

Nepalese Lychee

Promoting Nepalese Agrifood Exports to Canada

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Lychee (*Litchii chinensis*) also spelt *litchi*, is a very important sub-tropical fruit crop of Nepal (Huang *et al.* 2005). The fruit grows on evergreen trees and bear fleshy fruits that are up to 5 cm long and 4 cm wide. The outside of the lychee is covered by a pink-red, roughly textured skin that is inedible but easily removed to expose a layer of sweet, translucent white flesh. Lychees are high in sugar and contain many vitamins and minerals essential for human health. The fruit can be eaten fresh, frozen, canned, dried or processed into juice, wine, pickles, preserves, ice cream and yogurt (Huang *et al.* 2005).

Nepal is geographically divided into three parts: Terai, Hills and Mountains (Singh, 2002). With this separation of land, the temperatures range from subtropical in the Terai, to a cool climate in the Mountains (Singh, 2002). This variation in climate allows a diverse range in the production of fruits including the lychee (Huang *et al.* 2005). In the Terai and low hills, lychees grow and mature from mid-May to mid-June. In the Hills, lychees grow larger than in the Terai and the fruits are harvested from the end of May to the end of June (Singh, 2002).

Singh (2002) notes, there are some preparation to the land that must be performed to accommodate lychees. First, the selected piece of land must be ploughed and made weed-free. In Nepal this can be done by pit-digging which can be assisted by the district based horticulturists/agriculturists. After the pit is dug, fertilizers and manures must be added (see *Figure 1*) (Singh, 2002). The growing conditions for the lychee are best in warm subtropical climates, with best cropping in climates with hot humid summers and dry cool winters (Huang *et al.* 2005).

Lychees suffer from some agronomic limitations. Firstly, leaves may be damaged when temperatures drop below 2°C, and when it reaches -2°C the tree is at risk of death (Huang *et al.* 2005). A major issue is the production time. Trees take 3-5 years to produce fruits and will not

yield abundant crops until years 7 or 8 (Singh, 2002). Some farmers may not be able to sacrifice land for such a long period of time with no immediate benefits. Once the trees are producing fruit, regular chemical controls and tree nets must be in place to prevent losses from birds and fruit bats. Some other pests include the lychee mite, lychee bug and the fruit worm. The lychee mite is the most detrimental as they attack new shoots in the beginning of growing season. Fruit cracking is also a serious problem in the Terai region. Various problems can be resolved through mulching, irrigation, and repeated spraying (Singh, 2002).

As previously mentioned, there is some labour involved with production of the fruit. Weeding is needed in the early stages, which involves hand weeding and the use of mulches to keep the weeds down (Singh, 2002). This also conserves moisture in the soil. Watering the plant before the fruit blooms has shown to produce a higher quality fruit. Manure and fertilizers should be applied in January to December at a year after the initial planting and should continue yearly until substantial fruit production. In the Terai, fruit production starts in year 5-6, while on the hills production starts in years 6-8. Luckily, there have been no severe diseases found to limit the growth or yield of the fruit in Nepal. The only problem with the fruit itself is its short-shelf life. (Singh, 2002).

Lychees are globally well known and can be found throughout much of Southeast Asia, China, Europe, Africa and North America (Huang *et al.* 2005). In the past 15-20 years, lychees were produced from seeds in the hills (Singh, 2002). Seedlings were also sold for cash or they were traded for other material. Since there is topographical variation within Nepal, factors such as height, canopy, leaf size, fruit size, seed size and fruit shape also vary immensely in the hills for seedlings (Singh, 2002).

Lychees provide many health benefits ranging from weight loss due to high dietary fibre, antioxidants, no cholesterol, and improved blood flow due to oligonol (Mak, 2012). Lychees contain an excellent source of vitamins, minerals and flavonoids which are anti-cancer properties (Selke, 2013). See *Figure 2* for the nutritional breakdown of the fruit.

Singh (2002) suggests that in Nepal, lychee farmers have options when it comes to marketing their crops. They can both harvest their fruits themselves and sell them to the wholesalers. Or there are contractors that buy the fruits while they are still on the trees. In this case, the contractor then has responsibility for the trees. The fruits can then be harvested and sold to the fruit wholesaler. There is a lot of potential for export markets with the lychee, especially in Nepal. The difference in harvest times in the hills and the Terai opens up the market for a longer period of time for exporting (Singh, 2002).

There are numerous economic benefits for the Nepalese lychee farmers as production is expected to increase year by year. This is due to new bearing trees as well as the increase in the age of bearing trees (Singh, 2002). There are huge importing European markets with increasing markets in Saudi Arabia, Dubai and Canada (Singh, 2002). The lychee is found to be more profitable than the mango and the banana in the Terai region (Singh, 2002). As lychees become more popular around the world their economic value increases. To increase the market, the availability of high quality fruits for a longer period of time must be considered. Transportation of exporting goods must also be considered. Since there is many different ways of processing the fruit, there is much potential for exportation.

There are multiple ways to improve productivity, overcome agronomic constraints and start a lychee business. Singh (2002) suggests applying organic manure, nitrogen, phosphorous and potash as seen in *Figure 3*, which will produce higher yields. Liming every year is also a

factor that will help increase productivity. Mulching and watering are important elements that should be done often. Drip irrigation is also an effective way to control water quantities and produce sustainable crops. In the winter months, it is beneficial to cut off branches that are unproductive or block other branches. This will allow all the branches to easily receive sunlight (Singh, 2002).

Singh (2002) advises further research will need to be done to enhance lychee development in Nepal. Looking into smaller trees for easier harvesting, analysing genotypes of seeds in the fields, as well as micro activity in the soil are all factors needed to improve productivity and development. A few additional areas need to be researched but regardless, lychee crops are still becoming more attractive and popular among Nepalese farmers. This is due to the stable income received from lychee fruits, especially in comparison to the mango and banana in the Terai region (Singh, 2002).

Since lychees are growing globally as a popular fruit with numerous health benefits there are plenty of market opportunities. For transportation, lychees must be stored and refrigerated (Singh, 2002). Since the lychee does have a short shelf life, refrigeration does preserve the fruit. From then it can be frozen, canned, dried or processed into juice, wine, pickles, preserves, ice cream and yogurt. This leaves ample opportunity for transportation of the good. Exporting lychee will provide a steady income to farmers especially in the Terai or Hill regions of Nepal (Singh, 2002).

Export Potential

Like any other exporting good, there are documentation and permits that are needed. First Nepalese farmers will need to receive a letter of recommendation from the chamber of commerce

and industry at their district for the registration of a proprietorship firm or a partnership firm (N, Steps Export Procedures). To do this one needs a citizenship certificate photocopy, passport photographs and a letter of recommendation from the chamber of commerce/industry for the registration of the firm. Then a business registration certificate must be obtained as well as a permanent account number registration certificate. Then a potential seller must manage a financial account or bank account and establish relations with the importers(N, Steps Export Procedures). Many different procedures must be followed which require some documentation. More information can be found at <<http://www.eec-nepal.org.np/eec/ecibon/report/212/Publication/General%20Assessment%20trade/Annex%2019.pdf>>.

There is currently a market in Canada for lychee , at various grocery stores including Walmart, Metro, and T&T. Below is their contact info as well as the lychee products they current have. This gives Nepalese farmers an opportunity to import their lychee products to locations that are already selling the product in Canada.

Lychee in syrup, lychee drinks, lychee jelly
Wal-Mart Canada Corp.
1940 Argentia Road
Mississauga, ON L5N 1P9

Lychees (raw)
Metro Inc.
Head office
11 011, boul. Maurice- Dulessis
Montral (Quebec)
H1C 1V6
(514)643 1000
1 (800) 361 4681

Lychees (raw)

T & T (Head Office)
(Western Canada)
21500 Gordon Way
Richmond, B.C.
Canada V6W 1J8

Figure 1: Manures and Fertilizers quantities that should be applied into pits measuring 1m x1m x1m (Singh, 2002).

FYM	= At least 2.5 kg per pit
DAP Granule	= 100 g per pit
Muriate of Potash	= 100 g per pit
Urea	= 25 g per pit
Bone meal	= 100 g per pit
Lime	= 50 g per pit
Micronutrients	= 25 g per pit

Figure 2: Lychee fruit (*Litchi chinensis*), Fresh, Nutritive value per 100 g. (Source: USDA National Nutrient data base- Show Foods)

Principle	Nutrient Value	Percentage of RDA
Energy	66 kcal	3.3%
Carbohydrates	16.53 g	12.7%
Protein	0.83 g	1.5%
Total Fat	0.44 g	2%
Cholesterol	0 mg	0%
Dietary Fiber	1.3 g	3.5%
Vitamins		
Folates	14 µg	3.5%
Niacin	0.603 mg	3.5%
Choline	7.1 mg	1%
Pyridoxine	0.100 mg	9%
Riboflavin	0.065 mg	5%
Thiamin	0.011 mg	1%
Vitamin A	0 mg	0%
Vitamin C	71.5 mg	119%
Vitamin E	0.07 mg	0.5%
Vitamin K	0.4 µg	0.3%
Electrolytes		
Sodium	1 mg	0%
Potassium	171 mg	3.5%
Minerals		
Calcium	5 mg	0.5%
Copper	0.148 mg	16%
Iron	0.31 mg	4%

Magnesium	10 mg	2.5%
Manganese	0.055 mg	2.5%
Phosphorus	31 mg	4.5%
Selenium	0.6 µg	1%
Zinc	0.07 mg	0.5%
Phyto-nutrients		
Carotene-β	0 µg	--
Crypto-xanthin-β	0 µg	--
Lutein-zeaxanthin	0 µg	--

Figure 3: Manure and fertilizer application in winter months to increase yields (Singh, 2002).

FYM or Compost = 30 kg per plant
 DAP = 100 g per plant
 Muriate of Potash = 100 g per plant
 Urea = 100 g per plant

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