

COMMODITY CASE STUDY: FRUITS

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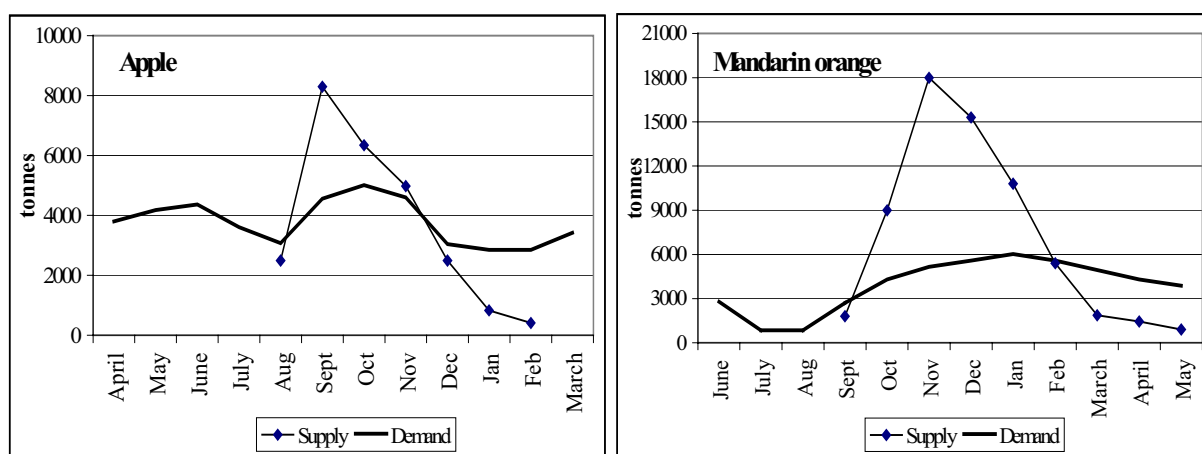
Nepal has high potentials for producing wide varieties of fruits. Already in the 1970s, the hills region was identified as area for fruits. This special emphasis was continued by subsequent five-year plans and the APP. Fruits production in Nepal has been increasing but not so rapidly. Much of the extra production has come from increased area rather than productivity. Seasonality is an issue, where domestic production is abundant in short peak seasons and the domestic supply is low at other times. While the obvious challenge is to raise productivity, the sector also faces some other serious issues such as the quality of fruits and import substitution in agro-industries.

This chapter is organized in three sequential sections and is directed at: identification of the key issues facing the fruits sector; analyses of various issues, focussing on policy-related issues; and conclusions and suggestions.

KEY ISSUES FACING THE FRUITS SECTOR

If one were to list 2-3 key issues facing the fruits sector in Nepal, these would be low productivity at farm, low competitiveness due to high “marketing” costs and seasonality. The issue of seasonality is also of importance as this brings out problems and issues in several related areas, e.g. storage, trade and industrial use. Figure 1 shows the seasonal pattern of supply of and demand for fresh apple and mandarin orange (orange, in short).¹¹² The demand for both fruits in Nepal is estimated to be just under 4 000 tonnes per month, or about 47 000 tonnes per annum

Figure 1: Demand for and supply of apples and mandarin oranges in Nepal



Source: Authors' estimates based on: MDD (2002), Thapa (2000), ASD (2002), MPHD (1990) and JICA (2001).

¹¹² The study focuses on mandarin orange and apples although many fruits are grown in Nepal. It has been done so partly because not all fruits have potential for export. Their significance and representativeness of the sectoral issues is the other reason.

(Annex 1). Total annual demand for apple is about 1.8 times the domestic supply, or an aggregate annual deficit of about 20 000 tonnes. By contrast, Nepal is surplus in orange, with net surplus of about 18 000 tonnes, about 1.4 times the annual domestic demand.

The seasonality problem is much less pronounced for apples because the volume of net surpluses (in surplus months) are not as large - just over 2 000 tonnes in January and February and about 600 tonnes in two other months. By contrast, for oranges, the net surplus is 13 000 tonnes in September and 10 000 tonnes in October, and 5 000 tonnes in August and November. Managing these surpluses is not easy. In theory there are several options, e.g. storage for consumption in lean months, processing into various products, exporting etc. One major objective of this paper is to discuss these issues.

As production expands, both from new areas and increased productivity, the seasonal imbalances in demand and supply will intensify, as demand is not likely to rise rapidly. Currently, apple and orange productivity in Nepal are significantly low relative to India (about 10 tonnes/ha versus 15-20 tonnes/ha), indicating immense potentials. Even with low productivity, when all currently planted areas come to production, total production is projected to almost double in a decade's time. Fruits demand responds strongly to incomes (income elasticity of demand is estimated to be 0.65, see MDD 2002).

An important feature of the external trade of fruits is seasonality. Fruits are both imported from and exported to India, in different seasons. This could also signify Nepal's comparative advantage. Irrespective of this pattern, there is a need for and considerable scope for import substitution and export promotion. Table 1 shows huge deficits in the fruit trade with India. Exports of all fruits averaged Rs 3 million during 1991-2001 while Nepal imported fruits worth Rs 138 million in the same period, for a deficit of Rs 134 million. There are no good statistics and studies that explain the trends in this trade. It seems that the sharp rise in imports after 1992/93 is associated with the liberal import regime with India following the bilateral trade treaty of 1991/92. The slowdown in imports and the corresponding improvements in trade balance in recent years are considered to be due to increased domestic production as newly developed orchards came into fruiting and feeder roads connected more production pockets to markets. All in all, the prospects for import substitution and export growth are good.

Table 1: Total fruit trade with India (in million Rs)

	1991/92	1992/93	1994/95	1995/96	1996/97	1997/98	1998/99	2000/01
Export	4.7	2.9	2.9	1.5	2.7	3.0	3.2	3.3
Import	89	92	137	233	168	164	136	81
Trade balance	-84	-89	-134	-232	-165	-161	-133	-78

Source: MDD (2002).

Many of the main issues facing the fruit sectors in Nepal are of internal in nature, which follows from the fact that fruits are not much traded products. They are listed below.

- Low productivity (about 50% of that in India)
- Lack of competitiveness in both import and export markets for a variety of reasons
- Small, scattered production structure means that the government needs to take initiatives and encourage appropriate institutional innovations (e.g. contract farming, group approaches)
- The commodities are characterized by seasonal problems and issues, thus requiring solutions through storage, processing and trade
- Research efforts appear to be weak, both in productivity, variety and quality
- External trade with India suffers from some significant non-tariff barriers

Cost of Production and Competitiveness

High cost of production: Like many other commodities, the cost of fruits production in Nepal is generally considered to be high. This may be so but unlike with annual crops like cereals it is difficult to accurately derive the overall cost in case of commodities like fruits that are produced over several years. What is needed is some kind of discounting or compounding technique, covering costs for orchard establishment through the final production year (Thapa, 1993). Sound information on costs and returns is essential because it is often heard that fruits production in Nepal is not profitable, which discourages the commercialization of the sector by enterprising farmers and businesses. That this is not necessarily so is shown by the data in Table 2 on generalised costs of production and profitability of apples and oranges. These show that the margins over cost in the farm-gate prices of apples and oranges could be as high as 27% and 21%, respectively, even including cost of family labour. Moreover, the prospects for higher margins are also good because citrus productivity in Nepal currently is only about 50% of that in India (DoA 2002; Pokharel 2003).

Table 2: **Cost of production of apple and mandarin orange** (in Rupees)

Stage of growth	Apple			Mandarin orange		
	Labour	Material	Total	Labour	Material	Total
Establishment stage (Rs/Ropani ^{1/})	1500	440	1640	1200	595	1755
Annual cost during growing stage (Rs/Ropani ^{1/})	900	400	1300	800	648	1448
Annual cost during bearing stage (Rs/Ropani ^{1/})	1700	585	2285	1520	696	2216
Average annual cost of establishment and growing period adjusted over the growing period (Rs/Ropani ^{1/})			2200			2260
Adjusted annual cost (Rs/Ropani ^{1/}) during fruiting period	-	-	4485	-	-	4816
Average cost of producing a Kg of fresh fruit	-	-	9.44	-	-	9.26
Productivity (M Ton/Ha)	-	-	9.5	-	-	10.4
Farm Gate price (Rs/kg)	-	-	12	-	-	11
Gross return	-	-	6175	-	-	6240
Net return (Rs/Ropani ^{1/})	-	-	1690	-	-	1323
Average time required to reach breakeven point (Years)	-	-	11-12	-	-	9-10

^{1/} 1 Ropani = 508.3 square meters

Source: Thapa, 1993; MDD, 2002; SSCI, 2001

High post-harvest losses: It is a common knowledge that post harvest losses are high in Nepal due *inter alia* to improper methods of harvesting, packaging, transportation and storage of fruits, often as high as 30-40% in general and up

to 29% in oranges (DFTQC 2002) and 25-35% in apples (Shrestha 1996). What is ironic is that in most cases, only small improvements may be needed to prevent substantive losses, like upgrading farmers' skills on better methods of picking fruits from trees, e.g. using light bamboo ladders and paper wrappings. This requires appropriate extension programmes. Needless to say, when losses are as high as they are, the return to investment on loss prevention can be substantive (Bautista, 1990).

Small-scale production: The average size of an orchard in Nepal is small, about three ropanis. With average productivity of 10 tonnes/ha, the output per farm is 1.5 tonnes and marketed volume is 0.9 tonnes (assuming 60% marketed). This is a small volume for profitable long distance marketing. To deal with the problem of small-scale production, the government opted for pocket development approach (focusing production efforts in selected pockets only) since the Ninth Plan as per the APP recommendation. But the results have not been encouraging, as no single pocket has been developed since then.

However, some institutional innovations are taking place in response to the problems of smallness on the one hand and the pressure of market-orientation on the other. One notable development is group approach to marketing. There are several examples of such approach. Box 1 narrates one of them.

Box 1

Group marketing of pear in Kaule and Fikuri villages of Nuwakot

The Micro Enterprise Development Project (MEDEP), with UNDP support, conducted a study in 1999 on group marketing of pear in two villages (Kaule and Fikuri) of Nuwakot district (Thapa, 1999). In these two villages, each household has at least 2-3 pear trees. With an average production of 250 kg per tree, the output was about 0.5–0.75 tonnes per household and marketable output of 0.25-0.5 tonnes (assuming 50% of marketable quality). With no transport facility, the product had to be hauled almost five hours to the Trisuli market. With no collection centre in Trisuli, farmers sold their produce over several hours sitting at street corners.

With the help of the MEDEP, a group approach in marketing was tried. Groups of 8-10 farmers were formed and collection points established at the production site. The produce was graded, wrapped in newspapers, and packed in improved bamboo baskets at the collection centre. The produce was then brought regularly to Trisuli where the marketing group itself established another transition store. A contract was made with the owners of passenger buses from Trisuli to Balaju (in Kathmandu) and as a result 15-20 baskets of fruits got transported each time. Two members of the group accompanied the produce by bus to Balaju and elsewhere in the more competitive Kathmandu market. Some of the fruits even reached Narayanghat Market in the Tarai.

Grading to achieve efficiency in transportation: For lack of knowledge and marketing skills, farmers rarely practice any grading. They pack fruits of all shapes and sizes in Dokos (bamboo baskets) and carry these to markets. As transport costs are high (including the opportunity cost of family labour), this practice results in higher transportation cost compared with a grading practice where only higher quality fruits are transported to distant markets where prices are better, at the same time selling lower quality fruits in other, nearby markets where prices are lower. In other words, there is a need for promoting a sales strategy based on the concept of price discrimination.

Research issue: The sector also suffers from lack of adequate and appropriate research aimed at reducing cost, raising competitiveness and product quality. It is not just about agronomic research but also other aspects in the entire chain

of production and sales, as noted above. The current allocation of research efforts is heavy on cereals and so comes at the cost of higher returns on sectors such as fruits. Besides correcting this allocation pattern, there is an urgent need for developing a critical mass of researchers in the horticultural sector.

Domestic Marketing Issues

Market information: Market information is a public good to some extent, but not fully. In the initial stage of development, this needs to be provided by the government. Importantly, there is a need for information that helps to connect producers to traders. In addition to prices, information is needed on the quality of produce, sources of supply, volumes of transaction and weekly price trends.

Sharp spatial and temporal variations in fruit prices: These are common to all agricultural products but seem to be much more so in case of fruits. Thus, farm-gate prices are about 1/5th to 1/6th of the retail prices. High transportation cost is obviously a key factor behind the large gap, but there could be other factors that are not well known, like lack of market integration and non-competitive market structures. Across time, both wholesale and retail prices are known to be almost twice as high in the lean season than those in the peak season. This is indicative of problems in a number of areas, notably lack trading opportunities, storage and processing of fruits into other products.

Inadequate market centres and physical facilities: A question often asked is to what extent should the government be directly involved in creating physical facilities like markets? Kalimati market is an example. For fruits, there are some market centres developed at the supply catchments areas like Pokhara (for produces from Myagdi, Baglung, Mustang and Parbat), Nepalgunj (for products from most Mid-Western Districts that have flight services), and Dharan (for products from Dhankuta, Bhojpur, Tehrathum and Sankhuwasabha). To some extent, these new initiatives merely support the traditional "hat bazaars". Given the obvious limitations of the State, the question is what can be done to create an environment to facilitate private sector investment on marketing facilities (e.g. legislation, loans on a preferential basis)? In the course of this study, it was found that not much thinking and analysis has been made in this area.

Marketing Act: Although the need for a Marketing Act that promotes orderly development of markets in Nepal was felt for many years, a concrete initiative was taken only recently. A draft of the proposed Bill has been prepared and submitted to the parliament for approval (Box 2). The process is pending due to political instability.

Octroi charges in Nepal disrupts transportation: Traders complain all the time about octroi charges, which can be as high as Rs4000 per truck when bananas, pineapples and so forth are transported from the Tarai to Kathmandu. Even fruits transported on the roof of long distance public buses are charged octroi fees in the range of Rs1000-2000. These charges not only involve payments, but also other costs, both "unbilled" and transaction costs of doing business. It is indeed an irony that the octroi system and misuses in the levy of charges by local bodies con-

tinues to day despite the consensus that this is not good for trade. Traders say they do not mind paying the charge, but resent very much the harassment.

Box 2:

Salient features of the proposed Marketing Bill

Private sectors can also establish agricultural markets.

Each market will have an executive committee. This committee may:

- prohibit the sale of adulterated and unhealthy products.
- fix quality standards of the produce for the market.
- establish its own market information system.
- recruit required staffs.
- fix rental and other rates for various market services.

Internal transport subsidy for apples: The government gave some subsidy for some years to transport apples from Jumla and Mustang. It takes 2.5 days for porters to walk from Jomsom (Mustang) to Beni (nearest road head) and 4-5 days from Jumla to Dailekh (nearest road head). Transportation subsidy of Rs7/kg (about 25% of the total cargo rate) helped to airlift more apples to markets like Pokhara and Kathmandu. In 2002/03, no subsidy was allocated for Mustang while provisioning for only 100 tonnes for Jumla. When subsidies were withdrawn or lowered, the effects were visible, i.e. shipments out of the districts fell. Analysts generally hold that these subsidies benefited poor apple farmers, and also helped to redistribute some of the state resources to remote areas.

Inter-seasonal price stabilisation – the cold-storage issue: The seasonality in production means that inter-seasonal price variations are high (Annex 2). One way to address this problem is storage. However, there are only limited numbers of cold storages being constructed in Nepal. Moreover, all facilities are single-chambered, which can store only one kind of commodity at a time. Since supplies of fruits come in small amounts, these facilities cannot be fully utilized. As a result, most cold storages are used for potatoes. The need for multi-chambered storage facilities is being realized by cold storage entrepreneurs, and indeed the storage spaces in two cold stores - one in Balaju and the other in Sitapaila of Kathmandu were partitioned into more than two chambers.

Electricity is a major operational cost for cold storages. Given higher electricity tariff in Nepal and smaller storage units, per unit cost of storage or rental rate is relatively high in Nepal, and definitely markedly higher than in neighbouring states of India (Table 3). One other incentive on the Indian side is that products put in cold storage can be pledged for applying loans (products valued at 70% of the cost).

One way to improve the situation would be to establish industrial parks for use by rural enterprises. At the same time, cellar storages need to be promoted as it has been demonstrated that these units work well. In a very limited scale, some orange and apple farmers store their produces in cellar storages as well. Cellar storage works well in low temperature areas (high hills and mountains). A 1999 profitability analysis of a store of 2m × 2m × 2m size that can store 6000 oranges for mid hill conditions showed net profit of Rs3000 for a three months storage pe-

riod (November to January). Including the cost of family labour (Rs2500), the return to the entrepreneur was Rs5500. As the facility works without any problem for four years, the discounted return or net present value was Rs8346 (Thapa, 1999).

Table 3: Cold storage situation in Nepal and India

Description	Nepal	India
Average size	1000	4000
Chamber type	Single	Multiple
Technology type	Mostly diffuser	Mostly bunker
Electricity tariff	NRs4.9	N Rs3.48
Rental per kilo per season	NRs2.00	NRs1.12 (UP)
<i>Interest Rate (%/year) on capital cost</i>	14	13.5-15 ^{1/}
<i>Interest Rate (%/year) on operational cost</i>	17	16.5 (Bihar)
Pledging facility	Non-existent	Exists
Loan in pledged goods as percent of the value of goods	None	70

1/ 13.5%/year in Bihar and 15% in UP state.

Source: *Boosting cold storage facilities in Nepal*, Nepal Agribrief No. 35, November 1998, Winrock International, Kathmandu

In order to promote the construction and use of cellar storages, a construction subsidy of 25% is given to cover the costs of construction materials and skilled labour, or a maximum of Rs10 000, whichever is lower. Cellar storage extends the edible period by three months and therefore fruits can compete with imports from India. Despite the subsidy and high return to investment, cellar storage facilities are still not in much use, presumably for lack of technical support and awareness among producers.

Utilization of Domestic Fruits by Agro-industries

Besides such direct benefits as value addition and employment, agro-industries can also make considerable indirect contributions to agricultural growth and poverty reduction through strong backward linkages, notably by sourcing local raw materials. Many fruit and vegetable processing industries have been established in Nepal. Currently more than 150 firms are registered, of which only four are large-scale processors. The following paragraphs briefly discuss some of the issues on the sourcing of raw materials by these four industries.¹¹³

A relatively large food and beverage producer produces mango drink in tetra pack using a brand name franchised with an Indian company and is required to maintain the same taste and flavour of the juice as in India. For this reason, it is compelled to use the same mango variety as is used by the Indian counterpart company. This variety of mango is not grown in Nepal. Therefore the industry imports 100% of the raw material from India (in the form of concentrated pulp). Moreover, presumably due to lack of market, capacity utilization of the industry has been low (estimated at about 50% only) as an agreement between the counterpart industries prohibits the export of the product produced in Nepal to India.

¹¹³ An entire chapter in this volume (Chapter 13) is devoted to this subject.

Another company, a joint venture company of India, originally established for herbs processing in Nepal, diversified its production and is now producing orange, pineapple, and mango juices in tetra pack. The industry also uses little domestic fruits. While juice concentrates of orange and pineapples are imported from Brazil, mango pulps are acquired from India. Unlike the case with the first company mentioned above, about 95% of its final output is exported to India. This is a good example of a firm that takes advantage of tariff differentials in India and Nepal for raw materials (the same concentrate juice from Brazil faces 65% tariff in India and 40% in Nepal). But it also shows that the mere existence of a processing factory in Nepal does not ensure the use of local raw materials.

When the first company diversified its products the government could have initiated measures to promote the use of Nepali raw materials. For example, some research could have been started towards developing or adapting same or similar mango varieties suitable for these firms. Similarly, the government could have taken steps, without delay, to promote and support institutional innovations that foster partnership between industry and farmers like contract farming. The legislative process is underway (Box 3).

Box 3

Features of proposed Contract Commercial Farming Bill

- Any kind of land owned privately or publicly can be leased out to agricultural firm for commercial agricultural use.
- The contracting parties can register the agreement in the respective Village Development Committees or Municipalities.
- The contracting parties must be registered firm or farm in their respective District Agriculture Development Offices.
- There will be a dispute settlement committee formed by consensus of the contracting parties at the time of registering the contract. There will be 1-3 persons mentioned as members of such committee in the contract paper itself.
- Compensation will have to be paid to the other party if either party breaches the contract.
- The compensation will be as specified in the contract; in case it is not specified, the dispute settlement committee will work it out.

Yet other fruit-processing company has technical and financial collaboration with a company of Bhutan. This company produces jam, jelly, squash, fruit juice, and canned fruit, ketchup, etc. It has about 7 ha of land in its premises and grows some seasonal vegetables for its own industry while the rest of the raw materials is bought from local markets in peak seasons and imported from India and Bhutan in other periods. This industry is running at full capacity. Though this industry is using Nepali raw materials to some extent, it has been reported that the cost of inputs is high in Nepal compared with what the parental company pays in Bhutan. Even the cost of processing is said to be high in Nepal for such reasons as: higher import duty on imported fresh fruits; higher price of sugar bought in local market; lower labour productivity; higher cost of packaging materials; higher customs duty on tin for canning (25% versus 15%); no special tariff treatment on imports for industrial goods; and no special treatment to agro-industries.

By contrast, there are no import duties on raw materials in Bhutan once approved by the authority as a raw material. Tax is levied only on finished products.

Labour productivity is higher and there is no labour union that disrupts production for political reason¹¹⁴. Being less competitive, Nepalese processed products cannot be exported to neighbouring countries, which in turn hurts fruit production in Nepal.

A fourth company diversified its production and established fruit processing plant three years ago and launched fruit juices in tetra pack by a new brand name. Its products are in mango, litchi, orange, and pineapple flavours. It imports orange juice from Europe, litchi and pineapple from Thailand and mango from India. About 20-25% of the products are exported to India and the rest is consumed locally. Here again, the raw material is imported.

Export of Fruits

The experiment with export subsidy to promote export to Bangladesh:

This was perhaps the first experiment of this type. The government provided financial support to exporters through Agro Enterprise Centre of the FNCCI to export apples and mandarin oranges to Bangladesh in 1996/97 (Box 4). The support was for collecting fruits, grading, packing and shipping. While this led to increased export for two years, further exports ceased as the subsidy was withdrawn.

Box 4

Trial export of fruits to Bangladesh supported with export subsidies

To promote fruit exports from Nepal, government provisioned Rs. 500 thousand in 1996/97 to Agro Enterprise Centre of the FNCCI to support exporters for trial export. The fund was used to collect fruits from production areas, grading and packaging. Bangladeshi market was identified as potential market for the export of apple and mandarin orange.

There was an agreement signed between the Nepalese and Bangladeshi traders. The effort was to harvest and clip the peduncles properly, separate the exportable qualities, pack them in cartoons, and despatch the materials in trucks as per the agreement. With this effort, 14 tonnes of mandarin was exported to Bangladesh in 1997. Then the exporters took the initiative and the export increased to 63 tonnes of oranges and 14 of tonnes apples in 1998. This support was not continued in the subsequent years and exports ceased. Although this matter has not been thoroughly analysed, it is generally held that exports ceased as costs rose in the absence of subsidies.

Based on this experience, it is generally held that Nepalese fruits are not as yet export competitive without some cost-reducing subsidies. Some conclusions drawn from this experience include the following:

- For assured availability of transport and other export logistics, having a critical volume of the product of uniform quality is essential;
- Some auxiliary industries are essential to support packaging materials and shipping;
- Information should be available on procedural and other matters; and
- A good linkage should exist between importers and exporters of the two countries.

¹¹⁴ Based on personal communication with Mr. K.D.Sharma, Senior Manager, Rijal-Tashi Processing Industry, Itahari

Tariff was also an important factor. While Bhutanese fruits receive preferential treatment in Bangladesh in terms of 50% reduction of the normal tariff (37.5%), Nepalese fruits pay the full duty. As a result, it was difficult for the Nepalese oranges to be competitive.

Exporting fruits to India – the transport permit issue: Nepalese trucks carrying fruits and vegetables to Indian markets require permission from the Indian Embassy in Kathmandu or else have to transfer the products to Indian trucks at the border. A bank guarantee of NRs 50,000 and a fee of NRs500 is also required, in addition to filling several forms. By contrast, Indian trucks carrying fruits can enter Nepal by obtaining entry permit at the border, and without any payment. This is one of the ironies of the so-called “preferential” trade relationship Nepal has with India. Customs clearance is another barrier. Being highly perishable, fruits suffer further. All these problems in trade facilitation add up to almost 30% cost and thus reduce competitiveness.

Exporting fruits to India - quarantine inspection issue: India does not accept Nepalese quarantine certificate and so Nepalese exporters have to pay an inspection charge at the Indian quarantine check post (IRs 2500 for first tonne and IRs 75 per additional tonnage in the same truck). By contrast, there is no such charge from the Nepalese side, and Nepal charges only NRs 10 per truck as registration fee. This is another issue to be resolved through trade negotiations.

Nepal's agriculture improvement tax: Nepal currently levies 10% tax on all agricultural imports from India as agriculture improvement tax (AIT) under the heading “other duties and charges”. Unless this is non-discriminatory (by import source and between imported and local products), the tax will not be WTO-compatible and will have to be rectified soon. There is another issue – the industry and farm associations feel that the revenues raised from this tax should be invested in agriculture. The value of fruit imports from India has been in the range of Rs. 80-150 million (Table 1), which should provide revenue in the Rs. 20-30 million range, which if invested on developing the fruits sector will have an impact.

CONCLUDING REMARKS

Reducing cost of production and marketing

Since lack of competitiveness with India in both import and export is the main issue, improving productivity is an obvious priority. The yield gap between the two countries - about 10 tonnes/ha in Nepal versus 20 tonnes/ha in India, is high.

Considering that competitiveness is also affected by factors such as scattered location of small producers, the government should redirect some of its research, extension and analytical programmes to support the ongoing institutional innovations such as group approach to marketing and contract farming in production. The government needs to play a catalytic role in promoting private-public partnership in production and marketing.

Grading should be encouraged through extension and information provision.

Auxiliary industries should be encouraged to develop materials for packaging and shipping.

Some aspects of the labour contract law are relevant to fruit processing industry in view of the short season for production, as well as for processing. This means that processing industries need to have the flexibility to hire workers on a seasonal basis without facing labour-related disruptions.

Enhancing research and extension to increase quality

Appropriate research is key to upgrading quality. Both farmers and traders complain that suitable varieties of fruits/vegetables for processing are not available in Nepal. There is little research work on introduction, testing and release of processable varieties by public or private institutions. This requires *inter alia* a critical mass of highly trained horticulturalists in NARC. A strong public research programme is needed on efficient methods of extracting and preserving fruit juices locally.

Proper training and pruning of fruit trees can greatly contribute to production of quality fruits. Hence, it should be encouraged through extension programme. Proper harvesting and packaging technologies e.g. use of fruit clipper to harvest fruits, wrapping in papers and packaging in appropriate cartoons for marketing, and so on, need to be promoted.

Facilitating internal marketing

Information on quality of produce, source of supply, volume of transaction and a weekly price trend should be made available through the mass media, so as to bridge the information gap between producers and traders.

Government may need to develop market centres and infrastructure in strategic locations. But importantly, the government should work with the private sector to find out how such centres can be developed in partnership with them. This is about making private investment attractive without subsidies. This also requires an early enactment of the proposed marketing act.

Cold storage plays a very important role in case of fruits, production being highly seasonal. The experience with the cold storage has not been good so far. There is a lack of analysis on what would make these units feasible in Nepal, compared to for example those in the Indian border towns, which requires a separate study on the economics of investing in cold storage.

Group approach to marketing can solve to a great extent several problems currently facing small producers and traders alike. The question is the level of effort put currently by the MoAC, among others, to support this. Often, lack of credit appears as a constraint to group marketing initiatives.

Currently, bulk of the contract production between processors and farmers takes place through middlemen, and without any legally binding contract. This has often led to disputes, with the effect that this mutually beneficial arrangement is undermined by both parties.

The government needs to address the complaints with the octroi system seriously. At stake for traders is not only the octroi charge – the system has led to “hidden” payments, high cost of transportation, losses and deterioration of quality.

Tariffs and other incentives that discourage the use of local materials need to be reviewed.

Facilitating exports and import substitution

Apple and mandarin oranges are two major exportable fruits of Nepal. Though orange orchards are nearer to road head as compared with apples, orchards in both cases are not planted from commercial point of view. Hence, some support in facilitating collection, grading, wrapping and packaging fruits would enhance export.

The unequal treatment in the movement of the Nepalese and Indian trucks in each others' territories has reduced the competitiveness of Nepalese products. This is a matter for negotiations in India-Nepal bilateral trade talks.

An agreement on mutual acceptance of quarantine certificates between India and Nepal will be immensely helpful, not just for fruits but also other agricultural products.¹¹⁵ Also to be resolved is the asymmetry in inspection charges.

An anomaly in Nepal's tariff structure that hurts processing industries is that there is no customs duty on packaging materials when these come with imported processed products, whereas packaging materials imported for local use face high tariffs.

It goes without saying that, as with other commodities, good quality trade statistics are essential for sound policy and programmes.

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¹¹⁵ This issue is discussed in the SPS chapters in this volume, notably chapter 7 SPS and plants.

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Estimation of demand for and supply of fruits

Average fruit consumption was taken from JICA (2001) and MDD (2002). Breakdown of fruits in per capita average consumption was taken from Thapa (2000). The share of mandarin orange in total per capita citrus consumption was taken from MPHD (1990). Based on these sources, per capita consumption was estimated to be 1.96 kg for apple and 2.03 kg for orange. Total demand was then estimated using Nepal's population of 23.1 million. On the other hand, the supply of these fruits was obtained from the national production data of ASD (2002), after adjusting for post-harvest losses (assumed 20%). As monthly demand and supply data were not available, these were estimated on the basis of market arrivals of fruits in Kalimati market and experiences of fruit traders in the Harsa Fruit market, Balkhu. Similarly, monthly supply was estimated on the basis of harvest pattern, as well as information from some cold and cellar storages.

Table 1.1 Demand for and supply of apple and mandarin orange

Fruits	Per capita Consumption (Kg/year)	Demand (000 tonnes)	Production (000 tonnes)	Adjusted production (000 tonnes) ^{1/}
Apple	1.96	45	32	26
Mandarin orange	2.03	47	81	65

1/ Assuming 20% as post-harvest loss.

Table 1.2 Approximate monthly breakdown of demand and supply of apple and mandarin orange (in 000 tonnes)

	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	Total
<i>Demand</i>													
Apple	3.8	4.2	4.4	3.6	3.1	4.6	5.0	4.6	3.0	2.9	2.9	3.4	45
Orange	4.3	3.9	2.8	0.9	0.9	2.7	4.3	5.2	5.6	6.0	5.6	4.9	47
<i>Supply</i>													
Apple	-	-	-	-	2.5	8.3	6.3	5.0	2.5	0.8	0.4	-	26
Orange	1.4	0.9	-	-	-	1.8	9.0	18.0	15.3	10.8	5.4	1.9	65

**Average retail and wholesale prices of mandarin oranges and apples
(Rs/kg)**

Market	Average prices (in Rs/Kg) in the month of:												
	Baishak Mar./Apr.	Jestha Apr./June	Asar June/July	Shrawan July/Aug.	Bhadra Aug./Sept.	Ashoj Sept./Oct.	Kartik Oct./Nov.	Mangsir Nov./Dec.	Poush Dec./Jan.	Magh Jan./Feb.	Falgun Feb./Mar.	Chitra Mar./April	Average
Monthly average retail price of mandarin orange, 2058 (2000/01)													
Kalamiti	65	70	-	-	-	-	35	30	35	35	34	40	43
Pokhara	60	55	-	-	-	25	25	18	22	35	35	70	39
Nepaljung	36	36	40	-	-	-	25	20	30	33	35	36	34
Biratnagar	60	60	-	-	-	38	35	33	28	35	34	31	40
Monthly average wholesale price of mandarin orange, 2058 (2000/01)													
Kalamiti	55	-	-	-	-	-	-	15	-	32	31	34	33
Pokhara	53	70	66	70	72	50	22	18	16	25	30	36	35
Nepaljung	-	-	-	-	-	-	20	20	26	31	27	32	28
Biratnagar	58	58	-	-	-	30	33	33	27	32	36	36	38
Monthly average retail price of apple, 2058 (2000/01)													
Kalamiti	65	70	55	55	70	60	65	60	55	55	52	55	60
Pokhara	80	80	74	80	80	57	57	-	75	60	60	75	71
Nepaljung	70	-	-	-	60	65	70	70	56	70	70	65	65
Biratnagar	75	80	80	80	75	53	43	45	55	65	70	65	64
Monthly average wholesale price of apple, 2058 (2000/01)													
Kalamiti	60	68	-	55	60	-	-	45	-	51	51	53	55
Pokhara	73	70	66	70	72	50	55	46	60	55	70	62	62
Nepaljung	80	80	63	60	55	55	60	60	51	59	57	60	60
Biratnagar	73	78	78	78	68	43	43	43	53	63	63	61	62

Source: MDD, 2002 (some adjustments have been made on the original data)