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PROCESSING SECTOR IN THE REPUBLIC OF UZBEKISTAN

By Adukakhkhor Abduganiyev

A B S T R A C T

The survey of the processing sector for fruit and vegetables reveals a massive under utilisation of processing capacity across the spectrum of enterprises in Uzbekistan. A continuation of this situation can only contribute to inefficiencies in the sector as a whole and to an erosion in the quality and volume of the raw material base, as primary producers are left to bear the consequences of late payments, low prices and general uncertainties about the future outlook for the sector. With a view to aligning supply with demand for processed products and allowing capital investment to take place in a competitive and efficient production environment, the report suggests that a programme of rationalisation be undertaken which would allow the more progressive processing enterprises to operate closer to full capacity while encouraging the weaker enterprises to cease production or amalgamate with others.

The objectives of the study are: to review the financial, economic and technological situation of the fruit and vegetable processing sector in relation to developments in the domestic and international markets; to evaluate the effect of privatisation and the recent institutional changes.

Keywords: The Republic of Uzbekistan, processing enterprises, “Uzplodoovoshvinprom” holding company, “Mevasabzavot” unions, “Uzplodoovoshvinpimpex”, “Uzplodoovoshvinpromservice”, Uzbek Government Standard Institute, Wine and wine products, Tomato paste.

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1. INTRODUCTION

Uzbekistan has large areas of irrigated land and a favourable climate for the production of fruits and vegetables. The country has an important processing industry consisting of wineries (wines, vodka, and brandy), canneries (tomato paste, fruit products and marinades) and drying plants (dried fruits and raisins). Total production exceeds domestic demand. During the Soviet Union era Uzbekistan's surpluses were channelled to other republics within the union but, following its break-up, these flows of goods were seriously interrupted. Newly independent states opened their domestic markets to third country imports and consumers were confronted with a greater choice of product quality and presentation. In addition, the difficult economic environment prevailing in these countries creates difficulties for payment. This situation has had a serious impact on the position of Uzbekistan's food processing industry, not only as producers of export products but also as suppliers of the domestic market.

The objectives of the study are:

- to review the financial/economic and technological situation of the fruit and vegetable processing sector in relation to developments in the domestic and international markets;
- to evaluate the effect of privatisation and the recent institutional changes;
- to identify the problems and constraints; and
- to provide policy recommendations.

In 1996, FAPU, in the course of reviewing the privatisation of agro-industrial enterprises, surveyed, among others, enterprises engaged in the fruit and vegetable processing and the wine sector. The report[1] from that study also provides useful information on the sector.

A FAPU team consisting of an economist, a food processing technologist and two local experts conducted a survey of nineteen companies. The companies were selected at random around the country among those belonging to the "Uzplodoovoshvinprom" holding and the "Mevasabzavot" unions. Enterprises visited comprise private companies and joint ventures. The questionnaire used is appendixed to this report The food processing expert of the team had independently visited a further 20 companies in the sector during an earlier assignment with a TACIS project in Samarkand. Furthermore, interviews were conducted with relevant organisations including: "Uzplodoovoshvinprom" holding, regional unions of "Mevasabzavot", "Uzplodoovoshvinpimpex", "Uzplodoovoshvinpromservice" and the Uzbek Government Standard Institute.

The report sets out to review briefly the recent legislation pertaining to the fruit and vegetable industry and its processing environment (ch.2), as well as the relevant institutions and organisations which assist and/or regulates the industry (ch.3). Chapters 4 and 5 describe the main products, the market for these products and their distribution. Chapter 6 presents an overview of the processing sector

[1] FAPU research report "The Privatisation of Agro-Industrial Enterprises in the Republic of Uzbekistan" 1996

while chapter 7 looks at the processing technology employed. Chapter 8 reviews the management of processing enterprises. Chapter 9 and 10 present conclusions and policy recommendations.

2. LEGISLATION

The Government has issued a number of decrees and resolutions to promote the development of the fruit and vegetable processing sector. The most important recent legislation pertaining to this sector is summarised hereunder:

Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 363 of July 18, 1997 on measures to further de-monopolisation and specialisation of the fruit and vegetable sector of the Republic:

This Decree provides for the establishment of the "Uzplodoovoshvinprom" holding company and regional "Mevasabzavot" unions by the dissolution of Association "Uzplodoovoshvinprom". The holding company is a nationally based open joint stock company which incorporates the activities of some 89 listed farms engaged in the production of fruit and vegetables as well as the activities of a number of designated processors. The State equity in these companies as well as the undistributed shares in these companies are held in trust by the holding company. The holding company is entrusted with furthering the privatisation process, developing new organisational forms of agro-industrial integration and co-operation, conducting common technical and investment policy and the introduction of advanced technologies in the production and processing sectors. In addition, the holding company is entrusted with the task of attracting foreign investment, establishing joint ventures and carrying out marketing research of the domestic and export markets. In particular, the holding company is requested to increase the volume of exports from its enterprises. On the other hand, regional "Mevasabzavot" unions operate independently and report to the regional khokimiats. Their main function is to co-ordinate the activities of specific enterprises engaged in the production, procurement, processing and marketing of fruit and vegetables that are not included in the holding company (see also par. 6).

Decree of the Cabinet of Ministers No. 338 of August 6, 1998 on measures for purchasing, processing and marketing of fruit and vegetable products of 1998 harvest:

The Decree provides for a number of measures aimed at increasing production of fruit and vegetables and thereby the output from processing enterprises. The measures include the setting of priorities in the allocation of land for fruit and vegetables, additional funding for the procurement of products from the 1998 harvest so as to increase the use of existing production capacities, improvement in production statistics to assist in improving forecasting and write-off and rescheduling of certain debts of enterprises.

Resolution of the CM of the RU No. 137 of April 1, 1998 on additional measures for liberalisation of foreign trade activities, to encourage an increase in production and marketing of export products and to improve the system of foreign trade reporting:

The Resolution provides specialised foreign trade organisations and companies within the ministries, institutions, corporations, concerns, associations and companies involved in export of commodities (works and services), with the right to setup trading houses and representations outside the country. In addition, it provides that raw products and materials and parts of equipment required for production of goods for export, may be imported duty free.

Resolution of the CM No. 221 of May 21, 1998 on additional measures for strengthening of state monopoly in production and turnover of alcohol products and increase in receipts to the budget from sale of alcohol and tobacco products in the RU

The Resolution contains provisions for the protection of consumers from low quality alcohol and alcohol marketed under falsified labels, while at the same time strengthening government's control over production and sales of alcohol and tobacco thus ensuring appropriate budget revenue.

3. INSTITUTIONS

The Association 'Uzplodoovoshvinprom' was established in 1994 out of the State co-operative entity with the same name, which in turn had been created in 1991. The Association contained more than 1000 organisations involved in the production, storage, processing and sale of fruit and vegetables, including 330 kolkhozes. By decree of the Cabinet of Ministers, No. 363 of July 18, 1997, the Association was abolished and 'Uzplodoovoshvinprom' holding (hereafter called the "holding") and regional unions "Mevasabzavot' (hereafter called the "unions") were created.

The "holding" is a joint stock company which incorporates 140 legal entities, including 89 collective farms. Each entity retains its economic independence and rights of a legal entity. The farms are organised in groups. Each group, normally comprising between three and seven farms, is linked to a processing enterprise which is a joint stock company (JSC) and acts as the lead organisation or "integrator". There are 27 such groups referred-to as "firms". In addition, to the aforementioned JSCs, there are 14 other JCSs incorporated within the "holding".

By decree, all the JSCs in the holding should transfer 25% of their shares (the state owned shares) for management by the "holding". The staff are to receive 26% of the shares, while 24% are destined for free sale (of which not less than 10% should be offered for sale to agricultural producers within the "firms") and 25% for sale to foreign investors. The share distribution schedule is not binding though most processors have complied with it. Of 41 JSCs in the holding, fifteen have not sold the foreign invested segment of the shares. The share holding of some alcohol

producing enterprises are held directly by the "holding" while there are a number of private enterprises that are associate members of the "holding".

The "holding" also incorporates the research institute "Uzmevasabzavotdesign" design, a large transport company and the potato seed company "Uzkartofel". The objectives of the "holding", as defined in the decree, are all embracing and aim at the development of the sub-sector right through the chain from primary production and processing to marketing and exporting. In addition, they aim at strengthening the privatisation process, establishment of joint ventures with foreign companies, and increasing the volume of exports.

Processors and farms of the former Association "Uzplodoovoshvinprom" which were not integrated in the "holding" were incorporated into the regional "Mevasabzavot' unions and report to the regional khokimiats. The latter are entrusted also with the management of the state shares of the JSC involved.

All general managers of the processing companies in the "holding" visited by the FAPU team declared their satisfaction with the arrangement of the "holding". By contrast, the managers of the "unions" processing enterprises expressed dissatisfaction at having been omitted from the more comfortable arrangement of the "holding". It was suggested that as a "union" enterprise it is more difficult to get the attention of foreign investors and other credit suppliers. "Union" enterprises are obliged to contribute 10% of their profits to the "unions" and there is greater interference from the khokimiats. Moreover, the "unions" themselves have very limited resources, apart from some staff, to assist the processors and farms. The largest and most efficient processors and agricultural producers have been incorporated within the "holding". Several "unions" expressed doubt on their own sustainability as the profits of enterprises are too meagre to sustain them.

4. THE PRODUCTS

4.1 Wine and wine products

Climate and soils in many different areas of Uzbekistan are suitable for growing quality grade wine grapes. Following the Gorbachov's anti-alcohol decree of 1986, the population of high grade vineyards was significantly reduced and, on the main, only table varieties survived. The sector continues to suffer the consequences of this decree with the production of relatively poor quality wine produced from table varieties or a mixture of table and technical varieties of grapes.

The feature which distinguishes table varieties from technical varieties of grapes is the maturation index i.e. the ratio between the sugar and the acidity content (acidity measured as acetic acid). For each variety of grape destined for processing, and taking into account location, climate and the "cru "[2], there is a predetermined value of this index that shows the best period for harvesting.

[2] "cru" is defined as "wine obtained from vineyards of defined characteristics".

Table grapes usually have a higher sugar content than technical varieties and thus have a higher maturation index. Mixing the varieties or harvesting when the index values are at variance with the recommended levels, may affect the final acidity of the wine. Acceptable pH values for wines are around 3 (less for champagne and higher for red wines) but never higher than 3,3. The Ph values for young wines in Uzbekistan seldom fall below 4, thus affecting the taste and the shelf life of the wine.

The maturation index for grapes is not well known in Uzbekistan. In any event, it is practically impossible to have an exact determination of the index due to the mixture of grape varieties prevailing. Besides, there are many other factors contributing to the inferior quality of the wine produced, including:

- inferior processing at the pressing stage;
- lack of control on the fermentation temperature;
- inefficient use of sulphur dioxide;
- non utilisation of stabilising agents such as casein and silicate.

Very few Uzbek dry wines can be considered to be of acceptable quality by international standards. Almost 85% of the wines are fortified. Their high sugar and alcohol content gives a sweeter taste and longer shelf-life, even in circumstances where the proper treatment has not been applied.

The Uzbek State-Standards differ substantially from the European standards. While a detailed discussion of this issue is outside the scope of the present work some comment is appropriate. At present only about 15% of the total production goes into dry wines. Thus there seems to be an over-emphasis on the production of fortified wines. By contrast, vine products in most European countries are defined as those produces obtained from the processing of fresh or naturally dried grapes. Fortified wines are classified as "Special Wines". The permitted alcohol content of fortified wines ranges between 18 to 24 degrees and no extra sugar may be added. The total acidity is also limited to 24 gr./lt. as acetic acid. Under this definition, scarcely any Uzbek wine could be exported to Europe.

Sparkling wines produced in Uzbekistan are of good quality and have a better appearance than most of the other wine products. They differ from the western production mainly in respect of the sugar content, gas bubble size and bubble retention period (which derives from the applied production technology). Gas bubble dimensions in Uzbek production are usually too large and the consequent retention period in solution too low and this perhaps constitutes the main concern for quality. Uzbek sparkling wines are usually sweeter than the corresponding European products since they still comply with the Soviet State Standards. The market for sweet sparkling wines in Europe, and likewise the production, has declined in recent years.

The wine classification operative in Uzbekistan and Italy can be compared and contrasted from Tables 1 and 2. In the first instance, the Uzbek classification does not take into account the geographical location of the grapes used in the manufacture. In addition, dry Uzbek wines are all classified under table wines with

no indication as to quality and premium. Moreover, sugar content is not a feature of the Italian classification.

Table 1. Uzbek wine classification

	Type	Alcohol % volume	Sugar gr./ml.
	Plain wines		
	Table wines		
	dry	9.0 to 14.0	up to 0,3
	half-dry	9.0 to 12.0	1.0 to 2.5
	half-sweet	9.0 to 12.0	3.0 to 8.0
	Fortified wines		
	Strong	17.0 to 20.0	1.0 to 14.0
	Dessert		
	semi- sweet	14.0 to 16.0	5.0 to 12.0
	sweet	15.0 to 17.0	14.0 to 20.0
	liqueurs	12.0 to 17.0	21.0 to 35.0
	Flavoured wines	16.0 to 18.0	6.0 to 16.0
	Wines with carbon dioxide		
	Sovjetskoje Champagne		
	brut	10.5 to 12.5	up to 0,3
	very dry	10.5 to 12.5	0.8
	dry	10.5 to 12.5	3.0
	semi- sweet	10.5 to 12.5	5.0
	sweet (only for bulk	10.5 to 12.5	8.0

	storing)		
	Sparkling wines		
	red	11.0 to 13.5	7.0 to 8.0
	rosè	10.5 to 12.5	6.0 to 7.0
	muskat	10.5 to 12.5	9.0 to 12.0
	Gas added wines	9.0 to 12.0	3.0 to 8.0

Table 2. Italian wine classification

	Plain
WINES	Sparkling
	Spumanti
	Special

	Table wines (maximum freedom on grape variety selection)
PLAIN WINES	Table wines with geographical indication (I.G.). Produced in defined areas.
Over-pressure from 0 to 1 bar	Table wines V.Q.P.R.D. (produced in defined areas and from determined grape varieties)

	Gas added with CO_2 (the cheapest)
(2)SPARKLING WINES Overpressure from 1 to 2,5 bar	Natural: [a] table wines with geographical indication (I.I.) quality wines (V.Q.P.R.D.)

	Gas added (the cheapest)
SPUMANTI	Natural (V.S.)
Overpressure > 3 bar	Quality wines (V.S.Q.). Produced from quality grapes
	From D.O.C. grape varieties (V.S.Q.P.R.D.)
	Flavoured (from determined grape varieties such as moscato, malvasia, brachetto etc.)

	Fortified (with alcohol addition)
SPECIAL WINES	Flavoured (from determined grape varieties and alcohol added)
	Passiti (from slightly dried grapes)

Due to shortage of wine grape varieties, processing plants are often compelled to make use of table grapes or mixes of both. The Government Decree for planting new selected vines is still being implemented and far from completion. The list hereunder contains some of the most suitable quality grapes for wines recommended by the Shroeder Institute:

Table 3. Suggested grape varieties to be grown in the Samarkand Oblast

Crop / variety	Yield (t/ha)	Sugar content (%)	Harvesting period
Bahian Chirei	25 to 35	20 to 22	end September
Kuldzinski	20 to 22	17 to 21	early September
Rkatziteli	15 to 23	17 to 20	early September
Riesling	8 to 10	17 to 19	end August
Bahrsiori	12 to 14	18 to 19	early September
Cabernet	12 to 14	17 to 20	early September

4.2 Tomato paste

Tomato paste is produced with the "cold break process" to a concentration of 28-30° Brix[3], and sometimes to 34-36° Brix. The "cold break" differs from the "hot break process" mainly in the crushing temperature. In the "cold break" system tomatoes are crushed at normal temperature while in "hot break" the temperature is raised to 85-90°C. A higher temperature kills the yeast activity and more pectin is retained in the juice. The result is that, given the same concentration, the consistency of "hot break" products is greater than for "cold break" products. Consistency is often specified as part of supply contract clauses and is measured in Bostwick degrees using a simple instrument.

Paste consistency is an appreciable factor for sauce makers, especially for ketchup, because it allows the producer to economise on thickeners. "Hot break" products often fetch higher prices than "cold break" products, although the differential is believed to have reduced significantly in recent times. The international price for tomato pastes relates mainly to the final sugar concentration, measured in Brix degrees, but colour may also be a factor in attracting premium prices. It is not unusual to see tomato paste produced in different periods and stored in the same finished product store having sharply different colours. Usually pastes produced with early or late tomatoes are darker in colour and more bitter in taste. The pH range is also often specified in supply contracts.

Mould count is always a crucial issue in tomato paste which, in turn, depends on the quality of the raw material and on the pasteurisation procedures adopted. Furthermore, the quality of the paste is affected by:

- quality of pulping which is usually carried out in three stages by passing it through a 1,0 mm hole diameter sieve, a 0,7 mm sieve and, finally, a 0,4 mm sieve. It has been observed that in many cases the last stage is not effective due to worn out equipment;

[3] "Brix degree" is a unit of measure of the sugar content in a solution as determined by a refractometer.

- concentration temperatures and time. The most recent models of concentrators have drastically reduced the dwell times and temperatures requirement;
- filling operations. Tomato paste is normally filled hot at about 92°C, kept hot in pasteurising tunnels and then quickly chilled down. The processing time is usually a function of the can size and of the initial mould count. Most Uzbek companies are not well equipped to observe these parameters, often due to lack of laboratory equipment and, perhaps, due to inadequate control procedures. Where the pasteuriser is of the open batch type, it does not allow for an exact determination of the dwell time.
- re-filling operations. This is normally involves pouring the paste from 9 kg cans to glass jars before sale. Jars are then sterilised at 100 °C. Sterilisation at this temperature causes the product to turn brown because of sugar overheating.

Tomato juice is usually available in 1 lt. and 2 lt. jars. One company surveyed had recently installed a new filling line for tomato juice in tetra-pack brick. This product seems more oriented to the domestic market.

4.2.1 Tomato paste packaging

Tomato paste packaging plays a considerable role in marketing. The normal packaging used in Uzbekistan and in the west is shown in Table 4. New equipment has recently been installed by some processors for producing and packaging tomato paste in aseptic bags for export. This product is in good demand on the international market and thus represents a commodity with export potential. The advantage of this packaging is in the ratio of weight of product to weight of packaging. The most common size used in Uzbekistan is 200 lt. (around 220 kg.) whereas in Europe there is a growing demand for the 1,000 lt. size. In this particular situation, tomato paste is sterilised and filled cold (30-35° C) in multi-layer flexible bags. The guaranteed shelf-life can be as long as 2 years at room temperature. Bags are put into plastic or returnable steel drums for transport. This product is considered “half-finished” and competes on the market with the more traditional 9 kg cans.

Table 4. Comparative table for tomato paste packaging

Market	Packaging used in Uzbekistan	Packaging used in Western Europe
Export	200 lt. aseptic bags 3 kg can 9 kg can 2 lt. glass jars	1000 lt. aseptic bags 200 lt. aseptic bags
Domestic	0,65 lt. glass jars 1 lt. glass jars 2 lt. glass jars	75 gr. Cans to 500 gr. Cans 125-250 gr. Tetra Bricks

Cans are made from steel sheet imported from Kazakhstan and Russia which is lacquered and printed in Yanghi Yul. Cans are formed, for the most part, manually

at the processor's premises. This packaging is used mainly for intermediate storage and transport. The quality of the cans tend to be poor and they are usually seamed with lead. Lead for can soldering has been banned in Europe for some time and is likely to be soon banned in Russia. Thus, the Russian market for product in 9 kg cans could soon be lost. In any event, the costs of containers at US$ 2 per 9 kg steel can is not competitive with aseptic bags at US$4 per 220 kg.

Glass jars are more suitable for product for local consumption and are even sometimes used in exports. However, the sizes used appear to be too large (tomato paste should be sold at the retailers in small containers not exceeding 1 kg size). Furthermore, the jars themselves are too expensive, too heavy and fragile. It has been observed that the sterilisation associated with glass jars takes place at too high a temperature (100° C is beyond the limit of sugar browning) and the cooling cycle in autoclave appears to be too slow, thus allowing a mould count increase during this phase.

4.2.2 Tomato varieties for processing

The raw material price for tomatoes should be related to the sugar content. The sugar content of local varieties does not exceed 4,5° Brix, while experimental imports have produced an average of 5,5° Brix. For example, to produce 1 kg of tomato paste at 30° Brix, using imported Lima or Rs varieties, some 5,95 kg of raw tomato is needed as compared to 7,5 kg when using the local varieties. Thus, sugar content of tomatoes has to be taken into account in any comparative analysis of raw material costs. Thus to increase the profitability from processing the introduction of appropriate tomato varieties for production of paste is of primary importance.

4.3 Juices, concentrates, compotes and jams

4.3.1 Apple and grape concentrates

These concentrates are considered half-products to be further processed mainly as juices. They are expected to comply with standards mainly on sugar concentration, colour, acidity and SO_2 content (for grape concentrate). They are normally marketed in 200 lt. aseptic bags.

In Uzbekistan, most of the concentrates are produced in a process involving partial clarification, filtration and subsequent concentration in evaporators designed mainly for tomato processing. The concentrate is stored in tanks. This practice does not meet international standards and the concentrate produced can be sold only at discounted prices. Tomato paste evaporators are of the forced circulation type while falling film technology is the preferred technology for fruit concentrate production. Neither is the system of filtration in normal usage (such as carton filters) satisfactory for juices. Vacuum filters or ultra-filtration should be used instead. Aseptic bags should be used for storage and transport.

There are, however, some new installations in the country that can produce fruit concentrates to international standards. To further comply with the desired

standards and to secure the top market price outdated technology most be replaced and this in turn involves huge investments.

4.3.2 Fruit juices

Uzbekistan has a good potential as a producer of juices and compotes because of the favourable prevailing climatic conditions for many orchards. Among the most important fruits produced are apples, pears, peaches, plums and apricots. There are good export opportunities for processed products when packaged to meet international market demand. Example of the type of packaging in demand as well as the packaging currently in use is shown in Table 5.

Table 5. Comparative table for juice and concentrate packaging

PRODUCT DENOMINATION	PACKAGING USED IN THE INTERNATIONAL MARKET	PACKAGING USED IN UZBEKISTAN
Clear apple and grape concentrate	aseptic bags	aseptic bags bulk
Natural fruit juices	aseptic bags deep frozen glass bottles size less than 250 ml. tetra bricks up to 1 lt. easy open tin cans small size other composite materials	aseptic bags glass jars 1 and 2 lt. Seamed lids Tetra Brick up to 1 lt.

Fruit juices in Uzbekistan are usually of acceptable quality. They are obtained with traditional techniques and equipment, mainly of Hungarian construction. Besides the traditional packaging in 1 and 2 lt. glass jars with pry-off lids, juices in 0,5 and 1 lt. tetra bricks are now available. It is possible to store juices in aseptic tanks for long periods and transport them in aseptic bags, aseptic bulk containers or as deep frozen product, as is commonly the situation in Europe.

Clarified apple juice and tomato juice in tetra-pack were found to be of good quality from any point of view (taste, colour and presentation). For other precious juices, such as peach, apricot and pears, the technology available is not conducive to the production of juices of excellent quality. These juices are produced at the moment in Europe by employing a relatively new process which allows for the preservation of the aromas while producing a clear product by means of juice extraction under vacuum. These juices are sold in the European retail market mainly in 150 gr. glass bottles.

4.3.3 Compotes

The compotes produced in Uzbekistan are packed in 1 kg glass jars with seamed lids. Even though the products are often palatable, the presentation does not always meet with consumers approval. Fruits are not selected by size criteria and are not peeled. Moreover, the portions in the jars are of varying dimension, shape and colour. In addition, jars are often not adequately filled with fruit thus reducing their attractiveness.

4.3.4 Jams

Uzbek jams are usually of good quality, especially jams from plums and berries. Discoloration caused by overheating tends to be a feature of other jams. This problem could be solved through the use of under-vacuum pans. On the other hand, Uzbek jams are completely natural and free of artificial colorants and preservatives. This is considered to be a desirable feature of the product and one that could be used in market promotion.

4.4 Marinades

Many different types of marinades are available in the country. They are made from single varieties and from mixtures. The most common are:

- green and red tomatoes with peel;
- cucumbers;
- garlic;
- cauliflower;
- mixture of the former products.

Domestic consumption of factory processed marinades is limited by the fact that most households produce their own requirements when the fresh products are in plentiful supply, as a hedge against the price increase of late fresh vegetables. Market demand is further constrained by poor presentation of the product on offer. While the taste may be good, the product is never calibrated or peeled . In addition, the jars are often too rich in brine. The usual packaging is the traditional 1 to 3 lt. glass jar with seamed lid.

The market for these products in Europe is also limited and production is restricted to a relatively small number of high value added products such as mushrooms and small cucumbers.

4.5 Dried fruits and vegetables

Uzbekistan is particularly well endowed with drying plants of modern construction all of which have huge capacity. They are involved in the production mainly of dried onions, garlic, and carrots in the case of vegetables and dried stone and seed fruits in the case of fruit production.

Sliced onions and garlic are attractive products and are usually well processed with the exception of excessive browning due to insufficient blanching. The products are packed in 12-20 kg paper bags and stored at room temperature.

Apples, are washed, sliced and dried without de-coring and peeling. The final product does not meet international standards and thus has a limited export market. Re-adaptation of the processing line would require huge investments which is unlikely to be financially feasible. Packaging of the product is in 12-20 kg paper bags.

Given the present shortage of raw material, installation of static dryers of small dimensions with packaging lines for plastic bags could be an appropriate alternative. These units are flexible and low energy consuming. They can also be used for aromatic herb processing which is a processing activity with considerable potential for development.

4.5.1 Raisins

Uzbekistan is a traditional producer of good quality raisins obtained from white and black Thompson seedless grapes. The raisins are dried in the field or on the vine, then taken to proper processing plants for cleaning, stalk removal, selection and packaging. Raisins are normally packed in 10 kg cardboard boxes and exported.

5. THE MARKET

5.1 Distribution and export

Processors sell 50% of their total production, on average, to state trading organisations who in turn export and/or supply retail outlets. Canneries and wineries otherwise supply the domestic market through a wide range of channels. A significant number of wineries, and to a lesser extent canneries, have set up their own network of retail outlets where up to half of their production is often sold. This manner of disposal is said to add significantly to the profitability of their enterprise. Alternatively, processors either sell directly or through agents to a large number of privately owned outlets. Two large wholesalers - Uzbeksavdo and Uzbekbirlashov - buy up to 60% of the production of some processors, especially wineries. All bottled wine is sold domestically through licensed traders or retailers. Prepayment for factory sales is normal procedure, with the exception of sales to the large national and other reputable wholesalers.

As discussed earlier in this report, the two main commodities exported are wine and tomato paste. Seventeen processors within Uzplodoovoshvinprom - holding are allowed to export on their own account while the remaining companies within the holding are obliged to export via the holding company's trading companies - Mevasabzavot marketing and Impex. While regional unions of "Mevasabzavot" are also entitled to export, the survey found no evidence of any significant progress in this regard due to lack of resources and organisational capacity. Some exports are conducted via the Uzbek Commodity Exchange. Up to 70% of the value of the goods sold directly to Russia by processors is by way of barter deals.

The Cabinet of Ministers sets export targets for wine, dried fruit and vegetables and cannery products. The target provision for 1998 was expanded by an internal

resolution of the “Uzplodoovoshvinprom” holding which specifies that $12 to $14 million of the $41 million export target should comprise centralised sales with all the proceeds exchanged at the official exchange rate. Of the remaining exports, 30% should be sold to state enterprises and 70% of the proceeds may be used to purchase imports. Each exporting company should have a mix of centralised and non-centralised export sales.

5.2 Wine and wine products

In Uzbekistan the consumption of wine and grape-based beverages, per year and per capita, has decreased from 3.7 litres in 1993 to less than 2 litres in 1997. This tends to be lower than per capita vodka consumption. Total wine consumption fell from the 1993 level of 8.1m dekalitres to 5.3m dekalitres in 1995.

Domestic demand for sparkling wines is estimated at 4 million bottles and the surplus production of about 3m bottles has until now been exported to Kazakhstan. The quality of most dry wines produced in Uzbekistan does not attract a large demand, although the introduction of improved processing technology could remedy this situation.

As production costs of wine greatly depend on alcohol content, fortified wines are more expensive to produce than dry wines. At the same time dry wines are imported into Uzbekistan and sold at many times the price of fortified wines. Import substitution of good quality local dry wines for imported product thus offers very good possibilities.

Uzbekistan produces a small quantity (about 1m litres) of quite good quality brandy which the domestic market can easily absorb.

Until recently the Russian consumer consumed 29 litres of wine and other grape-based alcoholic beverages per year and the total Russian market was estimated at over 400 millions dekalitres. About two-third of this consumption is fortified wines. In 1990, Uzbekistan satisfied about 5% of the Russian demand for fortified wine.

In the 1992-93 season Uzbekistan exported 6 millions dekalitres of wines and spirits, both bottled and in bulk, to Russia. This declined in the 1997-98 season to only 320,000 dekalitres. The introduction of high import tariffs in several CIS countries was the main contributing factor to this decline. The Russian federation charges import tariff on bottled imports of 2 ECU/litre on dry wine and 2.5 ECU/litre on fortified wine or higher alcohol products. Although Uzbekistan imposed a 20% excise tax on alcohol production in January 1997, exports are exempted from both excise tax and VAT.

The introduction of a 30% pre-payment obligation on export of Uzbek products is a major constraint on exports. This can only be circumvented by Uzbek producers establishing trading houses abroad. A further constraint on exports is the declining spending power in the Russian Federation which tends to strongly impact on the demand for wines. The introduction of high import duties on bottled alcohol beverages in Russia and Kazakhstan, has meant that exports in the form of bulk wine has gained greater significance.

Efforts are being made to enter the Western European and US markets with Uzbek wines. It is likely, however, that only the sparkling wine of the Tashkent champagne plant can compete on these markets. A few dry Uzbek wines could also be successfully sold in these markets with some additional processing to improve clarity and shelf life. However, most Uzbek dry wines cannot successfully compete in taste with average quality wines from Europe and Georgia.

While fortified and sweet wines are still in demand on the Russian market, they are likely to be substituted in the short to medium term with good quality dry wines. Their low-alcohol content makes them more suitable for the modern diet. Therefore, the wine sector in Uzbekistan will soon have to face up to the challenge of switching from sparkling wines and fortified wines to producing dry wines of an acceptable standard. The financial benefits of switching from fortified to dry wines, even to satisfy the domestic market, has already been discussed in par. 50 above.

5.3 Tomato paste and tomato juice

Domestic consumption of tomato paste is under 10,000 tons or some 400 grams per capita per year. The domestic product is only offered in 1 litre jars with pry-off caps. Tomato paste in the more desirable 100 – 250 gram tin containers, twist-off jars or foil tubes is not produced in this country, nor in other CIS countries. The introduction of small cans could boost domestic consumption significantly as the 1 kg jars, which cannot be re-capped, are too large for normal household use.

While production of tomato paste for the domestic market is mainly targeted at households, it is often used for secondary processing into soups, baked beans, ready made pasta, canned fish and sauces in the export market. Prices are not only determined by quality and packaging but also by transport cost. In this respect, Uzbek tomato paste has a comparative advantage for supplying the market east of the Ural. However, Uzbekistan mainly supplies the lower quality segment of the export market where prices are only 60% of that for premium quality.

While a relative small proportion of tomato paste is sold in 200-litres size aseptic bags, the remainder is sold in 9-litre lacquered tin plated cans which are only acceptable in CIS countries with buyers demanding heavy discounts due to this type of packaging. Each year 20,000 to 30,000 tons of tomato paste is exported, valued in the order of US$ 15m. Since independence, CIS countries (mainly Russia) have been buying 70 –75% of the total tomato paste production. Several producers report healthy margins of around 40%. In 1995 some 3,000 tons were exported to markets outside the CIS, but it would appear that this sale has not been repeated in recent years.

5.4 Fruit juices, compotes and jams

Most canneries produce tomato, grape and apple juices which are packed in 1, 2 and 3 litres jars with pry-off lids. A number of canneries also produce apricot, peach, plum and berry juices. The juice in jars is predominantly sold in traditional food-stores rather than at kiosks and modern supermarkets. These latter sales outlets favour juices in tetra-pack, which is a growth market, as juices in this type of packaging are of better quality and possess their original aroma. The growing market for this type of product was demonstrated by the fact that while many types of juices are now packaged in tetra-pack, the survey team found that within a few months of harvesting all such stock, except apple juice and grape juice, appeared to have been exhausted.

There is a niche market for compotes with growth opportunities. This can be achieved in most situations by greater attention to detail in the production process without the need for new investments. As in the case of jams, they should be sold in jars of smaller sizes (not bigger than 1/2 lt.) with twist-off lids.

As already discussed the market for juice concentrates is limited due shortcomings in the processing technology available to most processors. Good quality concentrated apple juice (clear, bright colour and original aroma) has good export potential at favourable prices. Any deviation from the highest quality standards will result in failure to dispose of the product or serious price discounts. Some years ago large amounts of clarified and dark concentrated juice were sold to Germany.

Concentrated grape juice is usually used to produce alcoholic beverages rather than for reconstituting grape juice and, thus, lack of aroma may play a smaller role than for apple juice. Large quantities used to be sold to Russia, but now adverse trading conditions have halted most of these export.

5.5 Vegetable marinades

Canneries supply the institutional market often on demand while a limited range of marinades is distributed to the traditional type of retail stores. Most canneries reported that demand for marinades is steady but not growing. They also suggested that the absence of locally made jars with twist-off lids restricts the development of the marinade sector. Apart from the type of packaging, the quality and the recipes of imported products tend to be more acceptable to the consumer. Uzbek canneries could successfully emulate several of these imported products, such as small green gherkins (small cucumbers) and vegetable salads with their original fresh colour.

Some limited orders for traditional marinades are received from Russian institutions. Western style pickles and marinades are widely available in the European CIS countries and are imported from Poland, Hungary and to a lesser extent from Western Europe. Once Uzbek canneries can attain the same quality level and packaging standards as its competitors, it would be in a position to capture part of this market.

5.6 Dried fruits and vegetables (onions, garlic, aromatic herbs)

There are several large mechanically drying installations in Uzbekistan, although few are producing significant quantities of dried product. The quality of the dried product and availability of raw materials is said to be the major factor limiting the growth of the market. On the other hand there is a healthy domestic market for sun-dried fruits and vegetables.

6. THE PROCESSING INDUSTRY

6.1 Raw material supply

Contact between processors and raw material suppliers is made at regional fairs which are usually conducted in December. While processors mostly procure their raw materials from nearby farms, they are free to procure nation-wide from all available sources. At this initial contact, or soon after, contracts are agreed between primary producers and processors specifying the quantities and kind of produce to be supplied at indicative prices. As previously mentioned, processors within "Uzplodoovoshvinprom" holding have, for the most part, their own dedicated supply of raw product from farms within the structure of the "firms". However, this supply is usually not adequate to meet their overall requirements with the result that these processors often compete for raw product with other processors on the free market. Processors in the regional "Mevasabzavot" unions do not benefit from a dedicated supply relationship. Farms affiliated to these unions may sell their products to the client of their choice.

Although quantities are agreed upon in the contract between processors and suppliers, in practice the processors cannot force the farms to supply the agreed volume of produce in the event of unfavourable weather conditions. Several weeks before the harvest, the actual price is agreed and prepayments in the range from 15 to 25% of the estimated value of the trade are made. According to a recent Cabinet Decree the unpaid balance should be transferred to the farm within two months following delivery. Processors with adequate financial means adhere to this, but others often only pay after the processed products are sold and payment received. In some cases the farms are forced to accept processed products as payment.

In the last few years the supply of raw materials have fallen well short of the requirements of processors to reach their processing targets. Some primary producers prefer to sell their products to the fresh market so as to generate immediate cash. Unfavourable weather, crop pests and an acute shortage of operating capital have also contributed to lower productivity and a downward spiral in available products for processing.

6.2 Equipment and buildings

In general the condition of processing equipment is poor and do not meet international standards. Apart from some recent investment by some processing enterprises, much of the equipment can be classified as obsolete. The condition of winery processing equipment is generally better than that of the canneries (with a few exceptions) and equipment condition of processors within "Uzplodoovoshvinprom" holding is significantly better that of "Mevasabzavot" union companies.

In details the sectors suffer from the following defects:

WINERIES	CANNERIES
Obsolete must extraction technology (particularly for white wines)	Scarce use of stainless steel
Inadequate processing technology	Obsolete concentrators
Obsolete packaging lines	Obsolete packaging lines
	Inadequate fruit juice production technology
	Obsolete fruit jam production technology

While some improvements to processing equipment have been made in the last two years, much more has to be done. None of the visited plants visited are provided with C.I.P. (Cleaning In Place) units; these systems, usually made of three tanks containing sanitary solutions (acid, basic solution and rinsing water), are regarded as standard equipment for juice processing lines and bottling lines.

The condition of the factory premises relative to international standards is of prime concern. The standards prevailing are unsatisfactory as far as the internal finish is concerned. The quality of the wall and floor finish is a major factor for hygiene and safety and this has not received due attention. New procedures, such as area classification need to be introduced. Physical divisions between dirty and clean areas need to be provided with appropriate sanitary barriers so as to preserve hygienic conditions.

6.3 Packaging[4]

The quality of packaging was a concern for practically all of the processors visited in the course of the survey. The absence of locally manufactured packaging of acceptable quality compels processors to look to imported materials. At the same time, difficulties associated with currency convertibility is a major constraint to securing adequate supplies of imported product. Cardboard containers, glass jars

[4] A detailed analysis of the packaging sector is presented in a FAPU publication - "Food and Beverage Packaging Policy in the Republic of Uzbekistan"

and bottles, metal cans of local manufacture do not comply with international quality standards even though prices are often higher than the cost of imported products. This situation is particularly difficult for wineries and canneries which produce quality products since poor product presentation tends to place their products in the same plane as poor quality products.

Labels on packaging are often unattractive and not sufficiently personalised relative to international standards. Moreover, the wineries will be compelled, starting from the next year, to make use of the standard labels printed under the Government's control in order to avoid product falsification. The labels will have the same lay-out, colours and denomination with an aside indication of the producer's identity. This will make it difficult for the consumer to distinguish one wine from another and is likely to reflect negatively on the demand of high quality products.

Corks and lids used are mostly seamed resulting in product deterioration after opening. Usage of screw caps and twist-off lids is still limited due to unavailability. Likewise, unavailability of cans of smaller sizes compels the tomato paste producers to utilise fragile, heavier and more expensive glass containers. Even then, the containers tend to be too large for family consumption requirements. New packaging, namely tetra-pack bricks, aseptic bags and PET bottles, have recently been introduced. This development, although requiring importation of the packages, has certainly improved the sales for juices, tomato paste, mineral waters and soft drinks.

All **glass containers** are produced in the Kuvassay factory. Jars smaller than 650 ml are not produced and the first twist-off type jars have only recently been released. The quality is still poor with much thickness variations along the body and insufficient accuracy at the opening, resulting in sealing difficulties with imported twist-off lids. Glass bottles are usually of clear glass while dark bottles are preferred for wines. Champagne bottles are almost twice as heavy and significantly more expensive than the equivalent western bottles. Crown capped bottles and corresponding caps are not produced in Uzbekistan, though very acceptable for table wine and for fruit juices.

An upgrading of glass container production technology is an urgent requirement. "Uzplodoovoshvinprom" indicated that it intends undertaking the necessary steps to resolve this issue.

Uzbekistan has three old holding **cardboard** plants but only one, located in the Tashkent area, is actually in production. Paper for cardboard is being imported even though a 1996 study, carried out in Samarkand, revealed that the production of cardboard could be a very attractive proposition for a private investor. The cardboard boxes locally produced are never colour printed despite international demand for this type of finish.

For many applications **metal cans** are an ideal substitute for glass containers, being lighter, more durable and cheaper. Metal cans should in fact represent the ideal packaging for a range of products made in Uzbekistan. In other countries, tomato paste, compotes and some marinades for household consumption are usually

packed in small size cans. Even though tin sheets have to be imported, local tin container manufacturing could introduce innovation and competition into the sector.

The **bag-in-box** is a relatively new type of packaging which is used quite successful for table wines. The material is composite (similar to tetra-pack), suitable for filling in aseptic conditions and provided with disposable plastic tab. The usual size is 3 lt. and this is particularly suited to family consumption of table wines. At the moment it is not used in Uzbekistan but it could become a competitor to tetra-pack and other types of cheap packaging for table wines once the local consumption of dry wines has increased significantly.

6.4 Quality standards, hygiene and safety

All modern international processing enterprises operate to "Total Quality" control standards, such as the ISO 9000 standards in Europe. Hygiene and safety are key components of such control standards. In effect, enterprises draw-up their own control and recording procedures in a quality manual for implementation at each stage of the processing chain. Sampling, laboratory testing, recording etc. constitutes part of the set procedures. The procedures are such that quality and consistency is guaranteed and that batches of production are traceable through every step of the production process. Not only is the health of the consumer protected but the processing enterprise itself is protected from the adverse image caused by sub-standard product reaching the market and from personal injury claims of consumers. No such quality manuals exist for Uzbek enterprises visited and, in any event, many of the enterprises are ill-equipped to carry out the necessary laboratory tests.

Even if all companies claim to comply with certain standards, the hygienic conditions of all the processing enterprises visited fall far short of international standards and, for most of them, a minimum required level is not reached. Evidence of vermin infestation is common. Cloakrooms within the factory premises are, to say the least, unacceptable. Yet, hygiene is a crucial factor in food industries and cannot be underestimated.

Safety is another important issue in production. Too often electrical installations are not complying to any minimum standard. Unsupported and unprotected cables, open electric command boards, rough earthing installation are commonly seen in the production departments. Electric cabinets are unprotected against atmosphere charges. In addition, hot pipes are often unprotected and devoid of warnings, fire-fighting installations comprise only fire-extinguishers and randomly located water hoses, warning signs of hazards are inadequate, hot surfaces and moving machinery components are often left unprotected.

7. PROCESSING TECHNOLOGY

7.1 Wine processing

Primary processing of grapes usually takes place in processing units located at or near the farms and most wineries have little or no control on this production phase since they merely buy the semi-finished product. Final clarification, filtration, stabilisation and bottling are carried out in secondary processing centres. As far as primary processing is concerned, all wineries are provided with the same Soviet made equipment including:

- carbon steel collecting bin with screw feed conveyor;
- centrifuge type carbon steel stalk separator;
- screw press ;
- fermenting tanks made from different materials;
- storage tanks made from different materials.

The technology applied does not lend itself to the production of good quality wines, especially white wine. The main deficiencies are as follows:

- insufficient attention to the maturation index (particularly for dry wines);
- none use of SO_2 during post-harvesting operations;
- unsuitability of the type of presses used (notably for white varieties); hydraulic or pneumatic soft presses should be used instead of screw presses;
- lack of control of the fermentation temperature; almost all primary processing points are not equipped with cooling installations;
- use of inappropriate fermenting agents;
- insufficient processing knowledge on application of sulphur dioxide (SO_2) and other stabilisation and clarification agents;
- insufficient laboratory equipment and skills in quality processing.

Details of an assessment of wine production made by the Tasic PIDEP project in 1996, in Samarkand Oblast is contained in the final project report (Project No: FDUZ 9301). Further investigations made by the AFID project in Samarkand Oblast in September-October 1998 have confirmed that considerable quality improvements can be obtained by introducing the proper know-how without changing the existing equipment, apart from the introduction of new laboratory equipment. Industrial quantities of dry red and white wines have been produced in Bagisagan and Bulungur with satisfactory results.

Further processing of wine material into fortified wines, port-wines and dessert wines is well established in the country and the products produced seem to satisfy the main market i.e. the Russian market. Processing into champagne type wines deserves some comment. The technology applied follows the former SU standards. In Europe the normal methods of producing champagne or spumante are the so

called “Charmat” (fermentation in tank) and “Methode Champenoise” (fermentation in bottle), while the common procedure in Uzbekistan is continuous fermentation. This latter method involves a shorter fermentation cycle but, at the same time, increases the size of the gas bubbles while reducing its shelf life. The major defect of the Uzbek champagne is the rapidity at which gas bubbles escape from the liquid.

Bottling lines in Uzbekistan are usually Russian made, of obsolete design and difficult to clean. In recent times, new German bottling lines have been installed in some wineries and this represents a significant improvement.

7.2 Tomato processing

Cold break tomato processing is the only technology in use at the moment in Uzbekistan. This type of processing does not represent a constraint since the product is in good demand in the international market. Apart from the newly installed processing lines (one of them visited in Shakhrisabs, is of Italian construction and meets the world standards), all the others are Yugoslavian made (Yedinstvo) and Hungarian (Lang). The equipment includes the following:

- coated carbon steel reception line;
- coated carbon steel screw mill;
- coated carbon steel or stainless steel (s.s.) pre-heater;
- three-stage stainless steel pulpers;
- stainless steels (s.s.) balance tank;
- s.s. pre-heater;
- one to three-effect evaporator;
- pasteuriser (of different shapes);
- filling line for 9 kg metal cans (Russian make);
- 1 to 3 L glass jar filling line with sterilisers;

The capacity ranges between 200 tons/day and 500 tons of raw material per day. Due to poor construction standards and inadequate maintenance, the lines often give the impression of being dated. Coated carbon steel is used where stainless steel is more appropriate. Sugar control instrumentation is often defective and pasteurisation procedures are inaccurate. While the lines can still be used there is a requirement for better trained and instructed operating staff and continuous quality control.

Packaging is old-fashioned and out of line with world market standards. Lead soldered cans are unacceptable and the type of glass jars used are not recommendable. On the other hand, the use of smaller size welded tin cans, if available, would be suitable.

Factory laboratories are, in virtually all cases, under-equipped and bacteriological analysis can be carried out only in centralised laboratories (not located in the plant).

Essential laboratory analysis may thus take days for completion whereas immediate ongoing analysis of the tomato juice and paste is necessary so as to guarantee the final quality.

Strict instructions on 'in-jar' sterilisation temperature are given in the standards to be applied. However, the sterilisation cycle should depend on the input mould count, the product pH and the type and size of packaging. In practice, the mould count and the product pH is not duly measured in most cases and, as a consequence, a proper pasteurising cycle cannot be worked out. To counteract this situation and to protect consumers, extreme temperatures are applied thus inducing taste and colour changes in the paste.

The implementation of proper quality standards is essential for success. In this respect each company should be properly equipped to ensure that, under the plants own responsibility, the proper quality standards are applied. Stricter procedures on raw material selection should avoid sharp quality changes from one batch to another. None of the companies visited were equipped with a Bostwick meter (not required by State-Standards) and most plants are not equipped with a modern pH-meter. Even if pH measurements are carried out using traditional methods the results are received too late.

7.3 Juices, concentrates, compotes and jams

Recently two new plants have been established for the production of apple and grape concentrates in aseptic bags as well as two for packaging of natural juices in tetra-pack. All of these are working well below capacity due to the limited availability of raw material and packaging materials. This equipment, of Swedish design, is of top quality and in line with world standards.

The technology applied involves the collection and cold-storage of apples so as to extend the production season. The apples, coming from the field or from the store, are tipped into a water-filled concrete tank, so as to avoid damages from the impact of the falling product, and then pumped to the beginning of the processing line. The apples are passed to a stainless steel washer and crushed to a pulp in a hammer mill. The pulp is then pressed by means of a belt press and the juice is filtered and stored in a balance tank. This tank supplies the ultra-filtration unit after the addition of chemicals and enzymes in order to provide the required clarity of the final concentrate. The aroma from the raw juice is first recovered by means of a special distillation unit and the remaining juice is concentrated to 70° Brix in a four stage falling film evaporator so as to reduce the steam requirement. On leaving the concentrator the final product is stocked in stainless steel tanks. The volatile apple aroma is later mixed with the final concentrate. All the equipment is made of stainless steel. The plant includes laboratory equipment, C.I.P. system for the sanitation of the equipment, cooling tower for condense recovery, steam generator of appropriate capacity and other ancillaries.

In other processing plants the equipment for production of natural fruit juices (namely fruit purees from apples, pears, peaches and apricots) is of Hungarian fabrication with minimal use of stainless steel and no aroma recovery facility. The

juices thus produced are often of poor taste and cannot compete with the quality of imported products. Compotes (fruits in syrup) are processed in lines of simple non-stainless steel construction. Selection, slicing and jar filling have to be carried out manually. Blanching is seldom done properly. The jars are then filled with hot syrup and sterilised and sealed with pry-off lids. Twist-off lid type jars should be used in place of the pry-off lid type jars.

Jams are usually processed in the same way (also without proper raw material selection), and sliced and cooked in double-jacketed pans. Blanching operations is normally not executed. The product is filled hot in glass jars and sterilised. Lack of proper blanching and atmospheric cooking results in the product being too dark in colour. Proper heat blanching and under-vacuum cooking would solve these problems. This product should only be packaged in twist-off lid type jars.

7.4 Marinades

Marinades are processed in the same processing lines used for compotes and therefore display the same quality problems: poor product appearance due to lack of raw product selection and high brine content.

7.5 Dried products

There are six similar Italian made processing lines spread throughout the country each having an input capacity of 3 tons/h. These plants were ordered under the former Soviet Union, probably with the view to providing dried vegetables and raisins for the whole SU. These lines were originally designed for grape drying but, having proved inadequate for this purpose, were converted to fruit and vegetables drying units.

Vegetable and fruits are thus processed using the same technological line. There is no initial calibration prior to sorting, rinsing and drying. Blanching is seldom if ever carried out. Drying is carried out with a three section Sandvic tunnel of excellent quality and usually still in good state of repair. These tunnels have been designed for very high output and a three-shift working day. Therefore, they are particularly suited to mono-product processing as production changes significantly affects the energy consumption and tunnel performance. Some units are equipped with very poor non-stainless steel off-line slicers of Hungarian manufacture. In practice, the output capacities are too high in the present market situation and given the scarce raw material availability.

Raisin selection and packaging lines of American and Italian origin are also present in Uzbekistan. Grapes are dried on the field or on the vine, taken to the factory and there cleaned, separated from the stalks in three stages, partially de-hydrated and selected manually by colour.

8. MANAGEMENT OF PROCESSING ENTERPRISES

The traditional managers of processing enterprises have changed little since Uzbekistan declared its intention to pursue a market-oriented course. The recent introduction of general meetings of shareholders, supervisory boards and new style management boards, has had little impact on the business orientation of the general managers, except in cases when foreign investors have started to put a new orientation on the style of management. On the other hand, the survey team detected a more positive approach in the case of newly appointed managers, many of which have different professional backgrounds from their predecessors.

During the interviews the managers were invited to express their opinions on the general economic and business environment. The most frequently mentioned issues related to:

- desirability for government to make low interest targeted credit available (though most directors showed to be very appreciative of the recent write-off of previous bank credit interest debt and penalties, and tax debt cancellation);
- difficulties with currency convertibility;
- high interest on bank loans (although no-one admitted that inflation hovers at the same level);
- need for more responsiveness by the company producing glass jars and bottles to customer demand and the production of larger, better quality and a more modern assortment;
- making barter legal;
- government assistance and funding for introduction of better plant varieties and for introduction of new processing technology;
- declining demand for fruit and vegetable preserves as people produce their own product;
- shortage of working capital.

When asked how profits would be spent, investment in equipment, improvement of social facilities for personnel and distribution of shares ranked high, while increasing working capital never featured. This is indeed surprising given that capacity utilisation is in general extremely low (15 – 45%) and could be greatly enhanced by an improvement in the company's financial ability to procure more raw material.

Processing plant managers in general do not have a market oriented approach to their business. They know little about the potential end-users of their product and the markets. This can easily be explained by the presence of a sellers market, in which all products are sold at, or close to, demanded prices. As many prices still have to be approved by authorities, higher cost producers achieve higher selling prices than others. This system does not reward the more efficient producers and

causes higher than necessary consumer prices. The absence of market competition keeps too many inefficient producers in the market and exacerbates low capacity utilisation of processing plants.

Very few managers acknowledge that, apart from packaging, demand for their products can grow by improvements in quality, taste and visual attractiveness. While some managers have a mass product focus and others looked at product and market diversification only one of the managers visited had a clear quality focus. The survey team feels that this is a major deficiency as quality is a key to development.

All managers suggested that they had the required information at their disposal to make rational decisions on plant management and product prices. However, the company financial information, which the FAPU team received, was often incomplete and not sufficiently accurate to evaluate the situation. Information on cost elements was not available in the required detail and, even then, it was often not updated. The currently applied accounting system may have had its merits under command economy conditions, but it falls short of that required to manage an enterprise in a market economy. Production costs are often understated giving the false illusion of satisfactory profits. Closer analysis, however, reveals depreciation calculated on original cost (up-dated by an official multiplier) rather than on replacement cost. Interest costs and repair and maintenance costs are often omitted from the equation. Over-estimation of profits results in payment of excessive corporate profit-tax, over-payment of dividends and, as a consequence, shortages of working capital. Introduction of International Accounting Standards (IAS), will not only help to improve company management, but will also provide more objective information to foreign shareholders and potential investors.

The governmental debt relief measure contained in the Decree of the Cabinet No. 338 of 6 August, 1998 has given the management of processing enterprises some time to get their operations in order. Assistance to the weaker enterprises has, however, been disproportionate since such enterprises, in the first instance, tended to have the greater financial difficulties. This may not be in the overall best interest of the sector as the life of some processing enterprises, that ought to be closed, will merely be prolonged. Neither, is it in the interest of the overall efficiency of the sector as already almost all enterprises are operating well below production capacity. Given this situation, a strategy of rationalisation is called-for where maximum support is given to enterprises with the capacity to compete in the market place and outdated inefficient enterprises are phased out. Moreover, such a strategy cannot be delayed for too long as, otherwise, there is a risk that primary producers will also be dragged down by inefficient processors, thus reducing the overall production base of the sector.

9. CONCLUSIONS

The Uzbek fruit and vegetable processing industry produces a range of products with good market potential for which the raw material can be grown domestically in a competitive production environment. The quality and presentation of the products needs to be significantly improved, which in the case of wine, may require foreign expert assistance and, for most other products, a significant investment.

Almost all processing enterprises are operating well below production capacity. This can, in part, be attributed to failure on the part of primary producers to meet processing requirements due to low productivity, especially for producers not incorporated within the structure of the "Uzplodoovoshvinprom" holding company. Lack of working capital, and delays in receiving payment from processors contribute to the low productivity performance. As a consequence, many of the farms within " Mevasabzavot" union find themselves caught-up in a downward production spiral. On the other hand, given the depressed export market for the type of commodities produced, the current processing capacity may be regarded as excessive to overall market demand.

Most of the processing plants are operating with outdated technology and require large investment in equipment and general infrastructure if they are to compete internationally. There is an urgent need for a programme of rationalisation which would allow the more efficient processing enterprises to increase their throughput and engage in a programme of capital investment, while allowing the processors at the lower end of the productivity spectrum to cease operations or amalgamate with other processors. In the absence of such a programme there is a risk that production from the already depressed primary producer sector will continue to contract with serious consequences for the processing sector as a whole.

In the context of need for rationalisation, it has been noted also that all canneries are engaged in producing a similar range of products. Thus, a programme of rationalisation should extend to encouraging product specialisation. This would have the impact of reducing costs through less frequent changes of the production line as well as giving the opportunity to develop greater expertise in the processing of individual products. Research and development (R&D) would also be enhanced through specialisation.

The current availability of quality packaging is a major constraint to the sector. The problems relate to inappropriate sizes of packages/containers for the market, unsuitable container closures, use of materials such as lead which are banned internationally and the high cost of the domestically produced materials. At the same time foreign currency limitations restrict the imports of better quality packaging.

The orientation of wine production needs to be reviewed and in future more emphasis needs to be placed on the production of dry white wines. The area under vineyards, especially under technical varieties, has reduced in recent years and not enough technical varieties are being replanted to expand the production of quality wine. Grape and other fruit producers have insufficient working capital to

purchase inputs so as to exploit the potential of their plantations. Apart from limitations on the availability of fertilisers, many farms have insufficient resources for the control of pests and diseases in their vineyards and orchards.

Tomato paste is a product with good potential for development. However, there is considerable room to improve the competitiveness of the product through improving the varieties grown by primary producers. The use of dated varieties not only affects the yield of the crop but also the quality of the processed product.

Quality control is a critical aspect of the processing operation which extends all the way from the selection of the raw material to the placement of the final processed product on the shop shelf. Quality control must be carried out by trained personnel with access to proper analytic facilities (laboratory) and operating to a quality manual drawn-up within the company. The processing technology and facilities must match international standards if the products are to compete on the international markets.

Financial data forthcoming from the processing enterprises falls well short of that required to make any detailed business assessment of individual enterprises. Despite the low level of capacity utilisation most enterprises reported profitable operations. However, it would appear that current accountancy procedures do not adequately account for depreciation in the financial statements e.g. depreciation is calculated on an insufficiently corrected historical asset price rather than on replacement cost.

The processing sector is greatly in need of a large injection of capital investment. One potential source of such funding is through foreign investment in joint ventures. However, the present environment is not conducive to foreign investment. Obstacles include the over-valuation of the currency and its implications for export competitiveness, difficulties associated with repatriation of profits, accounting methodology which adopts a “cost plus” method as a means of establishing prices rather than one with an objective of achieving a certain return on investment. The foregoing is not exhaustive and for a more in-depth review of the investment environment the reader is referred to the FAPU research report on attraction of foreign investment for the agro-processing industry[5].

The following are some specific conclusions relating to the constraints affecting individual products:

- Wine
  - poor harvesting procedures;
  - insufficient production of technical grapes with the result that wineries have to accept unsuitable raw material for processing;
  - non-standard quality packaging;
  - obsolete technology and insufficient understanding of the problems connected to dry wine production;

[5] See FAPU publication: “Attraction of Foreign Investment for the Agro-Processing Industry - Policy Issues”

- non-compliance of production standards with those in use in other countries;
- the Russian “Continuous” technology process applied in the production of champagne;

- Tomato paste
  - insufficient care in raw material selection for early and late season processing;
  - use of low sugar content tomato varieties;
  - use of coated carbon steel instead of stainless steel in the processing line;
  - pulpers are seldom provided with an effective 0,4 mm. sieve;
  - pasteurisers are often of the batch-open type;
  - packaging in lead soldered cans;
  - packaging in glass jars of inappropriate size with pry-off lids;
  - laboratories are too often under-equipped for the determination of mould count and pH.

- Fruit juices and concentrates
  - obsolete technology except for some newly installed units;
  - clarified apple and grape juices and concentrates of low quality when obtained from obsolete technological procedures;
  - fruit juice colour often too dark;
  - stainless steel and other modern processing equipment not always used;
  - packaging of products not always responding to market requirements.

- Compotes
  - quality and appearance of compotes do not meet desirable standards;
  - raw materials are not properly selected;
  - the raw product is sometimes not peeled and roughly de-cored;
  - product blanching is seldom applied;
  - concentration of product in the syrup is too low causing unattractive visual effects.

- Jams
  - use of open air double jacket cookers;
  - blanching is seldom applied;
  - the traditional glass pry-off lid jars are not efficient nor attractive.

- Marinades
  - presentation not attractive;
  - inadequate product selection in term of size and colour;
  - peels and cores present in the processed products;
  - product rarely blanched;
  - the brine content too large resulting in unattractive visual effects;
  - the traditional packaging in glass pry-off jars not sufficiently attractive.

- Dried products

- drying plants requiring re-adaptation;
- use of low raw material quality;
- insufficient sanitary production conditions;
- unsatisfactory blanching procedures;
- poor slicing operation which adversely affects final quality colour by inducing higher oxidisation;
- final packaging and storing facilities not satisfactory.

10. RECOMMENDATIONS

Responsibility for the overall development of the fruit and vegetable sector ought to be entrusted to one single national body. The board of this body would be representative of primary producers, 'Uzplodoovoshvinprom' holding, regional unions of 'Uzmevasabzavot', the Ministry of Agriculture and research institutes. This body would have overall responsibility for co-ordinating the development of the plan referred-to in paragraph 123 below.

An overall development plan should be drawn-up for the sector to steer its development over the next five to ten years. Such a plan should be drawn-up by a group of experts representative of the industry at primary and processing levels, Government Departments and private and public institutions with an involvement in the sector. The terms of reference for such a group should be established by the national body referred to in paragraph 122 and the plan should be developed with due regard to the limitations on Government resources for expenditure on the sector.

While it is envisaged that the aforementioned plan would include proposals for rationalisation of the processing sector, the sector cannot afford to delay this process in circumstances where most plants are operating at a fraction of their capacity with many in dire need of investment in new technology that cannot be justified at current levels of throughput. "Uzplodoovoshvinprom" holding should immediately carry out an evaluation of the situation with a view to more actively supporting enterprises with a potential for development, while phasing-out weaker enterprises.

The implementation of quality control standards comparable to international standards and the implementation of acceptable hygiene and safety standards is a prerequisite for processing enterprises to compete on the export market as well as with imported products on the domestic market. Each processing enterprise should

develop its own quality manual which should be strictly adhered-to. An appropriately equipped and staffed laboratory should be a legal requirement for all processing enterprises.

The necessity of price controls on processed fruit and vegetable products is to be examined at national level and price controls lifted for as many products as possible, especially to encourage the production of higher quality products, which demand more non-declarable and fixed cost items.

Accounting procedures at processing enterprises should be reviewed with the view to bringing them into line with international accounting procedures. Management accounting should reflect the real cost situation so as to provide management of enterprises with the tools necessary for decision making, particularly in relation to product pricing and investment in new plant and equipment. In this regard, depreciation of plant and equipment should be taken into account at replacement cost and the price of the finished product must reflect a satisfactory return to investment.

Foreign assistance should be sought through the donor agencies for projects aimed at improving the processing procedures and technology at processing enterprises and wineries. At the same time the list of constraints affecting individual products as listed in paragraph above must be addressed and, where possible, rectified as a matter of urgency.

As the processing industry needs to eliminate its technological obsolescence, large investments in modern equipment have to be made. Integral measures should be taken to recover the inflow of foreign direct investment. Decrees, which already stimulate foreign investment, notably on outward currency transfers, are to be duly enforced and legal procedures encouraged to expose implementation constraints.

11. REFERENCES

In our research we used statistical data (1992-1998) of next organisation:

- Ministry of Macro Economics and Statistics of the Republic of Uzbekistan;
- Ministry of Agriculture and Voter resources of the Republic of Uzbekistan;