally exempt from such taxation. In addition, and as noted earlier, the VAT paid on inputs is not always deducted from that due on the final product, so there is an unintended double taxation. Third, there are very high transactions costs associated with the importation of a variety of goods, but especially where there is pressure from producers for protection against imports, as in the poultry industry. This has high costs to consumers and is likely to pose severe problems for accession to the WTO.

Finally, the influence of monopoly on trade appears to be formidable, though many of these effects are not well understood because the monopolies are not created through a legislative process. For example, juice producers in Guba and Khachmaz complain that they are not allowed to produce and export to their full capacity without having a substantial percentage of their export receipts channeled to one or two large firms in the industry. One large importer reportedly has a monopoly on chicken imports, which appears to have restricted supply and increased prices to consumers. There may be a monopoly on rice imports. Finally, most imports are channeled through one of five customs brokers, who deal directly with customs. What effect this has in restricting trade is unknown. All told, there is abundant evidence that trade is being restricted by monopoly but to what extent is unclear. What is clear is that this not only injures consumers and will likely reduce efficiency in the import competing sector, but also that it will have a detrimental effect on Azerbaijan's accession to the WTO.

## **B. Sector-Specific Implications**

This section reviews some of the sector-specific implications arising out of the DRC survey, analysis, and informal interviews, as well as the qualitative studies undertaken by the PSCEP.

### **B1. Fresh Fruits and Vegetables, and Production Services**

The fresh fruit and vegetable sub-sectors examined in the analysis include apples, cherries, persimmons, pomegranate, greenhouse vegetables, kiwi, and feykhoa. The DRC analysis shows all of these to be very profitable activities, both economically and financially. DRCs are universally less than one, and in some cases are less than 0.2. Although in many instances, orchards have long since been amortized so that there are no capital costs included in the calculations, there are other examples showing the cost of investing in new orchards, and these are uniformly profitable.

Constraints within the fruit and vegetable sector hinge upon issues of renewal and updating of the capital stock of orchards, greenhouses, grading, and processing equipment; access to new, high-yielding varieties; expansion of cold and other storage; high cost and lack of refrigerated transport; packaging and labeling; access to finance, and improved marketing. There is also a need to upgrade managerial and technical capacity. Improved storage is required to take advantage of seasonal price movements and to avoid transportation bottlenecks. Better packaging and labeling is needed in order to meet the demands of an evolving market towards higher value added and brand name identification. There is also a need to assure the quality of pesticides and other agricultural chemicals through an inspection and certification

process. Inputs of seeds, fertilizers, pesticides, and other chemical treatments vary widely in terms of availability, cost, and technical understanding of producers. They are a constraint that is felt throughout the agro-industry sector, which PSCEP will be engaging on an individual value chain basis.

### **B1a. Greenhouse Vegetables**

Production of tomatoes, cucumber, and various greens in greenhouses for export is a very profitable activity, with DRCs that are much less than one. Sector constraints begin with the greenhouse technology in use. Because energy costs for heating and cooling represent a substantial portion of the final cost of greenhouse vegetables, the energy inefficiency of the majority of greenhouses in Azerbaijan, combined with high energy costs in relation to competitors such as Iran, comprises a key constraint on production. One choice, because of its lower cost, is using greenhouse sheeting in lieu of fully heated greenhouses, when this can advance harvest time at critical moments. Additional constraints include the need for appropriate irrigation technology and the proper use of herbicides and pesticides, as well as storage, packaging and labeling.

### **B1b. Early Potatoes**

Production and export of early potatoes is a very profitable activity, with DRCs near 0.2. The critical problem for early potatoes is getting the crop to the Russian market as early as possible. Potatoes sold in Moscow before May 15 last year fetched a price of 0.4 AZN/kg, whereas two weeks later the price was 0.20 AZN/kg. However, planting is constrained by the need to avoid frost in late winter. Greenhouse sheets are often used to accelerate the date at which the harvest can take place.

Another problem is that all harvesting must take place within a period of about 20 days before the crop starts spoiling in the field. Unless storage is available, farmers are forced to sell at this time, when prices on the local market tend to be low. For example, early potatoes flood the market during the harvest season and anecdotal evidence suggests that some of these potatoes have been purchased by Iran, stored in cold storage facilities in Iran, and then sold back to Azerbaijan months later as prices have risen and domestic supply has depleted.

The other problem that potato farmers complain of is increased competition from other countries and an increasingly disorganized market in Russia. In addition, there is a three-year quarantine requirement, which prevents them from importing the best seed from Holland. Other constraints include sorting, grading and packaging, irrigation, and small plot sizes.

### **B1c. Hazelnuts**

Hazelnut exports have DRCs of about 0.47 to 0.56.<sup>12</sup> A few years ago, most of the hazelnut processing and trade was in the hands of Turkish traders, who combined Azerbaijani hazelnuts with the Turkish hazelnuts being exported to Europe. As Azeri traders and processors have taken over this sub-sector, they are having some problems finding markets. In addition, they are finding it hard to compete with Turkish traders in Europe because of long transportation distances and the continued presence of

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<sup>12</sup> This contradicts the results of the Project Framework Paper for the Agricultural Development and Credit Project, which showed that Azerbaijan does not have a comparative advantage in hazelnuts.

Turkish intermediaries. This has resulted in some reorientation of their exports towards Russia. Another problem experienced by the hazelnut sector is high price volatility in foreign markets. Nevertheless, hazelnut exports are growing rapidly.

#### **B1d. Kiwi and Feykhoa**

Kiwi and feykhoa are two crops grown in the well-watered south of Azerbaijan and exported to Russia and the Ukraine, which present very profitable opportunities for farmers in the region. Their DRCs range from 0.20 to 0.33. These crops have the further advantage that they are immune to frost, which has seriously damaged other citrus crops in the area.

Major constraints are shortage of refrigerated trucks in the busy season, the high cost of bringing in irrigation water, and competition from Iran and Turkey in the Russian market. In addition, great care is required in irrigating the plants.

#### **B1e. Table Grapes**

Although table grapes are not currently being exported in any significant quantities, they have DRCs that are very low – from 0.18 to 0.58. Much of current grape production is an input into the wine industry, which has been growing rapidly. Although this industry was not a subject of this study, there seem to be no reason from the grape production side why it should not be successful. In addition, there is a substantial potential for exports of table grapes, with producers and traders asking for contact information.

### **B2. Grains and Animal Feed**

#### **B2a. Wheat**

As noted earlier, wheat is characterized by wide differences in financial and economic profitability. DRCs range from 0.31 to 2.22. Wheat is grown most efficiently by large farmers using extensive, mechanized techniques. Irrigation does not appear to be a prerequisite, except possibly in some drier regions, where its economic profitability remains to be tested. Current subsidies on wheat production make only a slight difference in profits and their effects are swamped by those of cultivation practices, use of good seed, and adequate but not excessive fertilization.

Wheat farmers complain about lack of irrigation infrastructure and the fact they could get much higher yields if this infrastructure were available, but there is no evidence that investment in irrigation would be economically profitable, given its high costs. In any case, much of the irrigation infrastructure that is needed is at the level of the individual farm, and, if it were profitable, there is no reason why the farmers should not invest in the infrastructure themselves.

The wheat sector of Azerbaijan suffers from lack of cleaning and grading equipment, which prevents the separation of good bread wheat from that used for animal feed. As a result, it has been claimed that much of the effort to promote greater self-sufficiency in wheat production has simply resulted in a greater supply of animal feed. There is a major need for investment in this equipment if the domestic wheat sub-sector is going to compete with imported wheat in the flour milling industry.

## **B2b. Rice**

Rice production for local consumption appears to be quite profitable in Azerbaijan at current high world market prices. DRCs range from 0.30 to 0.48. Most rice is grown for the local market, but some is also shipped to Baku. Rice uses a lot of water, but it is not clear how much of this is subsidized water furnished by the state. Current production practices are quite efficient, combining mechanized land preparation and threshing with manual construction of bunds, transplanting of seedlings, and harvesting.

## **B2c. Barley, Corn, and Feed Mills**

The DRC results differ markedly for barley, corn, and feed mills. Those for barley vary from 0.81 to 3.31, whereas those for corn are all within the range of 0.41 to 0.73. Thus corn appears to be the better feed input, especially if it is combined with second-quality wheat made available through better cleaning and grading, as well as appropriate protein, vitamin, and mineral supplements. One reason why corn appears to be financially and economically more profitable than barley may have to do with the fact that the price of corn has been bid up on the international market as a result of its use in the production of bio-fuels.

Feed mills are also quite profitable in Azerbaijan. Some of these mills are located on the large poultry farms, where they are integrated into other poultry operations. Others serve the middle-size segment of the poultry industry with scientifically-based feed mixes. These mills will be an increasingly important source of demand for the feed grains: corn, barley, and second-quality wheat, as well as an important conduit for modernizing the medium-scale poultry industry.

## **B3. Processed Fruits and Vegetables**

### **B3a. Fruit Juice and Tomato Paste**

Three important processing industries included in the DRC analysis are pomegranate juice, apple juice, and tomato paste. Each of these is exported, is financially profitable, and has DRCs that are substantially less than one.

The key issue facing these industries is the choice between exporting juice or paste, or exporting concentrate. There has been an increasing tendency in recent years for the market to move towards the exportation of concentrate in aseptic packaging rather than juice or tomato paste. This reduces the cost of transporting both bottles and less concentrated product. Water is then added to the concentrate at the other end, where the juice or paste is packaged. However, the processors frequently prefer to sell juice or paste because there is more of a margin and they can develop a brand name. In addition, substantial investment in equipment is required to make the concentrate. However, this extra cost is more than compensated for by assurance of food safety and of packaging to the specifications of the export market. The PSCEP needs to assist firms in arriving at this business decision.

## **B4. Animal Products**

### **B4a. Poultry**

The poultry industry is highly bifurcated into very large, integrated operations and those of medium size, which tend towards separate hatcheries, raising of broilers, and milling feed. There are also many very small operations, but these may prove difficult for PSCEP to effectively assist. DRCs for the middle range of the industry are, on average, reasonably low, especially when producing for the local market. They range from 0.71 to 0.82. On the other hand, the DRCs for the larger poultry operations selling in Baku that were included in the survey are very high – ranging from 2.07 to 6.06. This is due only to a minor extent to the fact that they are competing with imports in Baku rather than upcountry. More important appear to be their high capital and operating costs coupled with their ability to sell in a highly protected market.

Key constraints in the poultry sector include poultry feed, technical education, management information systems, marketing, and lack of understanding regarding finance. There is a major need for quality feed, which comprises up to 70% of the price of the product. That Azerbaijan produces limited animal feed domestically and imports feed components at relatively high cost is the greatest weakness of the poultry industry. This constraint opens the market to risks relating to restrictions on cross-border trade and fluctuating exchange rates. Education is also a key constraint in this sector; there is a lack of management information systems, technical understanding regarding each component of poultry operations, and a low level of capacity at educational institutions. Consumer behavior and demand is poorly understood and the ability of the industry to create products based on consumer needs is generally lacking. The ability to utilize finance and investment mechanisms to maximize productivity and profitability is also limited.

An excellent opportunity for intervening in the middle-size range of the sector is through the feed mills, a number of which are furnished with equipment made by a company in Baku. These mills assist the poultry farmers in defining their nutritional needs and in obtaining the feed mixes that satisfy those needs. They also create a demand for barley, corn, and second grade wheat as ingredients in feed mixes. The demand for protein supplements such as fish meal is also there.

In the larger scale segment of the poultry industry, PSECP is providing detailed recommendations regarding how efficiency can be enhanced by linking technical information with financial data in order to improve the larger firms' strategic planning and obtain better access to finance, including equity investment. Better business modeling will enable these enterprises to: (1) monitor their performance; (2) identify opportunities to increase productivity; (3) evaluate the impact of exchange rate risk; and, (4) evaluate the impact of changes in sales prices and input costs. This study has, in fact, tried to look at best practice in order to use the analysis as a tool for determining what is possible in the future. However, it is important to bear in mind that achieving greater efficiency in the face of highly distorted price incentives, such as exist in the poultry industry through heavy import protection, may prove difficult and could be costly. This is an issue that PSCEP will have to address carefully.

## **B4b. Dairy**

DRCs in the dairy industry vary widely but are generally in excess of one (from 0.67 to 3.06). The major constraint in the dairy industry is the fragmented and highly dispersed nature of production. Critical to overcoming this constraint is the establishment of sanitary milk collection centers. Other constraints include: improving dairy cattle nutrition and genetics; increasing the efficient use of irrigation water; improving raw milk and dairy product quality; supporting human resource development; and, developing, supporting and strengthening relevant dairy industry associations and institutions.

Production in the dairy sector is the key segment of the value chain, with major obstacles present in terms of cattle nutrition and the appropriate irrigation and management of pasture land. Chilling and collecting facilities are very much needed. While associations in the dairy sector continue to be poorly regarded by dairy companies in Azerbaijan, there are basic needs that they serve. For example, the absence of an organized milk collection system hampers the natural associative company interactions that generally occur within more developed market segments, resulting in shared best practices around issues such as herd management and food safety, which contribute to greater sector wide levels of growth and sustainability.

The dairy industry will probably require several years of investment before it will become generally profitable. Some processing operations are competitive for the local market within the regions but not for shipment of most of their products to Baku. Expanding their capacity, and especially strengthening the linkages between processing plants and small milk producers will require major efforts to upgrade the quality of the dairy herd, reduce the incidence of disease, and improve the transportation and storage involved in the collection of milk. In the meantime, a number of processors are suffering because they have substantial excess capacity and cannot get access to the milk they need to operate efficiently. The DRC results showed that integrated operations are not necessarily the answer. One relatively modern integrated dairy farm was highly unprofitable because of its high capital and operating costs.

## **B4c. Processed Meat**

The DRCs in the meat processing sub-sector vary from 0.97 to 2.75. Profits rates are low despite the fact that effective protection coefficients are quite high – from 1.35 to 1.63. Ninety percent of the inputs into the processed meat sub-sector are imported. This is primarily because of the poor health and safety conditions that exist in the domestic meat industry. There is also a need to modernize production, processing, packaging, and food safety standards, as well as to obtain the finance required for these investments. Firms complain that their access to imported raw materials is monopolized.

## **B5. Packaging and Labeling**

Constraints in the packaging sector include capacity limitations in paper and cardboard packaging, aseptic packaging, and glass and plastic packaging, thus requiring heavy reliance on imported packaging materials to meet local needs. There is lack of knowledge concerning the increased profits and product durability that occur through proper post harvest handling and adherence to appropriate grades and standards. There is a lack of capital investment and management ability in this

subsector. The lack of diversity and capacity in packaging and labeling supply limits producers' ability to satisfy market demands both locally and internationally.

The DRC analysis performed for this sector was limited to the construction of 15 kilogram wooden boxes for exporting fruits and vegetable, the production of which is expanding rapidly. The DRCs for this activity vary from 0.84 to 1.40. More important, the construction of these boxes represents an important first step in moving away from bulk shipment in large 32 kilogram boxes, which provide little protection for the fruit.

## **B6. Cold Storage**

Constraints in the cold storage and warehousing sector go beyond a basic lack of capacity. They also include a knowledge gap in how to build, run, and maintain a storage facility. Preventative maintenance schedules are lacking and rudimentary activities such as daily recording of cold chamber temperatures and humidity controls also seem to be missing. There are also problems of management and marketing of existing warehouse and cold storage facilities, which are often empty. Given the importance of cold storage to many of the fruit and vegetable value chains, this is a sector where PSCEP could have a major impact.

## **B7. Furniture, Building Finishes, and Carpets**

The furniture and building finishes sector is highly variable, with DRCs running from 0.39 to 3.07. At one end are several building finishes companies that seem to be highly competitive, exporting to Europe, the CIS countries, and Iran. At the other end are companies that are barely holding their own in the Baku market. In between are the furniture firms, which in the sample at least produce primarily for the regional market within Azerbaijan. This sector is one where exposure to export markets seems to have a favorable impact on productivity. It is also one where style and design can play an important role. A major problem is access to good raw materials, especially wood.

The carpet industry is another one in which style and design is very important. Here, exports are the norm, with DRCs from 0.58 to 0.88. An important problem is high cost and lack of access to quality raw materials, principally wool and silk. There is also a question as to whether the industry will be able to compete over the longer run with countries in which labor costs are much lower.

## **B8. Computer Assembly**

Computer assembly is another sub-sector with substantial variations in DRCs. One firm, with exports to Kazakhstan, has a DRC of 0.68. Others have DRCs ranging from 1.70 to 2.75. These firms need to be much more aggressive in seeking out local market opportunities, combining quality components with Azerbaijani keyboards and good follow-up services. The firms have relied thus far to a large extent on government contacts without developing sound marketing strategies for future expansion. One problem cited by the firms is lack of qualified workers. Another is high taxes paid on imported components. PSCEP will be undertaking an assessment and Action Plan that will analyze other subsectors within ICT including e-business solutions, software, and broadband expansion, as well as development of green zones or IT parks to promote high tech business development.

## **B9. Catering, Waste Management, and Protective Clothing**

Catering, waste management, and protective clothing, as they are analyzed in this report, are essentially spinoffs of the oil industry's effort to increase its local procurement of goods and services. For example, the catering industry has existed in Azerbaijan for some time, but it is only recently that a few firms have begun to compete successfully with the catering services provided by foreign firms. This has meant, above all, adherence to international standards of food safety and cleanliness, which might be seen as paving the way for more widespread acceptance of these standards in the local food industry. In any event the few firms that are successful in bidding against their foreign competitors are also quite efficient, with DRCs from 0.45 to 0.90.

Waste management is another activity for which local firms have bid successfully against their foreign competitors. One of these treats chemically and recycles the brine used in drilling oil wells. This results in substantial savings over the importation of chemicals used in the production of brine. The DRC for this activity, using the cost of producing fresh brine from these chemicals as the import parity price, is 0.45.

Protective clothing is another local industry that has begun to compete successfully with imports. Here the experience across firms is very different. One firm has a DRC of 0.71 whereas another has a DRC of 1.64. There is a large difference in the scale of activities of these firms, which probably accounts for much of the difference in performance.

## **B10. Truck Transport**

Section 2 of this report describes briefly the transportation alternatives that exist in Azerbaijan. One is the state owned and managed railway. The other is truck transportation, which is primarily owned and operated by the private sector. Both are used extensively by Azerbaijani for international as well as domestic commerce and trade. A DRC analysis was undertaken of truck transportation based on information gathered from traders in the survey. This showed a high degree of economic profitability, with a DRC of 0.79 using relatively low Russian backhaul rates for the import parity price. It would seem that investment in transportation is highly profitable, with the only constraint being financing.

## **B11. Finance and Investment**

Constraints to the finance and investment sector relate principally to high fragmentation of the financial markets, with substantial variation in the terms offered to different borrowers, large margins between lending and borrowing rates, lack of equity investment in the local market, and absence of the requisite capacity in corporate governance required to sustain and benefit from this type of investment. In addition, Azerbaijan currently suffers from liquidity and insolvency issues stemming from the global financial crisis and the steep reduction in oil revenues which drive the Azerbaijani economy.

## **C. Conclusions**

One overarching conclusion of the study is that there are many agricultural, agro industrial, manufacturing, and service sub-sectors that have a strong potential for

growth. This is true for such exportable products as apples, cherries, persimmons, pomegranates, grapes, kiwi, feykhoa, pomegranate and apple juice, early potatoes, greenhouse vegetables, hazelnuts, and tomato paste. In most of these sub-sectors, there are many opportunities for profitable investment in orchards, processing and grading equipment, cold storage, transportation, and other areas, but this is coupled with a highly fractured financial system that is not responding to areas of high economic return. This points to the critical importance of the PSCEP's work on finance and investment.

Greater care is required in selecting interventions related to poultry and dairy. Here there is a strong divergence between a relatively small number of well protected larger firms producing for the Baku market and the more diffused and smaller scale production activities that are supplying the upcountry market. Although the DRCs for the latter are generally lower, this is not universally true. There is substantial heterogeneity in these sub-sectors and more care is required in order to avoid supporting activities that are not sustainable in the longer run without substantial import protection.

The poultry and dairy sub-sectors are closely linked with the animal feed sub-sector, which in turn is linked with the feed grains subsector. Here corn seems to have a strong comparative advantage over barley and even second-grade wheat. The profitability of wheat for human consumption depends very much on farm size.

In manufacturing and services, the study identified a number of economically profitable activities in which Azerbaijan has a comparative advantage – either for export or for substitution against imports. These include building finishes, carpets, some computer assembly, catering services, waste management, some protective clothing, and truck transportation. However, there is much more disparity in DRCs among firms in these sectors than for agriculture and agro industry. This is because agro climatic conditions, location in relation to markets, land/labor ratios, size distribution of farms, and other relatively immutable variables determine comparative advantage to a much more powerful extent than they do for manufacturing and services. In the latter case, economic profitability depends more on technology, labor skills, capital accumulation, management, and the history of the firm and industry.<sup>13</sup>

Given these broad overarching conclusions, the rest of this section looks at some specific areas of policy and then provides support for the programmatic choices made regarding the sub-sectors in which the PSCEP will work.

## **D. Policy**

### **D1. Agricultural Subsidies**

One of the most pressing issues facing the Azerbaijani government is whether to continue, expand, modify or eliminate the agricultural subsidies that are used to promote wheat and other crop production in accordance with the Food Security Program. According to the results of the sensitivity analysis presented earlier, removal of the subsidies on wheat production would have a negligible effect on the DRC ratios, i.e., it would only reduce the average profit on wheat measured in the

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<sup>13</sup> In this respect, it is interesting that among the industrial countries, patterns of trade are based much more on comparative advantage within rather narrowly defined industries than across these industries.

survey from 41% of gross revenue to 34%. In other words, the subsidies, despite their costs, do not appear to provide a significant incentive in relation to existing profits. Large wheat farmers capture most of these subsidies. Given that their farms are relatively profitable in any case, it is unlikely that they would reduce their wheat production if the subsidies were removed. Smaller farmers, on the other hand, are unlikely to be able to grow wheat profitably even with the subsidies. In addition, the poor quality of the wheat that they do produce renders it unsuitable for modern flour mills; most of it appears to go instead for animal feed. This is a very poor alternative to growing the fruits and vegetables or other products in which Azerbaijan has a comparative advantage, and which would reward them much better.

If fully implemented, the wheat subsidy would cost the government more than 40,000,000 AZN per annum. This equals about 10% of the government's agricultural budget for 2009 and is a very high price to pay given that the state could use these funds to invest in agriculture through research and development, construction of primary irrigation infrastructure, developing pre-feasibility studies for the numerous private sector investments that are needed, and other areas. Furthermore, the wheat subsidy is applied to the area of land planted in wheat, which encourages the use of very extensive techniques of production rather than those resulting in higher yields and greater utilization of labor. While this may be appropriate for those who are able to take advantage of the economies of scale implicit in highly mechanized systems of production, it is not efficient for small farmers operating on very limited and often fragmented land holdings, especially given the alternatives that are available to them. If the government chooses to provide subsidies, a more efficient system would be a broad direct income agricultural subsidy that does not discriminate between alternative crops. Experience with the existing 40 AZN per hectare fuel and motor oil subsidy that applies to crops other than wheat suggests that the criteria and procedures for receiving a direct income Subsidy should be simple and transparent. Furthermore, if a differential subsidy is to be provided this year wheat producers exclusively, then the subsidy should be related to past, not future production in order to avoid distorting agricultural market incentives.

Finally, the current fertilizer subsidy needs to be reconsidered. Farmers report not being able to obtain their fertilizer needs from Agro Leasing, which supplies the subsidized fertilizer. At the same time, this subsidy drives private sector input companies out of the business of distributing fertilizer. This creates substantial uncertainty and has an adverse impact, especially, on smaller farmers who often are forced to resort to the private market for their fertilizer needs.

## **D2. Irrigation Policies**

There is an urgent need in Azerbaijan to develop a coherent strategy and policy regarding irrigation. This needs to be incorporated into a broader agricultural strategy. Little is known of how farmers actually irrigate their land, whether by drawing on gravity feed systems developed by the state or using pump irrigation paid for by the farmers. Furthermore, an assessment needs to be made of the existing irrigation infrastructure and what it would cost to have it rehabilitated to different degrees. Then there needs to be an economic assessment of alternative uses of the land, both with and without irrigation, to see what the economic benefits would be of irrigation. These would then have to be weighed against the costs of the irrigation investment, operation, and maintenance.

Throughout this process, attention should be paid to how access to water is to be managed and paid for. In general, it is better to have the state plan and pay for the primary system but not the secondary or tertiary systems, which should be the responsibility of water user associations or individual farmers.

Although the choice of cropping systems can be left to the individual farmer, the public sector needs to make choices regarding the provision of irrigation infrastructure that will influence farmer decisions. This requires long-range planning based on the viability of alternative cropping systems, both irrigated and non-irrigated.

### **D3. Trade Regime**

The import trade regime in Azerbaijan is very restrictive. Price comparisons between world market prices and those prevailing on the domestic market show markups over CIF import prices often in excess of 100%, even though the maximum tariff rate, inclusive of the value added tax, is 35.7%. This suggests the presence of significant non-tariff barriers. The most likely source of these barriers is the limited competition and monopolies, which restrict trade. This not only has adverse effects on consumers and encourages inefficient production by producers, but it also appears inconsistent with WTO prohibitions on the use of non-tariff barriers to restrict trade.

The need for reform in the export trade regime is also crucial. With evolving and increasingly diversified markets, the delays experienced at the border are likely to be seen as increasingly severe impediments. Development of modern export trade will require the corresponding establishment of modern customs and trade facilitation services. This will also require improving transportation from areas of production to the border, making better use of backhaul capacity, investing in refrigerated and non-refrigerated trucks, and encouraging the construction of cold storage facilities that will help to alleviate the seasonal transportation bottleneck.

### **D4. Non-Agricultural Issues**

The manufacturing and services sectors offer many challenging opportunities for investment and growth. Many of these opportunities are closely related to the evolution of agriculture and agro industry, e.g., packaging materials, cold storage, truck transportation. Others have only been touched on here. For example, the only activity analyzed in this report under ICT is computer assembly. There are many other areas within ICT that will have an enormous impact on the rural sector that PSCEP will explore further. One is the possible use of mobile telephones to facilitate financial transactions in rural areas. Another is the adaption of computer software to the needs of modern agriculture, for example poultry farms.

The analysis in this report shows the potential of a range of activities in the manufacturing and services sectors. One element that seems to be important is the desire and ability of firms to engage in exports. This helps to increase their awareness of marketing, introduces them to new technologies, shows them how to increase productivity, and in general contributes to their competitiveness. This is an area in which the PSCEP could be of assistance by helping to establish contacts, organizing study trips abroad, and in general raising the horizons of local business leaders.

## Annex A: Technical Description of DRC Methodology

Domestic resource cost (DRC) models of comparative costs and incentives have been used for several decades as a tool for analyzing the agricultural and industrial sectors of less developed countries, especially those whose economies have been highly distorted by overvalued exchange rates and restrictive trade policies. Most of these models have emphasized the calculation of domestic resource cost (DRC) as an indicator of comparative costs and of nominal and effective protection coefficients (NPC and EPC) as measures of incentives.

This annex briefly sets out the basic theory underlying the DRC/NPC/EPC models, followed by a discussion of how that theory has been applied in a number of countries using the IMPACT model.<sup>14</sup> Appendix I to the annex provides examples of the use of the IMPACT model for an export product (apples from Guba) and for a product being produced as a substitute for imports (poultry in Barda)

### ***DRC/NPC/EPC Model***

The concepts of domestic resource cost and nominal/effective protection, as well as the relationships between these concepts, are well established in the literature (Bruno, Krueger, Corden, Pearson, Page and Stryker, Pearson and Monke, Tsakok). What follows is a brief review of these concepts coupled with a discussion of some important aspects that have received little attention until recently.

### **Domestic Resource Cost**

Domestic resource cost (DRC) is an indicator of the efficiency with which a country's factors of production (land, labor, and capital) are converted into useful output. More precisely, we define the DRC for a given economic activity as the ratio of the economic opportunity cost<sup>15</sup> of the domestic, non-tradable<sup>16</sup> resources used in the production of output  $j$  to the value added that is created measured in world market prices, which equal the shadow prices or economic opportunity cost of tradable goods.

$$DRC_j = \frac{\sum f_{sj} P_s^*}{P_j^* - \sum a_{ij} P_i^*} \quad \dots (1)$$

where

$f_{sj}$  is a technical coefficient relating non-tradable primary factor  $s$  (land, labor, capital) to output  $j$ ,

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<sup>14</sup>These countries include Algeria, Bangladesh, Burundi, Côte d'Ivoire, Ghana, Guinea, Iraq, Jordan, Liberia, Madagascar, Mali, Morocco, Nigeria, Senegal, and Tunisia.

<sup>15</sup> In the absence of monopoly, externalities, or other market imperfections, the economic opportunity cost of a resource differs from its financial cost in that the former is exclusive of indirect taxes or subsidies, such as the value added tax and import duties, whereas the latter includes these taxes and subsidies.

<sup>16</sup> Non-tradable resources are those whose prices vary domestically depending on supply and demand. Tradable resources, on the other hand, are those whose border prices (FOB and CIF) are determined by the world market. Although the domestic prices of tradables can vary from their border prices because of tariff and nontariff barriers to trade, changes in domestic supply and demand do not normally result in movements in the prices of tradables unless these changes lead to the cessation of trade.

$P_s^*$  is the economic opportunity cost of non-tradable factor  $s$ ,  
 $P_j^*$  is the world market price of tradable output  $j$ ,  
 $P_i$  is the world market price of tradable intermediate input  $i$ ,  
 $a_{ij}$  is an technical coefficient relating input  $i$  to output  $j$ .

If there are intermediate inputs that are non-tradable, these are broken down into their tradable intermediate input and non-tradable primary factor components. This assumes that the non-tradable intermediate inputs are produced at constant costs so that it is appropriate to break them down using the existing input-output structure of the supplying industries. The numerator of the DRC given in equation (1) thus represents the opportunity cost of all non-tradable primary factors employed both directly in the production of output  $j$  and indirectly in the production of inputs used in the production of  $j$ . Similarly, the denominator equals the value of output less the value of direct and indirect tradable inputs.

The distinction between tradables and non-tradables is critical to the analysis. The basic distinction is that tradables are obtainable from the international market at constant prices whereas non-tradables are available only at prices that rise as the aggregate quantity used increases. Non-tradables thus act ultimately as the constraints on economic production. In the absence of monopoly, externalities, or other market imperfections, economic efficiency implies the maximization of value added measured in world prices subject to these constraints.<sup>17</sup>

The difference between tradables and nontradables is also critical insofar as the exchange rate is concerned. Both numerator and denominator of the DRC are given in the same currency by multiplying the latter by the economic opportunity cost of foreign exchange, or the shadow exchange rate, which expresses the marginally efficient rate at which non-tradable primary factors of production may be transformed into tradable value added. Multiplying the denominator of the DRC by this rate converts the shadow prices of tradable outputs and inputs, expressed in foreign currency, into their opportunity cost at the margin in terms of domestic factors of production. Once this is done, the numerator and denominator of the DRC may be compared to see whether activity  $j$  is more or less efficient than the activity that, at the margin, is just efficient. If the DRC is less than one, the domestic resource cost per unit of value added is less for activity  $j$  than for the marginally efficient activity, so the country has a comparative advantage in activity  $j$ . If the DRC is greater than one, the opposite is true and the country does not have a comparative advantage.

An alternative to the DRC measure is net social profitability (NSP), obtained by subtracting the numerator from the denominator of equation (1).

$$NSP_j = P_j^* - \sum a_{ij}P_i^* - \sum f_{sj}P_s^* \quad \dots (2)$$

This indicator is expressed in units of output, however, which prevents comparisons being made of the relative profitability of activities involving different products. The

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<sup>17</sup>This is analogous to the standard linear programming problem. Whereas inputs purchased on the market at constant prices (tradables) form columns of the LP matrix, inputs that are either fixed in supply or are available only at rising prices (non-tradable factors of production) are included as rows. The LP problem is to maximize the weighted sum of the columns subject to the row constraints.

DRC is a ratio, on the other hand, which expresses the amount of gain that can be achieved per unit of scarce domestic resources. The lower the DRC, the more efficient is the activity that it represents.

## Nominal and Effective Protection

While the DRC indicator is related to the theory of comparative advantage, nominal and effective protection refers to the structure of incentives involving international trade (import duties, export taxes, quantitative restrictions on imports, etc.). Nominal protection may be measured either as the nominal protection coefficient ( $NPC = P_j/P_j^*$ ) or as the nominal rate of protection ( $NRP = NPC - 1$ ), where  $P_j$  is the domestic price of output  $j$ . These indicators measure the degree to which consumers are either taxed or subsidized by trade policy. If the NPC is greater than one ( $NRP > 0$ ), they are being taxed because they are paying prices which are higher than those paid on the world market; if the NPC is less than one ( $NRP < 0$ ), they are being subsidized vis-à-vis the world market.

Effective protection measures incentives that affect the prices of both outputs and inputs, and is therefore a better indicator of protection offered to producers. The effective protection coefficient (EPC), which measures value added in domestic prices relative to value added in world prices, is given by

$$EPC_j = \frac{P_j - \sum a_{ij} P_i}{P_j^* - \sum a_{ij} P_i^*} \quad \dots(3)$$

The effective rate of protection is obtained from this by subtracting one ( $ERP = EPC - 1$ ). If the EPC is greater than one ( $ERP > 0$ ), producers receive positive incentives vis-à-vis the world market; if  $EPC < 1$  ( $ERP < 0$ ), then producers receive negative protection. The denominator of the EPC is the same as that of the DRC if each is measured at the shadow rate of exchange.

## IMPACT

The Integrated Model for Policy Analysis Computer Template (IMPACT) was developed as a standard tool for conducting DRC/NPC/EPC analysis. A separate model is constructed from the common template for each production/marketing/processing/manufacturing activity which is defined with respect to product, technique, and location of production and consumption.

## Organization of the Template

The template is used with an Excel electronic spreadsheet and is divided into four basic parts. The first presents a series of key parameters, such as the ratio of the shadow exchange rate to the market exchange rate. The parameters can be easily changed for sensitivity analysis.

The second part of the template provides data on quantities of inputs and outputs, their unit prices, expenditures on inputs by the producer, the financial cost of the inputs delivered to the producer and the breakdown of these costs into the economic cost of the inputs, and taxes and subsidies on tradables and non-tradables. The economic cost is, in turn, divided into its tradable and non-tradable components, the latter including labor and

capital, and, where relevant, land. Each of these variables is added across inputs to derive total costs and its components at the production, processing, and trading stages.

The breakdown of financial costs into taxes, subsidies, and various economic costs is accomplished by multiplying financial costs by a set of coefficients contained in a second part of the template. These coefficients may be either national or regional in scope and are common to all products and techniques. The coefficients are obtained by breaking standardized inputs down into their tax/subsidy and tradable/non-tradable components using the input-output structure of the supplying industries. In the Azerbaijan study the 2006 Input-Output matrix was adapted for this purpose.

A third area of the template is used to calculate the parity price of tradable outputs. Starting with the world price, adjustment is made for quality differences and for freight costs to obtain the relevant border price, either FOB or CIF. Conversion to local currency is made at the official exchange rate. The border price is then adjusted for trade taxes and subsidies, handling, and delivery charges, and transport costs to the point at which the calculations are made. For imports, this may be a major wholesale market or a rural market or assembly point. In calculating the indicators for an import substitution activity, adjustment is made for the savings not only in the CIF value of imports but also in the cost of delivering those imports to the point of consumption. For exports, on the other hand, the frontier is the point at which domestic production competes with the world market. Ideally this is the FOB price, but in some cases it is the wholesale price at the destination point.

The fourth area of the template shows the calculations of nominal and effective rates of protection and of the domestic resource cost ratio.

## **Uses of Impact**

IMPACT has proven to be a highly versatile tool of analysis. One of its main advantages is that it combines a variety of different types of data in one spreadsheet. For example, data on yields, labor times, and input prices and quantities are often available from surveys and information gathered by extension and BDS agents. Costs of processing, transportation, and marketing can frequently be obtained from feasibility studies and other project documents, as well as specific surveys. Even where data on downstream activities are limited, informal interviews with a few traders and processors will usually quickly fill in the gaps.

One of its most intriguing features of IMPACT is the ease with which it permits the analyst to investigate the effect of different market locations on the profitability of production. DRCs in many countries vary enormously depending upon whether output is consumed upcountry, is consumed in the capital city, or is exported.

Another use to which IMPACT has been put is in the construction of supply functions based on either financial or economic costs as well as on additional information regarding the actual or potential relative importance of each activity in production. These are then linked to demand functions in partial equilibrium models in order to determine which regions and techniques of production would be profitable in both the presence and the absence of policy distortions.

Because of IMPACT's prepackaged design and the fact that most data are either already generally available or can be obtained in a fairly short period of time through informal interviews and rapid appraisal surveys, sub-sector analyses using the DRC/NPC/EPC methodology can be accomplished relatively quickly. In Bangladesh, Burundi, Ghana, Madagascar, Mali, Nigeria, Tunisia, and other countries, these studies have been undertaken for as many as 60 activities (combination of product, technique of production, location of production, and destination) in as few as three months time.

### ***Benefits of DRC/NPC/EPC Analysis***

What do we derive from DRC analysis? First and foremost, the analysis tells where the comparative advantage of a given country lies in relation to its international trade. This indicator of comparative advantage is specific with respect to product, location of production, technique of production, and destination. It can be made dynamic by focusing on current best-practice technology or on new techniques that have been identified and can be transferred to the country.

Second, the analysis tells us the extent to which the policy environment is encouraging or discouraging the exploitation of this advantage. For example, a trade regime that provides high protection to domestic industry acts to encourage production in areas of comparative disadvantage. As long as profits are to be made in heavily protected sub-sectors of the economy, high-cost investments there are likely to increase. On the other hand, if the DRCs for activities in the export sector are well below their effective protection coefficients, as is often the case, this suggests that investment there will be economically profitable. Thus DRC analysis serves as a guide to where there are policy distortions and what their effects on investment are likely to be.

Third, by eliminating the effects of taxes, subsidies, and other distortions in the economy as part of our DRC estimation, we gain a picture of what would be financially, as well as economically, profitable should these distortions be eliminated. This is always a danger. Policy environments change – sometimes as a result of broad-based reform. Investments made in sub-sectors that depend on subsidies and trade protection are always vulnerable to these changes.

## Appendix I to Annex A

Poultry Shamkir Broilers																		
Key Parameters:																		
Official Exchange Rate				0.825														
Ratio of Shadow to Official Exchange Rate				1														
World Price (CIF)																		
Interest Rate				15.00%														
		Nr Units	Service	Unit	Financial	Indirect Tax/Subsidy		Econ				Financ	Indirect Tax/Subsidy		Econ			
	Unit		Life	Cost	Cost	Trad	Nontrad	Cost	Labor	Capital	Tradables	Cost	Trad	Nontrad	Cost	Labor	Capital	Tradables
Input Costs																		
Processing																		
Capital costs																		
Plant	unit	2	20	93000	14858	0	193	14665	0	14665	0	1.000	0.000	0.013	0.987	0.000	0.987	0.000
Equipment	unit	0	10	3750	747	17	20	710	0	710	0	1.000	0.023	0.027	0.950	0.000	0.950	0.000
Operating costs																		
Raw Materials																		
Feed grains	kg	336000		0.25	84000	1260	420	82320	42420	17220	22764	1.000	0.015	0.005	0.980	0.505	0.205	0.271
Protein concentrate	kg	0		0	0	0	0	0	0	0	0	1.000	0.005	0.002	0.993	0.299	0.168	0.526
Packaging	units	50000		0.004	200	7	3	190	23	35	132	1.000	0.037	0.013	0.950	0.113	0.174	0.662
Day-old chicks	units	60000		0.4	24000	1152	168	22680	2797	2427	17448	1.000	0.048	0.007	0.945	0.117	0.101	0.727
Labor					9000	0	0	9000	9000	0	0	1.000	0.000	0.000	1.000	1.000	0.000	0.000
Benefits					0	0	0	0	0	0	0	1.000	0.000	1.000	0.000	0.000	0.000	0.000
Electricity					3000	102	72	2826	264	132	2433	1.000	0.034	0.024	0.942	0.088	0.044	0.811
Fuel					600	15	8	577	113	59	404	1.000	0.025	0.014	0.961	0.188	0.099	0.674
Water					30	2	1	28	5	1	21	1.000	0.051	0.022	0.927	0.183	0.046	0.698
Spare parts					1000	21	5	974	29	155	790	1.000	0.021	0.005	0.974	0.029	0.155	0.790
Financial Charges					0	0	0	0	0	0	0	1.000	0.008	0.085	0.907	0.464	0.145	0.298
Rent					0	0	0	0	0	0	0	1.000	0.012	0.013	0.975	0.107	0.447	0.421
Administration					0	0	0	0	0	0	0	1.000	0.019	0.084	0.897	0.296	0.206	0.395
Taxes					300	0	300	0	0	0	0	1.000	0.000	1.000	0.000	0.000	0.000	0.000
Other food-drink					0	0	0	0	0	0	0	1.000	0.052	0.005	0.943	0.080	0.048	0.815
Transport					0	0	0	0	0	0	0	1.000	0.007	0.035	0.958	0.341	0.143	0.473
Broiler to Baku	3 ton truckloads	16.67		300.00	5000	30	180	4790	1705	715	2370	1.000	0.006	0.036	0.958	0.341	0.143	0.474
Total Cost Delivered to Consumption Center																		
					142735	2606	1370	138759	56356	36119	46363							
Revenue																		
Total sales																		
Broiler	unit	50000		3.6	180000													
Quail	unit	500		1	500													
Total																		
					180500													
Net Profit																		
					37765	0.209												
Total Benefit from Sale of By-products																		
					500	3	18	479	171	72	237							
Total Costs less Total Benefit from Sale of By-products																		
					142235	2603	1352	138280	56185	36048	46126							
Import Parity Price, broilers																		
CIF Price	kg	60000		1.28	76846	0	0	76846	0	0	76846	1.000	0.000	0.000	1.000	0.000	0.000	1.000
Import Tariff and VAT	CIF			35.7%	27434	27434	0.00	0.00	0.00	0.00	0.00	1.000	1.000	0.000	0.000	0.000	0.000	0.000
Handling and intracity transport	CIF			20.0%	15369	92	553	14724	5241	2198	7285	1.000	0.006	0.036	0.958	0.341	0.143	0.474
High transactions costs	kg	60000		1.51	90600	90600	0	0	0	0	0	1.000	1.000	0.000	0.000	0.000	0.000	0.000
Transport border to consumer mkt	kg	60000		0.00	0	0	0	0	0	0	0	1.000	0.006	0.036	0.958	0.341	0.143	0.474
Domestic Price, Baku	kg	60000		3.50	210249	118126	553	91569	5241	2198	84131							
Indicators:																		
NPC, output																		
					2.40													
NPC, tradable inputs																		
					1.06													
Value Added in Domestic Prices																		
					153528													
Value Added in World Prices																		
					38005													
EPC																		
					4.040													
Net EPC																		
					4.040													
Cost of Nontradables																		
					84794													
DRC																		
					2.231													



<b>Annex B: Price Comparisons, Import Substitution</b>									
	Unit	2003	2004	2005	2006	2007	2008	Feb-09	2009*
<b>Wheat</b>									
CIF (\$/kg)		0.135	0.164	0.131	0.141	0.210	0.277	0.210	0.162
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825	0.825	0.825
CIF (AZN/kg)		0.132	0.161	0.124	0.126	0.181	0.228	0.173	0.133
Import tariff and VAT (%)	0.00%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Handling and transport to Bacu	10.00%	0.026	0.032	0.025	0.025	0.036	0.046	0.017	0.016
Unexplained transactions costs		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Wholesale (AZN/kg)		0.159	0.194	0.149	0.151	0.217	0.274	0.190	0.150
<b>Rice</b>									
CIF (\$/kg)		0.183	0.214	0.216	0.284	0.245	0.526	0.466	0.259
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825	0.825	0.825
CIF (AZN/kg)		0.179	0.210	0.204	0.254	0.210	0.434	0.384	0.214
Import tariff and VAT (%)	35.70%	0.064	0.075	0.073	0.091	0.075	0.155	0.137	0.076
Handling and transport to Bacu	10.00%	0.018	0.021	0.020	0.025	0.021	0.043	0.038	0.021
Unexplained transactions costs		0.321	0.357	0.457	0.449	0.594	0.644	0.686	0.598
Wholesale (AZN/kg)		0.582	0.664	0.755	0.818	0.900	1.275	1.245	0.909
Consumer (AZN/kg)	10.00%	0.640	0.730	0.830	0.900	0.990	1.403	1.370	1.000
Consumer price/CIF		3.569	3.470	4.070	3.548	4.712	3.236	3.568	4.679
<b>Barley</b>									
CIF (\$/kg)							0.208	0.160	0.104
Exchange rate (AZN/\$)							0.825	0.825	0.825
CIF (AZN/kg)							0.172	0.132	0.086
Import tariff and VAT (%)	18.00%						0.031	0.024	0.015
Handling and transport to Bacu	0.016						0.017	0.016	0.016
Unexplained transactions costs							0.000	0.000	0.000
Wholesale (AZN/kg)							0.219	0.172	0.117
Consumer (AZN/kg)	10.00%						0.241	0.189	0.129
Consumer price/CIF							1.158	1.183	1.243
<b>Corn</b>									
CIF (\$/kg)		0.111	0.100	0.099	0.128	0.167	0.234	0.172	0.109
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825	0.825	0.825
CIF (AZN/kg)		0.109	0.099	0.094	0.114	0.143	0.193	0.142	0.090
Import tariff and VAT (%)	18.00%	0.020	0.018	0.017	0.020	0.026	0.035	0.026	0.016
Handling and transport to Bacu	10.00%	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.016
Unexplained transactions costs		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Wholesale (AZN/kg)		0.145	0.133	0.127	0.151	0.185	0.244	0.184	0.123
Consumer (AZN/kg)	10.00%	0.159	0.146	0.140	0.166	0.204	0.269	0.202	0.135
Consumer price/CIF		1.463	1.480	1.488	1.456	1.424	1.392	1.425	1.497
<b>Poultry/Chicken</b>									
CIF (\$/kg)		1.358	1.591	1.658	1.374	1.439	1.553		
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825		
CIF (AZN/kg)		1.334	1.563	1.569	1.227	1.235	1.281		
Import tariff and VAT (%)	35.70%	0.476	0.558	0.560	0.438	0.441	0.457		
Handling and transport to Bacu	20.00%	0.267	0.313	0.314	0.245	0.247	0.256		
Unexplained transactions costs		-0.104	-0.380	-0.224	0.490	0.823	1.506		
Wholesale (AZN/kg)		1.973	2.055	2.218	2.400	2.745	3.500		
Consumer (AZN/kg)	10.00%	2.170	2.260	2.440	2.640	3.020	4.122		
Consumer price/CIF		1.627	1.446	1.555	2.152	2.446	3.218		

	Unit	2003	2004	2005	2006	2007	2008	Feb-09	2009*
<b>Smoked, Semi-smoked Sausage</b>									
CIF (\$/kg)		0.915	0.980	1.373	1.669	1.687	2.010		
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825		
CIF (AZN/kg)		0.899	0.963	1.299	1.490	1.448	1.658		
Import tariff and VAT (%)	17.70%	0.159	0.170	0.230	0.264	0.256	0.293		
Handling and transport to Bacu	10.00%	0.180	0.193	0.260	0.298	0.290	0.166		
Unexplained transactions costs		0.735	0.729	0.429	0.348	0.752	0.003		
Wholesale (AZN/kg)		1.973	2.055	2.218	2.400	2.745	2.120		
Consumer (AZN/kg)	10.00%	2.170	2.260	2.440	2.640	3.020	4.618		
Consumer price/CIF		2.414	2.348	1.878	1.772	2.086	2.786		
<b>Pasturized Milk</b>									
CIF (\$/kg)		0.783	0.469	0.446	0.402	0.375			
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858			
CIF (AZN/kg)		0.769	0.461	0.421	0.359	0.322			
Import tariff and VAT (%)	35.70%	0.275	0.165	0.150	0.128	0.115			
Handling and intracity transport	20.00%	0.154	0.092	0.084	0.072	0.064			
Transport border to consumer mkt									
Unexplained transactions costs		-0.780	-0.246	0.017	0.150	0.345			
Wholesale (AZN/kg)		0.418	0.473	0.673	0.709	0.845			
Consumer (AZN/l)	10.00%	0.460	0.520	0.740	0.780	0.930	1.254		
Consumer price/CIF		0.598	1.127	1.756	2.173	2.892			
<b>Butter</b>									
CIF (\$/kg)		1.136	0.988	0.958	1.320	1.329			
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825		
CIF (AZN/kg)		1.116	0.971	0.906	1.178	1.140			
Import tariff and VAT (%)	35.70%	0.398	0.347	0.324	0.421	0.407			
Handling and transport to Bacu	50.00%	0.558	0.485	0.453	0.589	0.570			
Unexplained transactions costs		0.156	0.725	1.135	0.594	1.292			
Wholesale (AZN/kg)		2.227	2.527	2.818	2.782	3.409			
Consumer (AZN/kg)	10%	2.450	2.780	3.100	3.060	3.750	5.440		
Consumer price/CIF		2.196	2.864	3.420	2.597	3.289			
<b>Cheese</b>									
							<b>Baku</b>		
CIF (\$/kg)							2.500		
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825		
CIF (AZN/kg)		0.000	0.000	0.000	0.000	0.000	2.062		
Import tariff and VAT (%)	35.70%	0.000	0.000	0.000	0.000	0.000	0.736		
Handling and intracity transport	20.00%	0.000	0.000	0.000	0.000	0.000	0.412		
Transport border to consumer mkt							0.080		
Unexplained transactions costs		3.764	3.491	3.491	3.409	3.600	0.346		
Wholesale (AZN/kg)	10.00%	3.764	3.491	3.491	3.409	3.600	3.636		
Consumer (AZN/kg)	kg	4.140	3.840	3.840	3.750	3.960	4.000		
Consumer price/CIF		2.196	2.864	3.420	2.597	3.289			
<b>Chicken Eggs</b>									
							<b>Baku</b>		<b>Ganja</b>
CIF (\$/unit of 10)		0.247	0.241	0.279	0.270	0.329	0.348	0.348	
Exchange rate (AZN/\$)		0.982	0.983	0.946	0.893	0.858	0.825	0.825	
CIF (AZN/unit of 10)		0.243	0.237	0.264	0.241	0.283	0.287	0.287	
Import tariff and VAT (%)	35.70%	0.087	0.085	0.094	0.086	0.101	0.102	0.102	
Handling and intracity transport	10.00%	0.024	0.024	0.026	0.024	0.028	0.029	0.029	
Transport border to consumer market		0.080	0.080	0.080	0.080	0.080	0.080	0.080	
High transactions costs		0.132	0.227	0.257	0.378	0.621	0.672	0.422	
Wholesale (AZN/unit of 10)		0.565	0.652	0.722	0.809	1.113	1.170	0.920	
Consumer (AZN/unit of 10)		0.650	0.750	0.830	0.930	1.280	1.346	1.086	
Consumer price/CIF		2.679	3.167	3.143	3.862	4.527	4.690	3.783	
		58							

## **Annex C: Shadow Price of Foreign Exchange**

The international competitiveness of sectors and sub-sectors in Azerbaijan's economy, either in domestic or foreign markets, is highly dependent on key variables that are part of the macroeconomic policy environment established by different government institutions. Two of these variables are the real effective exchange rate (REER) and the shadow exchange rate (SER).<sup>18</sup> These can have an important influence on the domestic resource cost ratios in individual sub-sectors and on the overall structure of the economy.

### ***Macroeconomics and Real Effective Exchange Rate***

High oil prices and increased oil production have in the past five years created a "Dutch disease" that has suppressed the competitiveness of the non-oil sector through an appreciating REER. A rapid increase in oil production from 0.3 million barrels per day in 2005 to about 1.1 million barrels per day by 2009, with oil prices from 2005 to mid-2008 ranging from US\$30 to US\$130 per barrel, led to an increase in government expenditures by a cumulative 160% in nominal terms. These expenditures were directed towards supporting public investment projects in specific areas of infrastructure and raising the level of public sector wages and social benefits. In addition, the government initiated a regional socio-economic development program with the objective of facilitating rural employment, growth, trade expansion, and investment as a part of its fiscal policy priorities.

In terms of monetary policy, the Azerbaijan government established a regime of financial stability by: (1) liberalizing capital exports and increasing the volume of government securities to limit the total money supply, and (2) by intervening in the foreign exchange market to reduce the appreciation of the Azeri manat against other currencies in order to support the competitiveness of non-oil sectors of the economy. This was accompanied by efforts to increase domestic competition and apply the discipline of the market to state-owned enterprises. Despite these efforts, there was a substantial increase in the rate of inflation, rising to 22% in 2008 in the face of a nominal exchange rate that remained virtually constant in US dollars.

As shown in Table C-1 and Figure C-1, from 2005 to 2008, the Azerbaijan economy experienced an appreciation of the REER, following several years of depreciation.<sup>19</sup> This was because of the oil boom coupled with the expansion of the government expenditure, accompanied by substantial growth of the money supply, which raised the prices of non-tradable domestic factors of production relative to the prices of tradable goods and services. The average annual percentage change in the REER during the years of appreciation was 11.6, with the highest increase being recorded in 2008, when oil prices set a record level and the Consumer Price Index grew at approximately 20%. This trend was sharply reversed in late 2008 and early 2009 as a result of the economic crisis, which resulted in a depreciation of the real effective exchange rate due to the decrease in oil prices and a substantial decrease of the domestic CPI.

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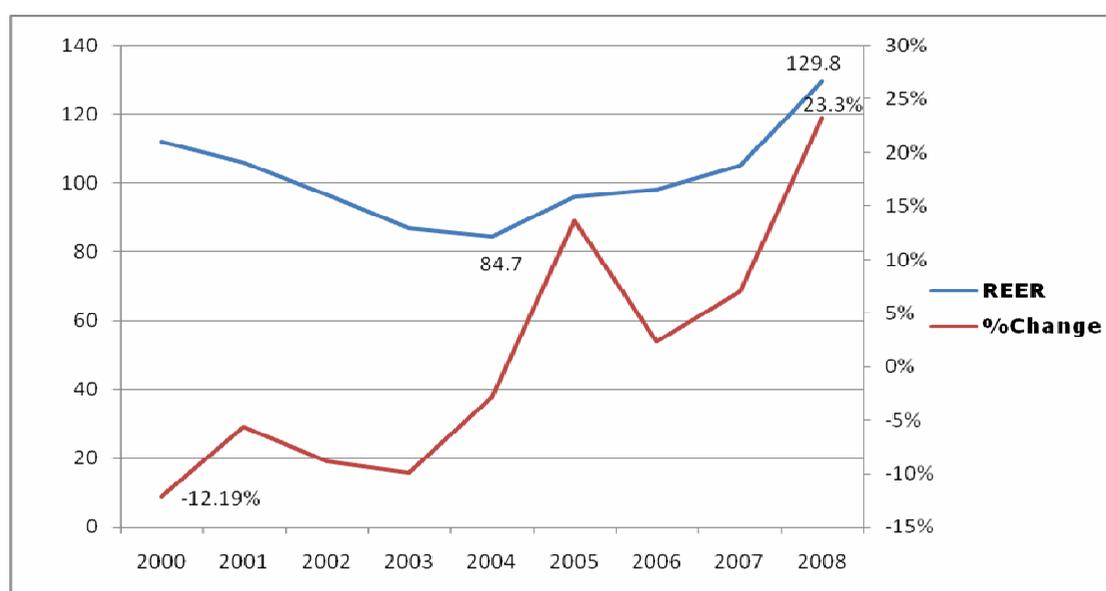
<sup>18</sup> The REER is the weighted average of a country's currency relative to an index or basket of other foreign currencies (of the major trading partners) adjusted for the effects of inflation. The shadow exchange rate is the second-best exchange rate in the presence of trade distortions, which reflects the true value of foreign exchange to consumers.

<sup>19</sup> An appreciation of the REER, according to the IMF's definition, is indicated by an increase in the value of this variable

**Table C-1: Real Effective Exchange Rate for 2000 - 2008**

<b>Year</b>	<b>ln REER</b>	<b>Change in REER</b>
2000	112.31	-12.19%
2001	106.28	-5.7%
2002	96.8	-8.9%
2003	87.18	-9.9%
2004	84.67	-2.9%
2005	96.2	13.6%
2006	98.46	2.3%
2007	105.33	7.0%
2008	129.83	23.3%

**Figure C-1: REERs and % Change in REER over 2000 - 2008**



### **Shadow Exchange Rate**

The real effective exchange rate shows the influence of macroeconomic policy on changes in the competitiveness of domestic products under various scenarios. The Shadow Exchange Rate (SER), on the other hand, shows the impact on competitiveness of price distortions in the domestic market.

Market distortions influence domestic prices relative to border prices – either FOB for exports or CIF for imports. This determines the extent to which Azerbaijan’s currency is over or undervalued in the presence of those distortions. The SER enables us to measure the impact of distortions, such as trade taxes, subsidies, and non-tariff barriers on the official exchange rate.

SER is the economic price of foreign currency in the presence of distortions, which is estimated as the ratio of the value of traded goods and services measured in domestic

prices to their value measured in border prices. One reason for the deviation of domestic prices from border prices is the existence of trade taxes. These cause domestic prices to be higher than border prices for import duties and to be lower than border prices for export taxes. Subsidies have the reverse effect. In addition, where taxes are neutral with respect to trade, that is, they are assessed on both trade and on domestic production; they do not distort domestic prices.

In addition to trade taxes and subsidies, non-tariff barriers to trade may also play an important role. In fact, the evidence suggests that additional upward pressure is placed on the exchange rate in Azerbaijan by the structure of taxes because of extensive non-tariff barriers to imports resulting from high transactions costs, monopoly, and other factors. The difficulty of measuring the effects of these barriers accurately precludes incorporating them directly into any estimate of the SER, but they are far too important to be left aside. Based on partial information, it is possible to estimate the order of magnitude of the effects of non-tariff barriers, using the analysis shown in Annex B for products for which actual comparisons can be made between CIF prices and domestic wholesale or retail prices. These show the ratio of the domestic wholesale price to the CIF price to be anywhere from 1.56 to 3.98, after subtracting out the costs associated with transport and handling of imports. Let us say, conservatively, that on average the domestic wholesale price is twice the average CIF price. This implies that for an official exchange rate of 0.81 manats per USD, the shadow exchange rate would be 1.62 manats per USD, reflecting an overvaluation of 100% when the exchange rate is defined in this way.<sup>20</sup> It is the latter exchange rate that is relevant for consumers of imported goods and producers of goods in competition with imports, whereas it is the former exchange rate, or any deviations of it because of export taxes, which influences exporters. Of course, it should be pointed out that this simply assumes that the equilibrium exchange rate can be determined by “netting out” the effect of current tariff and non-tariff barriers from the nominal exchange rate; without taking into account other policy or structural factors which impact on the longer-term trade/current account balance and thus on the equilibrium exchange rate. Thus it represents a gross oversimplification; and is essentially an explanatory device used to capture/quantify the magnitude of the distortive barriers in trade policy at a particular point in time, rather than a practical estimation of what the value of equilibrium exchange rate is.

### ***Other Approaches***

The REER analysis essentially tells us how the real exchange rate has been evolving but it does not say anything about where it ought to be. That requires estimating the equilibrium real exchange rate (ERER), which can be defined in a number of ways. At one time, the ERER was defined at the exchange rate that existed during a particular period in which the balance of payments seemed to be in equilibrium. Subsequent movements of the REER from this base period were then tracked to see whether there had been appreciation or depreciation of the REER compared with the

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<sup>20</sup> Under these assumptions, the second-best shadow exchange rate, expressed in terms of manats per dollar, is that exchange rate that would incorporate the effect of tariff and non-tariff barriers in raising domestic prices to twice the level of border prices at the official exchange rate. Assuming goods worth one hundred dollars were being imported with no trade barriers at the official exchange rate of 0.81USD/AZN, these goods would be worth 81 manats on the domestic market. With trade barriers, however, the goods would cost 162 manats. Their prices would be double those that would prevail in the absence of trade distortions. It is these higher prices that reflect the value at the margin of foreign exchange to consumers of imported goods.

ERER, resulting in either overvaluation or undervaluation. Movements of the REER away from equilibrium were thought to be essentially the result of monetary and exchange rate policy.

It became increasingly recognized, however, that there were any number of reasons why the ERER might change independently of monetary and exchange rate policy. These included changes in the terms of trade, in trade policy, in the relative importance of tradable and non-tradable GDP, and a host of other variables. Thereafter, a number of approaches to exchange rate assessment evolved, which included:<sup>21</sup>

1. **Macroeconomic Balance (MB) Approach:** Calculates the difference between the current account balance projected over the medium term at prevailing exchange rates and an estimated equilibrium current account balance, or CA norm. The exchange rate adjustment required to achieve this norm is then calculated using country-specific elasticities.
2. **Reduced-Form Equilibrium Exchange Rate Approach:** Estimates directly an ERER for each country on the basis of medium-term fundamentals such as its net foreign asset (NFA) position, the relative productivity differential between the tradable and non-tradable sectors, and the terms of trade. The exchange rate adjustment needed to restore equilibrium over the medium term is then calculated as the difference between its ERER and its current value.
3. **External Sustainability Approach:** Calculates the actual current account balance and the balance that would stabilize its NFA position at some benchmark level. This difference is translated into the required exchange rate adjustment using the aforementioned trade elasticities and assumptions regarding the country's rate of growth.

Each of these approaches is quite demanding in terms of the availability of data and parameter estimates such as trade elasticities. The MB approach was applied to Azerbaijan in the IMF 2008 Article IV Consultation Staff Report. This approach suggested that the manat was moderately undervalued by about 16%, but the report acknowledged that the temporary nature of the country's oil boom implied that this did not represent a serious exchange rate misalignment. However, subsequent projections of natural gas exports are more optimistic and suggest that consideration of Azerbaijan's ERER should be based less on short-term perspective and more on how to deal with reasonably sustained petroleum revenues in the future. This requires consideration of a range of objectives, including public investment to improve infrastructure but also providing a sustainable environment for the expansion of non-oil productive activities, which will contribute much more to employment and income of the general population, and will require avoidance of excessive overvaluation of time (essentially through a conservative oil revenue management strategy designed to smoothen oil revenue inflows over the medium to long term).

Balance of payments disequilibrium can be manifest not only in terms of current account surpluses or deficits but also in terms of the distortions introduced into the trade regime to avoid these surpluses or deficits. Thus one response to appreciation of

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<sup>21</sup> International Monetary Fund, "Methodology for CGER Exchange Rate Assessments," November 8, 2006.

the REER in Azerbaijan was to increase the degree of protection on imports. Therefore, a key parameter in determining the EREER is the likely persistence of trade distortions. If the magnitude of these distortions were reduced, as a result of Azerbaijan's accession to WTO or other independent policy changes, this would significantly lower the second-best, or shadow, exchange rate. At the limit, if all distortions were removed, one could estimate the first-best shadow exchange rate that would equilibrate the demand and supply of foreign exchange at a particular point in time. The relation between this rate and the EREER described above could then be estimated using one of the approaches listed.

## Annex D: Problems Cited by Survey Respondents

<u>Product</u>	<u>High Costs of Customs</u>	<u>High Transportation Cost</u>	<u>Finding export buyers</u>	<u>Lack of good quality packing materials</u>	<u>Access to Credit and financial resources</u>	<u>Time loss while gathering the product from farmers</u>	<u>Lack of special packaging equipment</u>	<u>Lack of info on markets</u>	<u>Delay at customs</u>	<u>High Sorting packing costs</u>
Apples	42%	25%	8%	50%	33%	8%	8%	8%	8%	17%
Cherries	43%	43%		43%	29%					
Persimmons		25%	25%	25%	25%					
Grapes					100%					
Pomegranate		25%				25%	25%	25%		
Hazelnut					60%					
Early Potatoes		25%		50%						25%
Tomatoe/Cucumber		17%			25%				8%	8%
PomJuice			20%		20%		20%			
Poultry		14%	14%		29%			14%		
Dairy					9%		9%			
B.Finishes	80%				60%					
Furniture					33%					
Barley					50%					
Kiwi			100%		100%					
Rice			25%	25%	75%					
Tomatoe Paste			75%		75%					
Wheat			25%		25%					
Corn					100%					
Feed Meal					100%			100%		
Feykhoa					100%					
Apple Juice			100%		100%					
Carpet										
PomConcentrate										
Sausage										
Catering					50%					
Computers					67%					
Uniform					100%					
Recycled Brine										
Poultry	50%				50%					

## Annex E: Financial Information on Farmers, Traders, and Processors

<u>Trader/Proc</u>	<u>Product</u>	<u>Working Capital</u>	<u>Duration</u>	<u>%</u>	<u>Source</u>	<u>Working Capital</u>	<u>Duration</u>	<u>%</u>	<u>Destination</u>	<u>Fixed Capital</u>	<u>Duration</u>	<u>%</u>	<u>Source</u>
<u>Farmer</u>		<u>Borrowed</u>				<u>Lent</u>							
Trader	Apples	30000	2 m		friends	20000	1 m		trader	22000	1 m		18 bank
Trader	Apples	20000	6m		friends	0				0			
Trader	Apples	10000			friends	500-1000	6 m		farmer	20000	12 m		friends
Trader	Cherries	30000	2 m		friends	20000	1 m		trader	22000	1 m		18 bank
Trader	Cherries	20000	6 m		friends	0				0			
Trader	Cherries	10000			friends	500-1000	6 m		farmer	20000	12 m		friends
Farmer	Persimmons	0				800				52000	36 m		7 bank
Trader	Persimmons	10000	3 m		3 friends	0				0			
Farmer	Grapes	0				3000				52000	36 m		7 bank
Farmer	Grapes	100000	12 m	16		0				0			
Farmer	Grapes	0		0		0				55000	60 m		7 bank
Trader	Pomegranate	8000	12 m		20 bank	0				0			
Trader	Hazelnut	0				0				7000	24 m		10 friends
Trader	Hazelnut	0				0				3000	24 m		10 friends
Trader	Tomt/Cucumr	7000	18 m		18 bank	0				0			
Trader	Tomt/Cucumr	0				10000	1 m		farmer	0			
Trader	Tomt/Cucumr	0				5000			farmer	0			
Farmer	Tomatoe	0				5000				0			
	Cucumber	0				3000				0			
Farmer	Tomt/Cucumr	0				20000				0			
Farmer	Tomatoe	0				3000				0			
	Cucumber	0				4000				0			
Processor	PomJuice	15000	24 m		21 bank	0				0			
Processor	PomJuice	0				3000	1 m		farmer	50000	5 y		6 bank
Processor	Dairy	12000	36 m		24 bank	0				0			
Processor	Dairy	4000			friends	0				2500			friends
Processor	Dairy	0				0				30000	36 m		30 bank
Processor	Dairy	0				46000	1 m		trader	40000	60 m		7 bank
Processor	Dairy	30000			friends	0				30000			friends
Processor	B.Finishes	0				0				300000	5 m		7 national fund
Processor	Furniture	20000	24 m		22 bank	0				0			
Processor	Furniture	0				30000	12 m	25		0			
		out of 88 16 borrowed			<b>9- friends</b>	out of 88 16 borrowed			<b>5- farmer</b>	out of 88 14			<b>8- bank</b>
					<b>5- bank</b>				<b>3- trader</b>				<b>6- friends</b>
													<b>1- national fund</b>